LICENSING REGULATORY COMMITTEE

13th October, 2016

PART 1 APPENDICES

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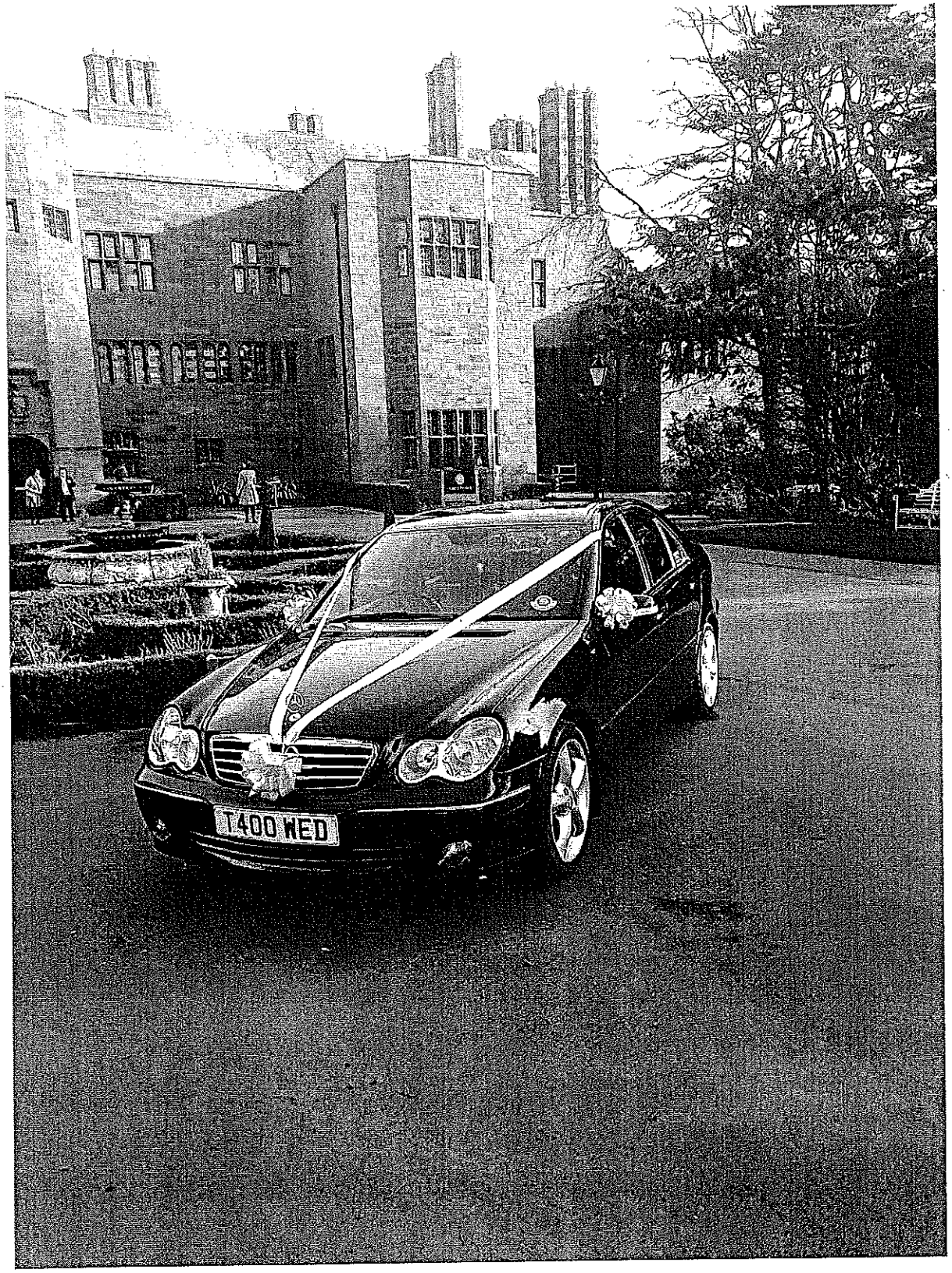
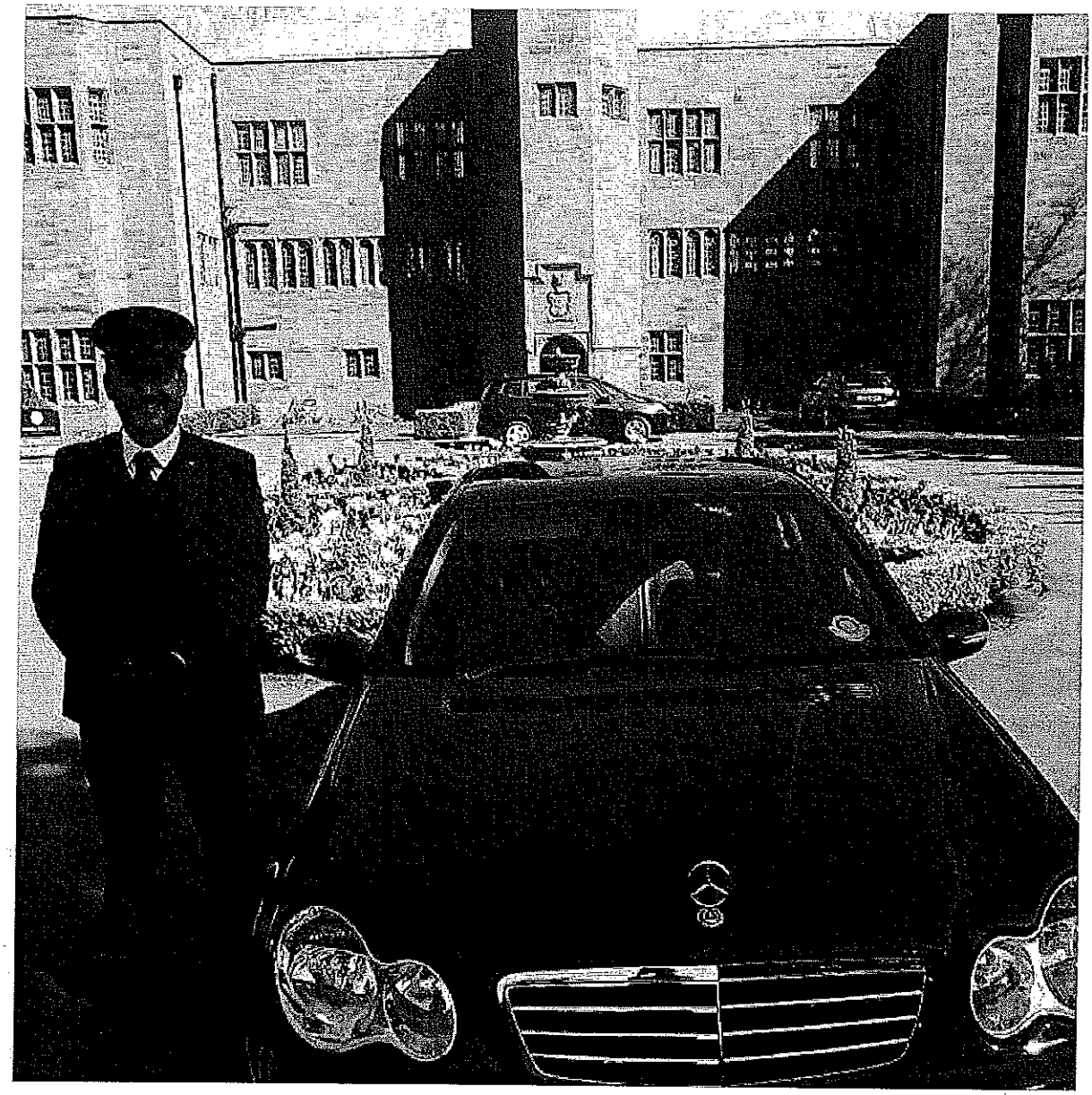
APPENDIX NO. 1





APPENDIX NO. 2

Section 75(3) Local Government (Miscellaneous Provisions) Act 1976

EXECUTIVE HIRE EXEMPTION GUIDELINES FOR PRIVATE HIRE VEHICLES

The Local Government (Miscellaneous Provisions) Act 1976 requires that a District Council must issue a private hire vehicle with an identity plate or disc and that the proprietor should not use, or permit the use of, that vehicle without displaying the plate as directed by the Council. The Act also gives a district Council the discretion to grant a proprietor an exemption from displaying the licence plates on their licensed private hire vehicle. Each application for an exemption will be considered on its own merits. The overriding consideration will be public safety.

Exemptions will not be granted as a matter of course. A clear case for the exemption will have to be made by the proprietor. In determining an application it will normally be the status of the passenger and the executive nature of the work that will indicate whether or not the exemption should be granted. The high quality of the vehicle being used will be supportive of an application, but will not be the sole determining factor.

THE TYPE OF WORK, WHICH MAY BE DEMMED EXECUTIVE HIRE

Examples of the type of work, which is considered to be Executive Vehicle Hire, are as follows:

- Corporate bookings to transport employees and clients on business related journeys.
- Other journeys where the client specifically requires a vehicle without any private hire plates or signage on it at the time of booking.
- Transporting a wedding party or funeral.

TYPES OF VEHICLE, WHICH MAY GRANTED EXEMPTION

Executive travel is considered to be a speciality private hire service in a luxury vehicle rather than a standard vehicle. Examples of luxury vehicle types include for example Mercedes, BMW, Audi, Jaguar and Lexus models.

The Council does not wish to provide a prescriptive list of acceptable vehicles because this may be subjective and also require frequent updates. Conversely, it does not wish to restrict the types of vehicles, which may be top of the range and therefore deemed to hold luxury status.

These guidelines set out a range of general criteria that leave it open to the private hire vehicle trade to put forward vehicles of its own choice, which can be shown to meet the criteria. This will enable flexibility if the circumstances merit it.

- Each seat is of adequate dimension and permits direct access into and out of the side doors of the vehicle without the need to move, remove or fold down any seat.

Vehicle types that are capable of seating more than four passengers will be considered for the exemption but will only be licensed for, in the opinion of the authority, the number of passengers who can travel comfortably. This consideration relates to the level of comfort that the average person may believe an executive hire car should afford.

- Evidence to show that the vehicle is a luxury or top of the range as represented by the vehicle manufacture.
- Relevant considerations as to whether a vehicle is an executive hire car include but are not limited to cost, reputation, specification, appearance, perception and superior comfort levels.
- The vehicle has a minimum specification of air conditioning/climate control, all electric windows, central locking and suitable front and rear headrests for each passenger.

PRIVATE HIRE (EXECUTIVE HIRE) VEHCILE – ADDITIONAL CONDITIONS

1. The decision to grant/refuse an exemption for the display of the current private hire licence plates will be that of the Environmental Health Manager.
2. To qualify as exempt, the vehicle must be of a higher specification than standard model vehicles.
3. Any bookings for the undertaking of a journey in an exempt vehicle must be made by way of a written contract. Such contracts must be in place for no less than 24hrs prior to the commencement of the journey. Written contracts shall be made available for inspection by an authorised Officer or Constable at any reasonable time and be retained for a period of not less than 12 months.
4. Exempt vehicles that conduct private hire work without a written contract in place as per condition 3 will have their exempt vehicle status withdrawn. They will then be required to display Barrow Borough Councils standard private hire plates on the front and rear of the vehicle.
5. Exempt vehicles shall not display any external markings eg. Operator details or advertisements.
6. Exempt vehicles can only be driven by a licensed private hire driver who is licensed by the same authority from which the exempt vehicle licence was issued.
7. At all times when the vehicle is being used on work covered by the exemption from the display of the private hire plate, the letter of authority must be carried on the vehicle and produced for inspection if requested. When not engaged on work covered by the exemption, the vehicle must display the licence plate in accordance with licensing conditions.
8. Any breach of the exempt vehicle conditions could result in the vehicle having its exempt vehicle status withdrawn; from which point, assuming it continues to be

used as a private hire vehicle, the vehicle will be required to display the current standard private hire licence plates.

9. All other private hire conditions will apply to both the vehicle and the driver whilst he/she is undertaking executive hire.
10. Appeal to Licensing Regulatory Committee regarding the type of vehicle and contracts of use if refused or deemed inappropriate by the Environmental Health Manager.

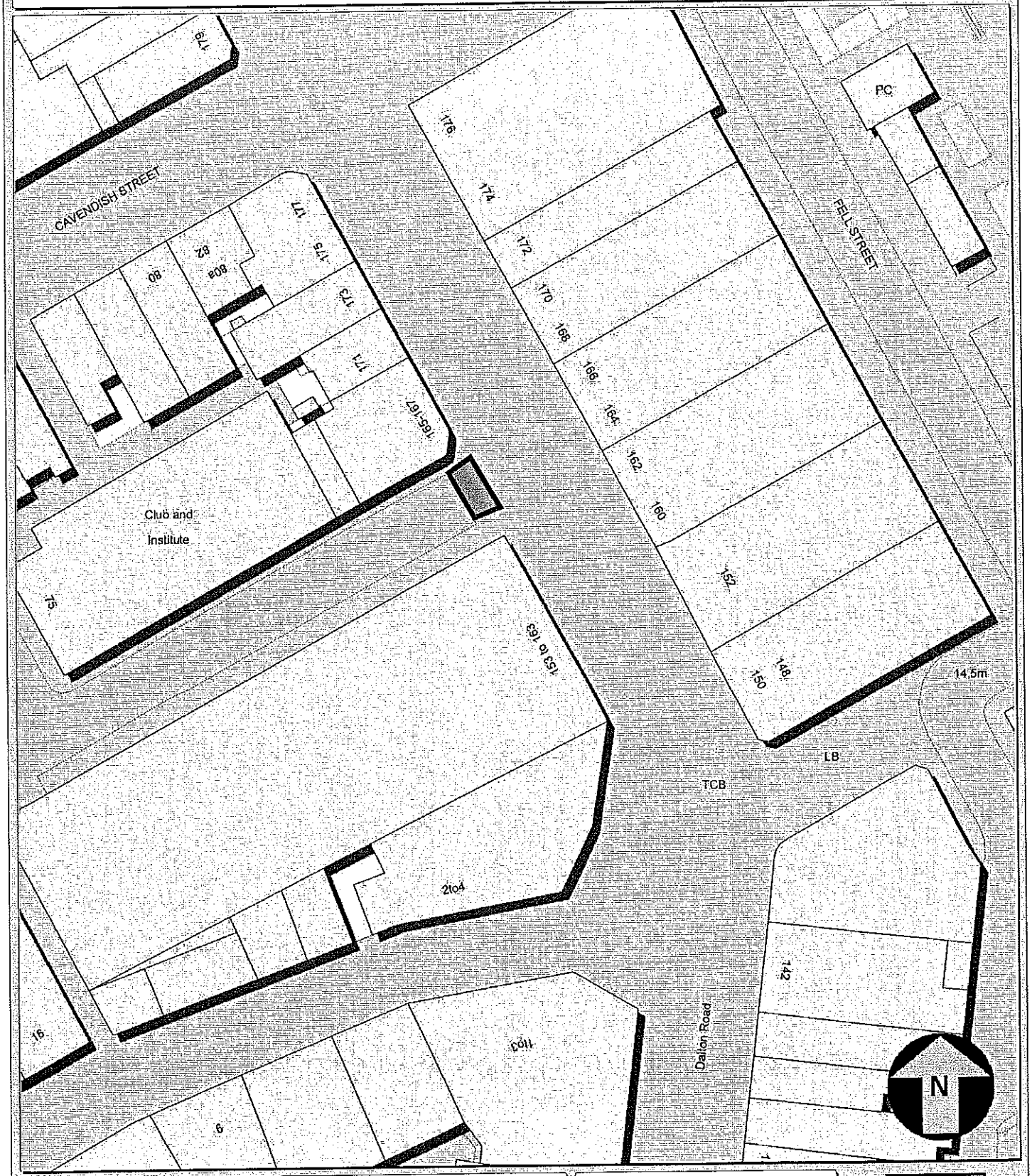
PRIVATE HIRE (EXECUTIVE HIRE) DRIVERS – ADDITIONAL CONDITIONS

1. Drivers shall wear smart clothing and are required to wear a suit with jacket or equivalent. Male drivers shall wear a tie. This dress code must be followed at all times the vehicle is being used to undertake a booking. Jackets may be removed for the comfort of the driver or where weather conditions require it.
2. The driver shall at all times when hired have his/her badge available to identify him/herself to the hirer.

APPENDIX No. 3

Street Trading Application (Taylor)

Location of Kiosk



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APPENDIX No. 4

Report on Special Inspection at South Lakes Safari Zoo (15th August 2016).

This special inspection was undertaken to assess the zoo's compliance with conditions 26, and 38. It was also to assess the two Direction orders, 17 and 18 covering veterinary programs and treatment, which had been assessed, in May 2016, as being complied with.

The inspection team was made up of Graham Barker (LA), Richard Garnett (LA) and Matthew Brash (LA veterinary advisor)

Present from the zoo during the inspection was Karen Brewer, Kim, and Jon Cracknel (Zoo vet consultant).

1. Condition 26

Formal staff development programme

In compliance with 10.4, 10.5 and Appendix 9 of the SSSMZP a formal staff development programme which defines the qualifications, experience and training required to progress from apprentice keeper, to qualified keeper to senior keeper to animal manager must be provided. In order to implement the programme must utilize a combination of in-house and external training and development opportunities relating to safe working practices, animal management and welfare and other related needs defined by the operator. An annual development record for each member of animal department staff to show progress in relation to training given must be provided on request by inspectors.

[Timescale by 13th August 2016]

Background

At previous inspections the inspectors had had concern regarding the level of ongoing training for all members of staff, to ensure that the staff were receiving up to date information and developing modern zoo practices.

Findings

1. There is a record of training for all members of staff. Two examples were provided, one of which was randomly picked by one of the inspectors. These are accurate and up to date. It is noted that two members of staff have now been signed up to the Diploma of Zoo Management.

2. There is a log of all ongoing training being undertaken by staff at the zoo.

3. Andreas Kaufman has been hired as consultant to oversee a training staff program. He has recently started, (August 2016) and the zoo informed the inspection team that he has agreed to undertake ten more weeks of training during the rest of 2016.

4. Jon Cracknel, a veterinary consultant has also been hired to assist the zoo in developing policies and to move forwards towards meeting the SSSMZP

Conclusion

This condition has been complied with.

2. Condition 38

Review of Animal Bites
In accordance with Appendix 6 paragraph 6.14 of the SSSMZP, a suitable and effective action plan to eliminate bites and injuries must be put in place, and a copy of this plan forwarded to the Licensing Authority. The action plan must then be implemented fully and its effectiveness monitored.

In accordance with 8.14 of the SSSMZP, all contact injuries to visitors from animals must be reported to the Local Authority within 14 days.

Background

A review of bites injuries was produced for the Inspectors, dated 30 April 2016, and read as part of their special inspection in May 2016. However this purely covered the bites that had been noted by the inspectors at their inspection in November 2015. The report also stated that there had been no further bites reported. The inspectors did not feel the review suitably addressed the issues.

During the special inspection in May 2016 the inspectors further noted interference from primates with visitors during their visit, (a Tamarin trying to remove popcorn from a child in a pram, and a ring tailed lemur trying to steal food from a family eating at an outdoor table).

The inspectors did not have confidence in the submitted report, and rejected it. The inspectors felt that it was likely that bites and other injuries caused by animals are still likely to be occurring but were not being reported and/or recorded.

The condition was therefore amended to the current condition.

The inspection

During the inspection, the zoo informed the inspectors that since the special inspection in May

1. The zoo have recorded three episodes of members of the public being injured by animals, all within the Illescas walk through aviary.

2. The zoo now permanently man the Illescas aviary with a member of staff, and have put in place a system that when the aviary is full of visitors, that a second person can be called upon the assist. The WWS is also permanently manned, albeit with only one person. The zoo are considering permanently manning the penguin area.

3. The zoo has placed more signage and created verbal recorded warnings about the need to avoid contact with animals, and the risks of bites.

4. A new picnic area has been created for people to eat food they have brought with them. This is adjacent to the zoo entrance. Although Primates and other animals do not come down into this area, there is no fencing to stop them doing so, should their behaviour change. A number of chickens were noted around the picnic tables, and members of the public were observed feeding them

5. A new outdoor eating zone has been created, the BOMA area. This is immediately adjacent to the restaurant in the middle of the zoo. It is 'Lemur proof', with a tall fence topped with electric wires. This provides a safe area for people to eat food that they have bought from the restaurant.

6. Consultants have been taken on, Andreas Kaufman and Jon Cracknel, to assist in compliance with this and other conditions. However they have only recently started and so this has yet to be undertaken, and a new review and report has not yet been compiled.

7. Risk assessments for staff have been reviewed, and all have been signed off by the staff.

8. The zoo are interviewing for new staff, to assist with the manning of the walk through areas

Findings

1. The zoo informed the inspectors that they estimate that there are potentially over one hundred free ranging primates. However primates tend to be territorial, and approximately seventy of these tend to stay within the World Wildlife Safari Walkthrough area (WWS).

2. The primates, potentially free ranging include Ring tailed lemurs, Black and white lemurs, belted lemurs, and Brown lemurs. Tamarins (4), Squirrel Monkeys (approximately 17).

3. The Bulk of these primates do reside within the WWS, however they can, and do, escape from this area mainly via the roof of the veterinary building, and passed the large pond.

4. Although there has been a considerable attempts to decrease the availability of human food in areas where there are primates, there are still food outlets outside of the contained eating areas; notably two pop-corn outlets, and three ice-cream outlets. These continue to

sell food, and people eating were observed by the inspector at a large number of places throughout the zoo.

Conclusion

This condition has still not been complied with, and it is therefore necessary to reissue it, albeit with more precise wording so that the zoo is clear on what is required. A more precise timeline must be added to the condition.

Whilst the zoo continues to have food outlets in areas where free ranging primates have access, then there is a high likelihood that bites or other injuries to the public will occur.

The inspector also noted, but did not observe, that the lemur feeding experience has not been altered, and feels that this is also an area where there is insufficient control over primate/ visitor contact.

Recommendation

The wording should be varied from the condition, to make the requirements more precise.

In accordance with paragraph 6.14 of Appendix 6 of the SSSMZP a full written review of the risk of bites or injury to members of the public caused by animals must be carried out. This document must include a detailed account of all the recorded or reported historical occurrences since January 2015; the areas within the zoo where bites or injuries tend to occur; progress the zoo has made to date to minimise the risk of bites or injuries by animals to the public and any other information the zoo feels necessary to add into the report to ensure that it is as accurate and complete as possible. This written review must be completed and submitted to the LA within two weeks of the implementation of this condition.

Secondly, a costed and timed, written action plan, detailing all further changes that will be put in place to eliminate the risks of bites or injuries by animals to members of the public, must be written and a copy of this plan submitted to the LA. The plan must ensure that there are no food outlets, and no public eating anywhere within the park where animals have access. The plan must also demonstrate how contact between visitors and animals is to be controlled during feeding encounters and specific written risk assessments must be formulated for each kind of encounter taking account of species, site, numbers of animals, numbers of visitors, etc. The timing for completion of the formulation of this action plan and its submission to the LA should be no more than two further weeks after the initial review has been completed and sent to the LA.

A start to implementation of this action plan must be made immediately following its approval by the LA and demonstrably active progress should be visible by 1st November 2016.

Full completion of implementation of the action plan must be achieved within six months.

3. Conditions 17 and 18

17 Review of Veterinary Programme

A review of the Veterinary programme must be undertaken in conjunction with the consulting veterinarian and a resulting written programme of care (to include parasite control, vaccination, p.m. routine etc.) be agreed, recorded and maintained accordingly.

Elevated to Direction Order 4th March 2016

Compliance Date 22nd May 2016

18 Delivery of Veterinary Services

The delivery of veterinary services to and in the zoo, is still unclear and in some areas appears uncoordinated.

The operator must, in conjunction with the Zoo's veterinary advisor and/or other such professional advice as deemed necessary, develop to the modern standards of good zoo practice and implement, an improved and clearly defined programme, for the delivery of veterinary services to the collection. (This must include the additional and extended collection). This programme must detail: the frequency of routine visits, duties expected of the Vet, routine prophylaxis (vaccination etc.), agreed surveillance policy – to include screening, post mortem protocols, transmission & recording of p.m. records & pathological results. All relevant information must be integrated into the animal records system, such that, information on any individual animal is quickly and easily retrieved. Agreed protocols for relevant veterinary cover when the principal vet is unavailable, must be clear. A written copy of the final procedures must be lodged with the licensing authority within 3 months & clear evidence of implementation provided within 6 months.

Elevated to Direction Order 4th March 2016

Compliance Date 22nd May 2016

Background

Compliance for these two direction orders were looked at during the special inspection in May 2016. However they were not considered by the Licensing committee in July 2016, as at the time they were subject to an appeal by DG. As such they have continued to stand.

During the special inspection of August 2016, it was deemed sensible to revisit this area, to ensure that compliance was still occurring.

Findings

Whilst compliance is evident, and the direction orders can be discharged, the inspector was disappointed to note;

1. The records of the veterinary visits are still poor.
2. Out of date drugs were still present in the veterinary treatment room
3. Frieda Schreiber is leaving the zoo, and at some point in the near future will need to be replaced. The zoo informed the inspectors that they are interviewing a veterinary nurse to take her place, and this person would take over the role of liaising with vets, and filling in the records.

Recommendation.

The zoo has complied with the direction orders, however the standard of record keeping is still poor, and there are concerns about how the gap left by FS departure will be filled. This area will need to be closely scrutinised to ensure that the SSSMZP are still being met, in the near future.

Further observations made during the inspection.

1. The exposed roots for trees adjacent to he restaurant are still of concern, and this is to be the subject of an H and S notice, and dealt with by the LA.

2. At the top end of the bear enclosure the standoff barrier just ends, allowing the public to gain access to the electric fence. This will need to be addressed.

3. Although a review of diets has been undertaken, the written diets are not being followed. It was noted by the inspector that a tray of Grapes and Bananas was being taken out to feed to the lemurs. And a tray of white bread and peanuts was being taken to feed another animal (unspecified.)

4. During further monthly routine visits by the LA, the inspector should pay particular attention to;

1. The food stores, and the levels of food supplies within the food storage area.
2. Waste removal. Check to see if there are levels of waste building up that might indicate that food is not being removed.
3. Check staffing numbers. Zoo keepers at present include; Kim, Kathy, Christina, Charlotte, Jaz, Mark. (All senior Keepers) Kandia, Laura, Harriet, Alex, Simon, Tony, Sarah, Eddy, Zoe, David Armitage. The numbers should be going up.
4. Shop stock levels.
5. Animal movements (if possible.)

SPECIAL INSPECTION SOUTH LAKES SAFARI ZOO RESPONSE

AIM

This document responds and addresses the findings of the Special Zoo Licence Inspection of the 15th August, 2016 undertaken by Mr Matthew Brash, Mr Graham Barker and Mr Richard Garnett which were outlined in the 'Report on Special Inspection at South Lakes Safari Zoo (15th August 2016)" document received on the 26th August, 2016.

REASON FOR, AND FINDINGS OF, SPECIAL INSPECTION

The Special Zoo Licence Inspection was required to formally assess that the following Direction Orders had been met within the stated timeframes from the previous inspections:

Condition 17: Review of Veterinary Programme

Condition 18: Delivery of Veterinary Services

Condition 26: Formal staff development programme

Condition 38: Review of animal bites

In addition further observations made and commented on during the inspection:

Observation 1: The exposed roots for trees adjacent to the restaurant are still of concern, and this is to be the subject of a HS notice, dealt with by the LA (note – this HS enforcement notice has been issued)

Observation 2: At the top end of the bear enclosure the stand-off barrier just ends, allowing the public to gain access to the electric fence – this will need to be addressed.

Observation 3: Although a review of diets has been undertaken, the written diets are not being followed.

Observation 4: During further monthly routine visits by the LA, the inspector should pay particular attention to:

1. Food stores and the levels of food suppliers within the food storage area
2. Waste removal – check to see if there are levels of waste building up that might indicate that food is not being removed
3. Check staffing numbers
4. Shop stock levels
5. Animal movements (if possible)

Observation 5: Flamingo indoor house substrate and foot health review.

FORMAL RESPONSE BY SAFARI ZOO - CONDITIONS

Condition 17: Review of Veterinary Programme

The inspection findings noted that the Direction Order had been complied with and can be discharged, however it was noted that several areas were of concern, namely:

1. The records of the veterinary visits are still poor

Response – this was agreed with by the zoo and immediately following the inspection a review and implementation of the animal and veterinary records keeping system was undertaken. This included the health care records, an example of which is included to demonstrate the use of a new veterinary diary and record, the improved role of the veterinary coordinator and the use of both ZIMS and now ZIMS medical. It is noted that this is a huge cultural shift for both the veterinary team and the animal keeping staff and is a progressive, ongoing effort to ensure accurate and reflective animal records are maintained on site.

This evolution of the existing system was demonstrated to the local authority representatives Graham Barker and Simon O'Hara on their visit of the 21st September using the example that they had to come to review (a complaint with regards to a vicuna made by a member of the public, an animal that was under veterinary care and no concerns of the management of the animal noted on the site visit). In this example the vet diary logs were clear, detailed and correlated with the information submitted and inputted on ZIMS. Other examples were shown to demonstrate the improvements made in this area in the short time since the special inspection.

The huge improvement noted is primarily down to the hard work of the veterinary coordinator [redacted] a registered veterinary nurse that has been in post for the last two weeks at the time of writing. As part of her role she is tasked with ensuring

appropriate documentation of health assessments that are undertaken and that this data is transferred on to the electronic record.

In addition, launched this week was the Animal Record Keeping Policy which outlines the expectation for animal records, medical records, escapes and drug therapy monitoring. Again this will take time to become fully operational but we would expect a clear demonstration that this system is being implemented across the zoo by the time of the next formal inspection.

See Appendix 1 – example animal record
See Appendix 2 – Animal Record Keeping Policy

2. Out of date drugs were still present in the veterinary treatment room

Response – expired drugs and drugs that have passed their broach by date have been disposed of. A complete review of clinical waste management is being undertaken including the use of DOOP bins on site for pharmaceutical management, the appropriate use and disposal of syringes and needles with cessation of the recycling and re-sterilisation of disposable needles and syringes, and the introduction of appropriate drug storage including temperature monitoring.

This has been tasked to the newly appointed Veterinary Coordinator and this has been complied with already with the addition of the use of a data logger in the veterinary drug cupboard to ensure appropriate temperature management is maintained for the in date drugs as per best practice for veterinary pharmaceutical management.

3. Frieda Schreiber is leaving the zoo (as veterinary coordinator), and at some point in the near future will need to be replaced. The zoo informed the inspectors that they are interviewing a veterinary nurse to take her place, and this person would take over the role of liaising with vets and filling in the records.

Response - [redacted] Registered Veterinary Nurse, joined the team at Safari Zoo on the 5th September. Her role is to act as veterinary Coordinator, overseeing the preventative and curative health care at Safari Zoo, liaising with the veterinary team and ensuring records are maintained. In addition, [redacted] role is to ensure the veterinary facilities meet best practice for a modern zoological collection as well as providing multiple other roles and responsibilities within the health care programme. This is to be a permanent role with [redacted] on board until the zoo licence is formally reinstated and the role will then become a permanent position, either for [redacted] or another similarly qualified individual.

The delivery of the preventative health care programme, its components and the responsible parties are outlined in the Appendices.

Condition 18: Delivery of Veterinary Services

See previous response above.

Condition 26: Formal staff development programme

A foundation level staff training programme was in place and reviewed during the Special Inspection. This was inspected as part of the inspection and was found to be satisfactory and compliant with the basic requirements of the SSSMZP and therefore satisfying the Direction Order.

However, since the inspection this programme has been built upon and steps taken to provide a formal system of training and internal workshops to ensure that a broad variety of training topics are introduced and implemented across the animal department. Elements of this will be introduced across the wider zoo team to ensure that all staff are aware of important animal and staff safety requirements that impact their responsibilities of the operation.

This programme has already been started with the initial training focusing on nutrition, food delivery and presentation. Other topics are to be introduced in October and ongoing into 2017.

See Appendix 3 – formal staff training programme – draft version

Condition 38: Review of animal bites

The inspectors found that this Direction had not been complied with and that previous reports had been rejected on the grounds of the lack of suitability and the lack of the assessments being representative of what was noted during this and previous inspections. As such the following recommendation, which Safari Zoo agrees to comply with, was:

> *"In accordance with paragraph 6.14 of Appendix 6 of the SSSMZP a full written review of the risk of bites or injury to members of the public caused by animals must be carried out. This document must include a detailed account of all the recorded or reported historical occurrences since January 2015; the areas within the zoo where bites or injuries tend to occur: progress the zoo has made to date to minimise the risk of bites or injuries by animals to the public and any other information the zoo feels necessary to add into the report to ensure that it is as accurate and complete as possible. This written review must be completed and submitted to the local authority within two weeks of the implementation of this condition".*
>
> *"Secondly, a costed and timed, written action plan, detailing all further changes that will be put in place to eliminate the risks of bites or injuries by animals to members of the public, must be written and a copy of this plan*

submitted to the Local Authority. The plan must ensure that there are no food outlets, and no public eating anywhere within the park where animals have access. The plan must also demonstrate how contact between visitors and animals is to be controlled during feeding encounters and specific written risk assessments must be formulated for each kind of encounter taking account of species, site, number of animals, number of visitors, etc. The timing for completion of the formulation of this action plan and its submission to the LA should be no more than two further weeks after the initial review has been completed and sent to the Local Authority. A start to implementation of this action plan must be made immediately following its approval by the Local Authority and demonstrably active progress should be visible by 1st November 2016".

"Full completion of implementation of the action plan must be achieved within six months'.

Safari Zoo has undertaken this report which consists of the following, in accordance with the recommendation:

1. A full written review of the risk of bites or injury to members of the public caused by animals, to include:

    a. Detailed account of all of the recorded or reported historical occurrences since January 2015
    b. The areas in the zoo where bites or animal related injuries tend to occur
    c. Progress the zoo has made to date to minimise the risk of bites or injuries by animals to the public
    d. Any other information the zoo feels necessary to add into the report to ensure that it is accurate and complete as possible.

2. A costed and timed written action plan, detailing all further changes that will be put in place to eliminate the risks of bites or injuries by animals to members of the public, to include:

    a. Plan that no food outlets and no public eating anywhere within the park where animals have access
    b. Demonstration how contact between visitors and animals is to be controlled during feeding encounters, including specific written risk assessments for each kind of encounter (including details of species, location, number of animals, number of visitors, etc)

Response – in response to the above recommendations to the local authority we have undertaken a complete review of the bite situation and expanded it to include all animal-guest interaction injuries as well as review the potential risk of zoonotic disease presence within the collection. There are limitations in the analysis of the documents and to improve the accuracy of the overall picture this was expanded to include

Accident Records, TripAdvisor reports of bites or similar, staff interviews, clinicopathological testing reviews as well as post mortem data. A complete 43 page review is included in the attached documentation.

Please note – due to the sensitivity of the post mortem and clinicopathological data only summaries of the data analysis have been provided as evidence. The complete database has been provided direct to the inspector Mr Matt Brash to prevent the release of the information contained under FOI. The full database is available on site at the zoo for inspection if required by members of the local authority at any time.

See Appendix 4 – Animal – Guest Interaction Audit

FORMAL RESPONSE BY SAFARI ZOO – OBSERVATIONS

Whilst the observation did not form part of the Special Inspection, this being elements that must be reported to the collection prior to the Special Inspection, it was noted that there were areas of concern within the operation of the zoo that had the potential to lead to visitor or animal welfare or safety concerns. As such, rather than wait to action these based on conditions or the licencing process, steps were taken immediately to attempt to address these areas of concern. The following outlines the steps taken in response to the points noted during the inspection but also in the report of the Special Inspection.

Observation 1: The exposed roots for trees adjacent to the restaurant are still of concern, and this is to be the subject of a HS notice, dealt with by the LA (note – this HS enforcement notice has been issued)

Response: This action has been undertaken as per the health and safety enforcement notice. The tree surgeons report can be found in Appendix 6 with the appropriate works having been carried out. This can be clearly seen in the images below. The area of operation and tree works were demonstrated to the local authority representatives Graham Barker and Simon O'Hara on their visit of the 21st September.

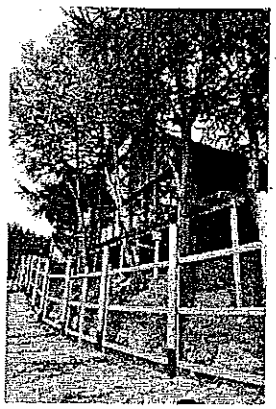


FIGURE 01: On the special inspection of the 15th August concerns were noted with regards to the root exposure of trees adjacent to the Boma area at the Maki Restaurant. The entrance walk way (left)) and the trees beneath the viewing platform (right)

FIGURE 02: The tree surgeons visited on the 30th August, 2016 to assess the trees, the subsequent report received on the 5th September and the works booked in and completed by the 21st September: (left) works being carried out the week of 19th September, the area closed to the public, the entrance trees stripped with the trunk braced and (right) the trees removed in front of the restaurant.

See Appendix 7 – tree surgeons report

Observation 2: At the top end of the bear enclosure the stand-off barrier just ends, allowing the public to gain access to the electric fence – this will need to be addressed.

Response – the fence line was noted and highlighted by the zoo's consultant during the special inspection as an area that was of concern and was planned to be addressed. It had been installed approximately 18 months ago and no modifications or removal of sections had occurred in this period. Options were reviewed with regard to the design and scope taking into consideration the safety requirements of a stand-off barrier but also the grazing needs and access for off show areas for some of the free ranging animals in this area. Considering both of these the fence was installed and works completed the week starting the 19th September, 2016.

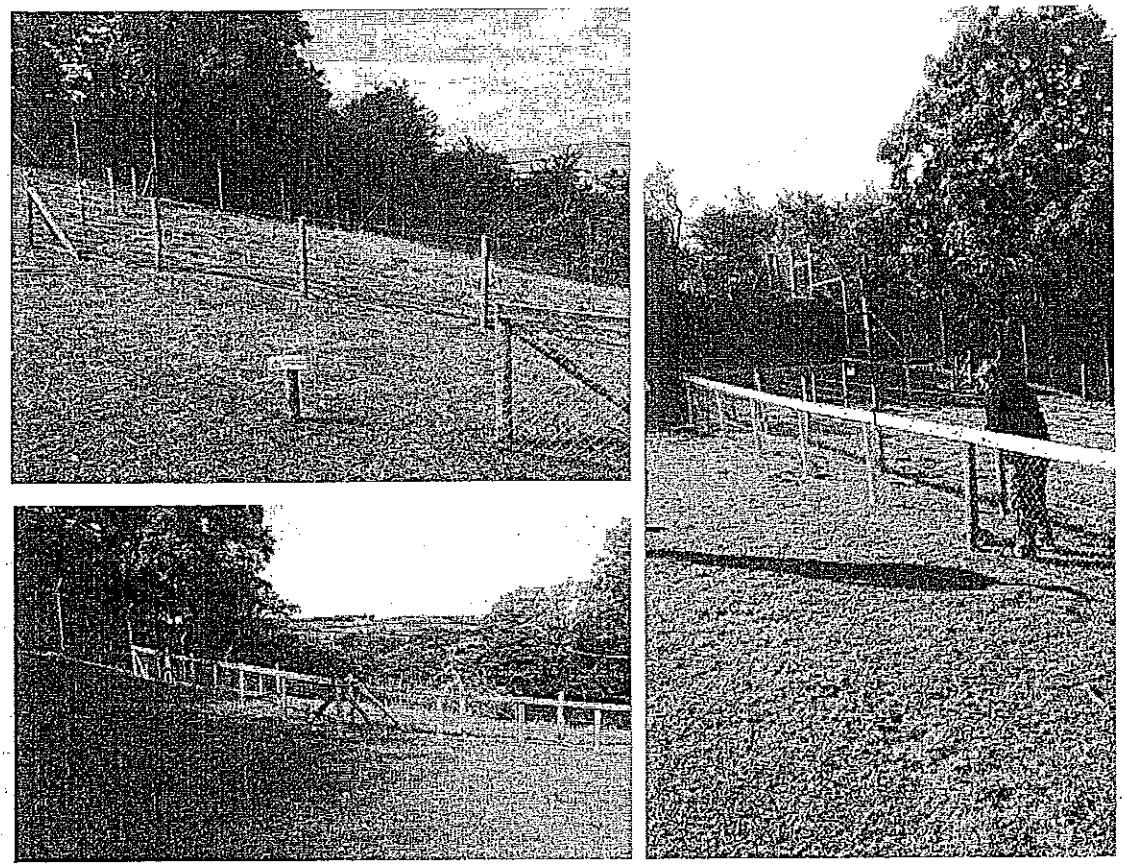


FIGURE 03: The Andean bear outdoor enclosure was noted to have a short stand-off barrier during the special inspection (top left), whilst not part of the special inspection nor a condition steps were taken to rectify this and the stand-off has been moved and extended to contain the perimeter of the enclosure in the event that a member of the public were to stray from the path (right and bottom left).

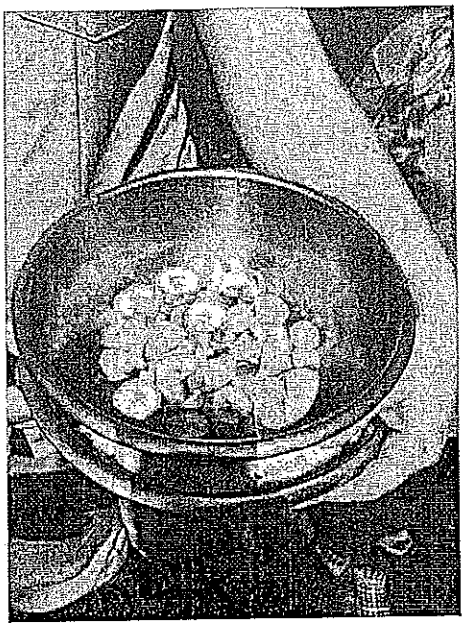
Observation 3: Although a review of diets has been undertaken, the written diets are not being followed.

A nutritional review and review of the diets was undertaken in September as part of the training programme organised by Andreas Kaufman. The first part of this was ensuring access to appropriate food items as well as maintaining adequate stock levels so diets could be met. This was achieved through the supplementation of donated food times with the huge investment in purchased food. This continues to be an ongoing process as represents a massive, but positive, cultural shift and investment in animal welfare for Safari Zoo.

This was demonstrated to the local authority representatives Graham Barker and Simon O'Hara on their visit of the 21st September with a tour of the kitchen and cold store food areas. This is still an area under review and work continues which can be assessed at the next formal inspection.

BEFORE

AFTER



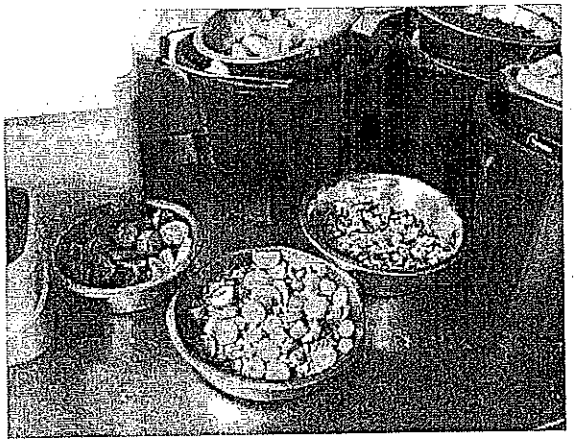


FIGURE 04: BEFORE: (top left) on the day of inspection diets being fed were noted to not be consistent with diet sheets, (bottom left) this was primarily diet to variation in the donated food dictating to some degree diets fed out. AFTER (current): (top right) diets fed are now in line with diet sheets and demonstrate variety and suitable food presentation, with Safari Zoo purchasing quality food rather than solely relying on donated food to ensure dietary compliance (Bottom right).

Observation 4: During further monthly routine visits by the LA, the inspector should pay particular attention to (see list in report or above)

Response – this is an ongoing check list for the local authority rather than an action list. We are happy to support this list and any other areas that the local authority may wish to review during this time. Some of these areas were reviewed with the local authority representatives Graham Barker and Simon O'Hara on their visit of the 21st September.

Observation 5: Flamingo indoor house substrate and foot health review.

Response – during the special inspection a discussion was undertaken about the flamingo foot health and the substrate. In response to this a complete foot care review was undertaken of the flamingos and the foot scores compared against published criteria. As a result, an action plan has been suggested based on the review and this will be discussed in detail at the next Ethics Committee meeting. In summary the foot health was comparable to other collections in EAZA and areas were highlighted where improvements could be made, however the literature is conflicting as to what actually is the best substrate and an evidence-based review is recommended, hence the need for an ethical review.

See Appendix 6 – Chilean Flamingo Foot Health Review

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-bellied ruffed lemur	Male	Mar 01, 2000

Sep 20, 2016

Clinical Note

Date	Time	Note Author
Sep 20, 2016	09:35	Jon Cracknell
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

GA: Isoflurane induction chamber, facemask the intubated, modified ayres T piece.
Ex: Left eye not as bad as suspected but pathology still severe - desmetocoel similar size, chemosis for approximately 3mm, neovascularisation from lateral canthus to desmetocoel, middle of desmetocoele bulging and possible rupture. Eye appears a little sunken. Bloods taken for biochemistry and haematology.
Plan: Reviewed with ophthalmologist and discussed options - eye potentially salvagable with conjunctival flap but prognosis guarded. Discussed with management and opted for enucleation. Plan to do tomorrow.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Sample

Sample Detail

Collection Date/Time	Sep 20, 2016 10:00
Sample Type	Whole Blood
Anatomical Source/Tissue	Femoral vein (not specified)
Additives/Preservatives	Heparin, Lithium
Collection Method	Phlebotomy
Collected By	Jon Cracknell
Reason	~
Exclude from reference intervals	No

Sample Quality

Additional Characteristics	~
Degraded	No

Pre-Sampling Conditions

Fasting Duration	2-8 hours
Restraint Type	Chemical
Activity	Moderate activity

Initial Holding Conditions

Initial Holding Temp.	~
Initial Holding Duration	~

Sample History

Date	Sample ID / Sample GSN	Status	Laboratory / Test Order / Test Results
Sep 20, 2016	~/S-SQB16-000004	Available	~/~/~

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-bellied ruffed lemur	Male	Mar 01, 2000

Notes

********** Pathology Report **********
Pinmoore Animal Laboratory Services Limited

J. Cracknell Conservation Med Services
Southview
Park street
Heytesbury
Warminster
Wiltshire. BA12 0HQ.
Lab Number 78535

Owner name: SAFARI ZOO
Animal name: Vvs001 Anaka
Species: Black/white ruffed lemur
Breed:
Age: 16 Years
Sex: Male
Sample date: 21/09/2016
Received date: 21/09/2016

BIOCHEMISTRY

Albumin	46	g/L	(34 - 79)
Total Protein	68	g/L	(49 - 105)
ALT	48	IU/L	(0 - 430)
Alkaline Phosphatase	267	IU/L	(0 - 1494)
AST	33	IU/L	(0 - 193)
Urea	2.7	mmol/L	(0 - 22.4)
Creatinine	46	umol/L	(0 - 1061)
Calcium	2.16	mmol/L	(0 - 3.38)
Glucose	Fluoride oxalate NOT received		

HAEMATOLOGY

White Cell Count	11.3		10^9/l	(1.96 - 23.8)
Haemoglobin	16.4		g/dl	(7.0 - 21.9)
Red Cell Count	8.94		10^12/L	(5.79 - 13.5)
PCV	39.1		%	(30 - 72)
MCV	43.7		fl	(38.6 - 89.6)
MCH	18.3		pg	(13.2 - 23.9)
MCHC	41.9		g/dL	(24.1 - 47.8)
Platelets	180		10^9/L	(0 - 692)
WBC Differential				
Neutrophils	72%	8.14	10^9/l	(0.49 - 15.8)
Lymphocytes	26%	2.94	10^9/l	(0.049 - 14.20)
Monocytes	2%	0.2	10^9/l	(0 - 1.55)

Film Comment: No polychromasia within erythrocyte series. No toxic or macrophaging leucocytes seen. Platelets appear normal on film.

( )

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Samples

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

Sample Detail

Collection Date/Time	Sep 20, 2016 09:00
Sample Type	Plasma
Anatomical Source/Tissue	Femoral vein (not specified)
Additives/Preservatives	Heparin
Collection Method	Phlebotomy
Collected By	~
Reason	Routine
Exclude from reference intervals	No

Sample Quality

Color	~
Color Intensity	~
Clarity	~
Additional Characteristics	~
Degraded	No

Pre-Sampling Conditions

Fasting Duration	2-8 hours
Restraint Type	Chemical
Activity	Moderate activity

Initial Holding Conditions

Initial Holding Temp.	Ambient
Initial Holding Duration	> 10 to <= 24 hours

Sample History

Date	Sample ID / Sample GSN	Status	Laboratory / Test Order / Test Results
Sep 20, 2016	~/S-SQB16-000007	Available	~/~/~

Notes

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Anesthesia

Anesthesia Basic Info

Restraint Date	Sep 20, 2016
Reason For Restraint	Medical
Responsible Clinician	Jon Cracknell
Health Status	Abnormal
Body Condition Score	~
Fasting Duration	2-8 hours
Fluid Restriction Duration	< 2 hours
Prerestraint Activity	Moderate activity
Restraint Risk Class	Low risk
Demeanor	Alert/Relaxed

Immobilizing Situation

Physical	Social
Small enclosure	Single Species Group

Recovery & Ratings

Anesthesia Induction	Fair
Anesthesia Muscle Relaxation	Fair
Anesthesia Overall Rating	Fair
Complication	None
Recovery	Normal
Renarcotization	No

Complication Notes

~

Notes/Comments

~

Anesthesia Location

Location Type	Undetermined

Weight

Weight : 3.35 kilogram

Drug Information

Drug Given	Dose	Dosage	Time Given	Elapsed Time	Duration	Route/Method/Success	Bottle
~	~	~	~	~	~	~	~

Effects & Milestones

Observation Date	Time	Elapsed Time	Observed Depth	Observed Milestone
~	~	~	~	~

Samples

Collection Date	Sample Type	Anatomical Source	Additive Preservative	Collected By
Sep 20, 2016 10:00	Whole Blood	Femoral vein (not specified)	Heparin, Lithium	Jon Cracknell

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

Measurements

Date	Body temperature	Respiratory rate	Heart rate
Sep 20, 2016 09:56	36.2 °C	48 breaths/min.	~
Sep 20, 2016 10:00	~	40 breaths/min.	160 beats/min.

Physiological Measurement

Measurement List

	Date/Time	Measurement	Value	UOM
	Sep 20, 2016 09:56	Body temperature	36.2	degree Celsius
	Sep 20, 2016 09:56	Respiratory rate	48	breaths per minute
	Sep 20, 2016 10:00	Heart rate	160	beats per minute
	Sep 20, 2016 10:00	Respiratory rate	40	breaths per minute

Sep 19, 2016

Clinical Note

Date	Time	Note Author
Sep 19, 2016	11:00	Jon Cracknell
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

Anaka - booked in for EUGA and possible enucleation tomorrow am, or review and procedure following day as required.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Clinical Note

Date	Time	Note Author
Sep 19, 2016	10:00	[redacted]
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

desmetocoele noted 24/08/16, treated with debridement and phenol, left to rest. Examination today the eye was tightly closed with epiphora, extremely painful despite recent course of meloxicam. Plan to EUGA tomorrow and assess eye - possible enucleation or document and assess for remote assessment with CH. Prognosis guarded for eye but prognosis for lemur good if can manage pain.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Prescription/Treatment

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

Basic Info

Date Written	Sep 18, 2016
Start Date	Sep 19, 2016 00:00
Prescribed By	Rick Browne
Prescribed For	1 animal
Reason For Terminate	~
Terminate Date	~
Reason For Treatment	Treatment

Weight Info

Date	Sep 18, 2016
Measurement Value	3.08 kg
Estimate	Yes
Exclude From Reference Intervals	Yes

Treatment Detail

Treatment Item/Drug	Metacam oral (1.5 mg/ml Liquid > Suspension) (Meloxicam)			
Dose Amount	0.616 mg	Frequency	once a day (sid)	Form Of Drug Suspension
Dosage Amount	0.2 mg/kg	Duration	7doses	Concentration Of Drug: 1.5 mg/ml
Administrated Dose Quantity	0.411 ml	Delivery Route	Oral (p.o.)	
		Loading Dose	~	

Treatment Response

Clinical Response	~
Adverse Effects	~

Adverse Effects Note:

~

Staff Instructions

Give [0.41 ml] of Metacam oral, once a day (sid) for 7 doses.
Start treatment on Sep 19, 2016
Administration route: Oral (p.o.).

Prescription Notes/Comments

~

Calendar Items

Date	Title	Assigned To	Done
Sep 25, 2016	VVS001 / White-belted ruffed lemur / MIG12-29512243 Metacam oral treatment is complete	Rick Browne	No
Sep 19, 2016	Start Metacam oral 0.616 mg once a day (sid) 7 doses Oral (p.o.) / White-belted ruffed lemur / VVS001 / MIG12-29512243	Rick Browne	No

Dispensing Records

Date Dispensed	Dispensed By	Quantity Dispensed
Sep 18, 2016	[redacted]	3 ml

Administration Records

Administration Date/Time	Administered By	Success	Notes
Sep 23, 2016 00:00	[redacted]	Complete	~
Sep 22, 2016 00:00		Complete	~
Sep 21, 2016 00:00		Complete	~
Sep 20, 2016 00:00		Complete	~
Sep 19, 2016 00:00		Complete	~

Sep 18, 2016

Clinical Note

Date	Time	Note Author
Sep 18, 2016	11:45	[redacted]
Significant	Private	Active Problems

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

No No ~

Note Subtype: General

Notes/Comments

Re checked by Rick Browne eye, half open and less watery than when checked by myself on thursday/friday. RB advised continue metacam for another week re check at next vet check.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Sep 16, 2016

Prescription/Treatment

Basic Info

Date Written	Sep 16, 2016
Start Date	Sep 16, 2016 00:00
Prescribed By	Rick Browne
Prescribed For	1 animal
Reason For Terminate	~
Terminate Date	~
Reason For Treatment	Treatment

Weight Info

Date	Sep 16, 2016
Measurement Value	3.08 kg
Estimate	Yes
Exclude From Reference Intervals	Yes

Treatment Detail

Treatment Item/Drug: Metacam oral (1.5 mg/ml Liquid > Suspension) (Meloxicam)

Dose Amount	0.616 mg	Frequency	once a day (sid)	Form Of Drug Suspension
Dosage Amount	0.2 mg/kg	Duration	3doses	Concentration Of Drug: 1.5 mg/ml
Administrated Dose Quantity	0.411 ml	Delivery Route	Oral (p.o.)	
		Loading Dose	~	

Treatment Response

Clinical Response ~

Adverse Effects ~

Adverse Effects Note:

~

Staff Instructions

Give 0.41ml of Metacam oral, once a day (sid) for 3 doses.
Start treatment on Sep 16, 2016
Administration route: Oral (p.o.)

Prescription Notes/Comments

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Dispensing Records

Date Dispensed	Dispensed By	Quantity Dispensed
Sep 16, 2016	[redacted]	2 ml

Administration Records

Administration Date/Time	Administered By	Success	Notes
~	~	~	~

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

Sep 15, 2016

Clinical Note

Date	Time	Note Author
Sep 15, 2016	13:00	[redacted]
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

Discussed case with vet RB as eye deteriated squinting alot and seems sore. advised can give metacam. giving metacam oral at previous dose rate 0.2mg/kg sid.
Checked eye when medicated, completly shut and watering ++ given baytril orally taken well

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Prescription/Treatment

Basic Info

Date Written	Sep 15, 2016
Start Date	Sep 15, 2016 00:00
Prescribed By	Rick Browne
Prescribed For	1 animal
Reason For Terminate	~
Terminate Date	~
Reason For Treatment	Treatment

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

Treatment Detail

Treatment Item/Drug: Metacam oral (1.5 mg/ml Liquid > Suspension) (Meloxicam)

Dose Amount: 0.41 ml
Dosage Amount: ~
Administrated Dose Quantity: 0.615 mg
Frequency: once
Duration: 1doses
Delivery Route: Oral (p.o.)
Loading Dose: ~
Form Of Drug: Suspension
Concentration Of Drug: 1.5 mg/ml

Treatment Response

Clinical Response: ~
Adverse Effects: ~
Adverse Effects Note:

~

Staff Instructions

~

Prescription Notes/Comments

Discussed with vet RB as eye deteriated squinting lots, advised can give metacam, giving same as previous dose 0.2mg/ml sid

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Dispensing Records

Date Dispensed	Dispensed By	Quantity Dispensed
Sep 15, 2016	[redacted]	0.615 mg

Administration Records

Administration Date/Time	Administered By	Success	Notes
Sep 15, 2016 00:00	[redacted]	~	~

Sep 12, 2016

Clinical Note

Date	Time	Note Author
Sep 12, 2016	14:30	Rick Browne
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

Eye improved no more treatment keepers to monitor

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Sep 08, 2016

Clinical Note

Date	Time	Note Author
Sep 08, 2016	00:00	[redacted]
Significant	**Private**	**Active Problems**

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

No No ~

Note Subtype: General

Notes/Comments

RB examined eye yesterday as acting strangly circling and hiding under wooden shelves. ? painful ?sensative to light. Advise metacam oral 0.2mg/kg sid 5 days

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Prescription/Treatment

Basic Info

Date Written	Sep 08, 2016
Start Date	Sep 08, 2016 00:00
Prescribed By	Rick Browne
Prescribed For	1 animal
Reason For Terminate	~
Terminate Date	~
Reason For Treatment	Treatment

Weight Info

Date	Sep 08, 2016
Measurement Value	3.08 kg
Estimate	Yes
Exclude From Reference Intervals	Yes

Treatment Detail

Treatment Item/Drug	Metacam oral (1.5 mg/ml Liquid > Suspension) (Meloxicam)				
Dose Amount	0.616 mg	Frequency	once a day (sid)	Form Of Drug	Suspension
Dosage Amount	0.2 mg/kg	Duration	5days	Concentration Of Drug	1.5 mg/ml
Administrated Dose Quantity	0.411 ml	Delivery Route	Oral (p.o.)		
		Loading Dose	~		

Treatment Response

Clinical Response ~

Adverse Effects ~

Adverse Effects Note:

~

Staff Instructions

Give 0.616 mg [0.411 ml] of Metacam oral, once a day (sid) for 5 days.
Start treatment on Sep 08, 2016
Administration route: Oral (p.o.)

Prescription Notes/Comments

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Dispensing Records

Date Dispensed	Dispensed By	Quantity Dispensed
Sep 08, 2016	[redacted]	0.41 ml

Administration Records

Administration Date/Time	Administered By	Success	Notes
~	~	~	~

Aug 26, 2016

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

Clinical Note

Date	Time	Note Author
Aug 26, 2016	00:00	Jon Cracknell
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

Reviewed - blepharospasm and epiphora, eye intact and not ruptured but appears painful. Local anaesthetic applied topically now worn off. To start with analgesia for next 7 days and review with AG/RB when next in.
Tx: Meloxicam (1.5mg/ml) 0.2mg/kg day one (0.5ml), then 0.1mg/kg thereafter (0.25ml) once daily for further 6 days. Administration informed RB and approved by AK

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Aug 25, 2016

Clinical Note

Date	Time	Note Author
Aug 25, 2016	00:00	Jon Cracknell
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

EUGA left eye assessment.
GA:medetomidine 0.4mg, ketamine 0.2mg IM, facemask oxygen maintenance.
Ex: Left eye has a large 8 x 6mm desmetocoele with fluorescein positive under running edges, phenol applied by RB followed by local anaesthetic and fucithalmic gel.
Plan to monitor and review next visit.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Clinical Note

Date	Time	Note Author
Aug 25, 2016	00:00	Jon Cracknell
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

The first picture (pre fluoresceln and pre phenol) shows a large descemetocoele in the left eye of this lemur. A descemetocoele is a corneal ulcer that has progressed through the majority of the corneal depth (all of the epithelium and stroma) down to 'Descemet's membrane'. Descemet's membrane is the basement membrane secreted by the single cell layer of endothelium that is the posterior border of the cornea (closest to the intraocular fluids). Together the endothelial cell layer and Descent's membrane is approximately 7um in thickness, which equates to the thickness of a red blood cell. A descemetocoele can 're-epithelialise' so that a new epithelial layer forms over it's surface (6-10 cell layers thick depending on species) which can make the animal more comfortable, albeit with a fragile eye at threat of rupture.

However, in the second photo there appears to be some stromal uptake of fluorescein in a ring around the descemetocoele, which suggests it is denuded of corneal epithelium (which does not retain fluorescein), and as Descemet's membrane does not retain fluorescein stain (as lipophilic like corneal epithelium) this lack of central fluorescein uptake it not unexpected. New epithelium grows centripetally from the surrounding stroma so this descemetocoele is not likely to have an epithelial covering given the surrounding halo of

Animal Type	GAN	Preferred ID	Taxonomy	Sex	Birth Date
Individual	MIG12-29512243	VVS001	Varecia variegata subcincta/White-belted ruffed lemur	Male	Mar 01, 2000

fluorescein uptake (exposed stroma).

Treatment of a descemetocoele is with surgery: it requires tectonic support and there are a number of techniques/grafts available (e.g. corneal transplant, corneoconjunctival transposition, amnion graft, ACell graft, conjunctival pedicle graft), although this requires microsurgical expertise and use of an operating microscope. Success rates can be excellent with appropriate care and post-operative treatment.

Phenol treatment of a corneal ulcer is only indicated under strict conditions, and specifically for certain *superficial epithelial ulcers* only. These superficial ulcers (with redundant epithelial margins) have been described as 'indolent' or 'recurrent' ulcers, or more recently (since 2005) 'spontaneous chronic corneal epithelial defects (SCCED)'. In this disease new epithelium fails to bind to underlying stroma during the healing phase and thus, epithelium recurrently lifts leaving a corneal ulcer. There are a number of treatments, and phenol is a rather old fashioned one of these. Given phenolic acid's carcinogenic status it largely unavailable and its use has declined substantially. Fortunately there are other more successful treatments available now. Phenol should be used with care, in finite small amounts (applied to a cotton tipped applicator and strictly 'wrung out' so the tip is dry with minimal phenol contacting the cornea) to the specific indolent area only. Indiscriminate use can provoke corneal malacia (corneal melting) as the acid penetrates deeper layers of the cornea and stimulates severe inflammation.

The use of phenol in this case (as demonstrated in photograph 3) is totally unwarranted and dangerous. Rupture of the descemetocoele and incitement of intense inflammation (to provoke corneal malacia) are very real possibilities. This lemur is perhaps fortunate that his descemetocoele does not appear to have ruptured, however the underlying condition has not been addressed whilst additional pathology has been incited by the use of phenolic acid. As an ophthalmologist this is extremely distressing to see, and my sincere sympathies are with this animal.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

Aug 24, 2016

Clinical Note

Date	Time	Note Author
Aug 24, 2016	00:00	Jon Cracknell
Significant	**Private**	**Active Problems**
No	No	~

Note Subtype: General

Notes/Comments

History of lesion of left eye, possible trauma. Much improved but considerable blepharospasm and eye partially closed, taken picture of face and clear large 4-5mm ovoid underrunning ulcer just to edge of lateral cathus, requested advice from [redacted] on best way to manage – possible to consider EUGA and debride edges but need to consider long term management which would benefit from twice daily topical treatment which may not be possible.
CH reviewed images and suspecte desmetocoele - trimming not appropriate, either graft or conjunctival flap. Plan to review with RB tomorrow under anaesthesia and confirm.

Animal Care Staff Medical Summary

~

Calendar Items

Date	Title	Assigned To	Done
~	~	~	~

ANIMAL RECORD KEEPING POLICY

Aim: This policy outlines the procedures required to ensure consistency and accuracy in animal husbandry record keeping from observation through to documentation on ZIMS, including all of the steps in-between. This includes medical, both preventative and curative, record keeping

AIM

1.1 This policy outlines the procedures required to ensure consistency and accuracy in animal husbandry record keeping from observation through to documentation on ZIMS, including all of the steps in-between. This includes medical, both preventative and curative, record keeping

1.2 This document does not outline the use of ZIMS nor the format of data entry for ZIMS, it is solely intended to ensure consistency of data collection for the registrar and senior staff when submitting data for ZIMS.

ASSOCIATED DOCUMENTS

2.1 This document should be read in conjunction with:

Secretary of States Standards of Modern Zoo Practice (SSSMZP) (2012)
ZIMS Best Practices in Animal Husbandry and Inventory Records Keeping (2015)

INDEX

INTRODUCTION

3.1 Of all zoo employees, keepers have the closest association with the animals here at Safari Zoo. As such, they are the ones who know the details of daily feeding, the normal behaviours and activities, and the physical condition of the animals in their charge. This information is of no overall value unless it is shared with colleagues, both within the zoo and at other facilities around the globe. The best mechanism for sharing this information is **the written record**.

3.2 Records gathered over time can provide an archive on individuals, and a larger number of records gives us a more accurate picture of a species. On a global scale this information is used to manage breeding programmes and to ensure accurate information is maintained for both individuals and species, with husbandry and welfare implications for both. At a local level written records provide an efficient communication tool outlining the recent and historical events of an individual or species group, ensuring accurate information is passed on between colleagues on a daily basis.

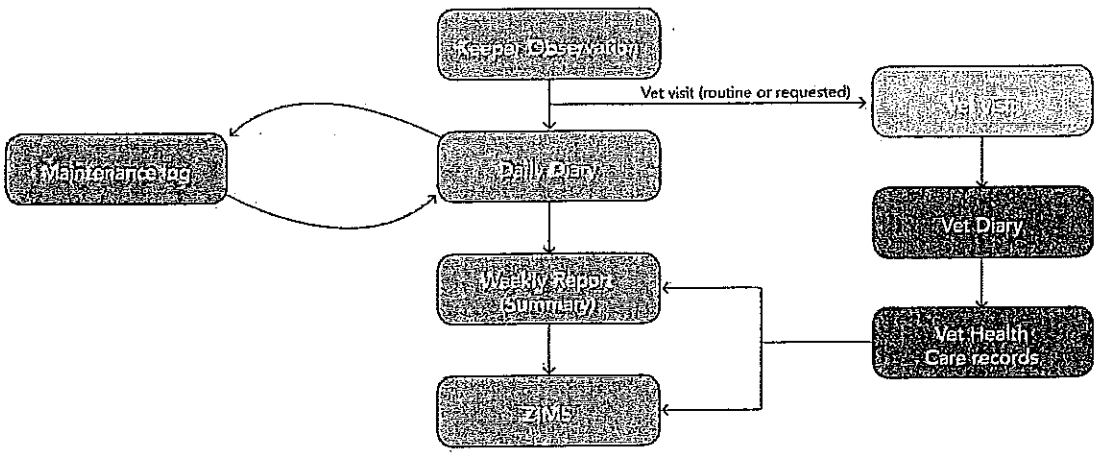
3.3 Accurate, high quality and consistent record keeping is critical in any modern zoo. Good records and communication impacts in multiple areas:

- Communication
- Animal husbandry and care
- Veterinary health care, both current and retrospective
- Welfare and enrichment
- Population management and planning
- Animal identification, births, deaths and transfers
- Compliance
- Maintenance and site activities

3.4 It is critical that accurate, quality records are maintained by all animal keeping staff and that these records are consistent in their approach to data collection.

3.5 This policy aims to ensure that the approach to record keeping is consistent and considered in a similar fashion between staff members, at every level. As Safari Zoo moves forward the animal record keeping policy will evolve and ultimately staff will enter data directly into ZIMS, however this is for the future.

OVERVIEW



4.1 The Animal Record Keeping System at Safari Zoo consists of four core components:

(i) Keeper observation
(ii) Daily diary
(iii) Weekly report summary
(iv) ZIMS

4.2 **Keeper observation** is the normal daily husbandry routines and observation where the keepers monitor and care for their animals. It is the recording and noting of normal or abnormal behaviour, changes in health, special events such as births, sickness or deaths, or any other events considered notable or relevant to that individual or the group as a whole. These are observed and must then be documented using the available tools – this can be verbally to a line manager or direct into the daily diaries.

4.3 Each section has a **daily diary** which is used to document the pertinent aspects of the keeper observations and ensure that they are recorded on the correct date. It is imperative that the information recorded at this point is correct, especially with regard to animal species and identification. The daily diary should be considered as one of the most important elements of the animal record keeping system – it is a professional document utilised for record keeping but also communication, especially when there is hand over to colleagues that are in on separate days. It is a record of the activities of the section both from an animal husbandry and health perspective but also documenting maintenance requests, activities on section, staffing and other pertinent information as staff feel necessary to record. The daily diary is the core document that provides the foundation for all of the animal record keeping system and as such it must be used appropriately and consistently.

4.4 Each week the data documented in the daily diary must then be condensed into a **weekly report** for the section. This outlines an overview of the activities of the section for the week and uses the data in the daily diary as the foundation. The elements are outlined later in the policy, as is a template, but this normally will consist of changes in stock, animal health, animal activities or enrichment, maintenance requirements (and noting when completed), and other relevant information including escapes. This is then submitted to the registrar.

4.5 This information is then uploaded to **ZIMS** (Zoological Information Management System) which is a web based system that anyone can access, access privileges dependent, and review the data from Safari Zoo at a local level or on a global scale. This information is critical to the success of the global zoo industry and allows huge amounts of data to be accessed to improve captive management of species as well as global breeding programme management. It is critical that staff understand that the data they submit will form part of the global network and impact all animals of a species, not just the ones in their direct care.

ANIMAL RECORDS CODES

5.1 To ensure consistency across the daily diary, weekly report summary and to ensure the registrar knows where you intend the information to be submitted a system of codes has been introduced outlining the major topics.

5.2 These codes should be used at the beginning of each section of the reports to clearly define the area where the information should be submitted.

5.3 The codes are:

ID	Identification - used when animals are identified or re-identified e.g. microchipped, banded, notched, etc.
ENC	Enclosure codes – each enclosure will have a designated code along with normal name
BEH	Behaviour – any normal or abnormal behaviour noted as significant for the records
DIET	Diet - any nutrition changes or failure of intake or diet acceptance
REP	Reproduction – any matings, births or reproduction related records
VET	Vet - vet visits or health care procedures
TX	Treatments - any treatment given or needed to be actioned – also see animal treatment sheets
MORT	Mortalities – all deaths, including infertile eggs or abortions
ESC	Escapes – both internal and external (over perimeter) are recorded with this code
MOV	Move – animal transfers into or out of the collection.
MAINT	Maintenance – any maintenance requests actioned, and logged when completed
AT	Animal training

5.4 Animal record codes should be used in conjunction with animal identifiers, preferably species and ARKS number, name is optional but may assist colleagues in communication e.g. for daily diary:

- BEH. – Giraffe, GR001 seen mating GR002 twice.
- ESC – RTlemur, LC008, escaped over fence at giraffes. Returned in 20m – see escape report.
- Tx – BWRlemur, WW001, given 2.5% baytril – orgoing for further 5 days – see treatment sheet.

5.5 Where an ancillary form of data collection exists, such as an escape report form or an Animal treatment sheet, then reference can be made to those to save duplication of all the pertinent points – it is imperative that the data are collected on one or the other though, so if not sure then better to duplicate rather than lose information.

WEEKLY REPORT SUMMARY

6.1 The weekly report is an important document as it outlines a summary of the principal activities of the previous week and condenses the information from the daily diary into a usable format that can be submitted onto ZIMS.

6.2 The weekly report is usually the responsibility of the Assistant Animal Manager or the Senior keeper with support from the rest of the team.

6.3 It can be completed in one sitting at the end of the week or updated daily and then submitted at the end of the week, whichever is the preference of the team.

6.4 An example of the Weekly Report Summary is outlined in the Appendix 2.

ESCAPES

7.1 Escapes are an infrequent event but are an important part of compliance with the Zoo Licensing Act (1981) and its subsequent amendments as well as forming a large part of the SSSMZP (2012).

7.2 Concerns with regards to escapes are twofold: public safety is the obvious primary reason, especially when considering category 1 or 2 dangerous animals, the other being the welfare of the escaped animal or the welfare of native species that maybe impacted by the release of non-native wildlife.

7.3 As such it is imperative, in line with best practice and legal compliance, that all efforts are made to prevent or minimise the risk of escaped animals.

7.4 To this end it is important that all escapes are adequately documented and reviewed to ensure that the team understands the reason as to why the escape occurred and what steps are required to prevent this happening again e.g. failure of fencing, keeper error, population structure or conspecific aggression.

7.5 With regards to compliance all animal escapes, considered those going over the perimeter, must be reported immediately, or within a maximum of 24 hours of the event to the local authority. Normally any escape reports and documentation will be assessed at the time as well as reviewed at the formal zoo licence inspections.

7.6 Internal escapes, those not going over the perimeter, should be recorded with the same diligence as external escapes – these so called 'near misses'. An internal escape is only one fence away from an external escape and lessons learnt from internal escapes demonstrate the effectiveness (or not) of escape management policy and allow demonstration to the local authority of the effectiveness of both the escape policy and internal audit processes that aim to build upon existing systems.

7.7 All staff should be aware of the escape policy and should familiarise themselves with the 'Animal Escape Report' template – these should be filled in for every escape, both internally and externally. A copy of which is in the Appendix 3.

MEDICAL RECORDS

8.1 Medical or clinical records are an essential part of the veterinary care of animals within any collection. The analysis of medical records, in combination with other recording systems, promises a wealth of information that can further inform our knowledge of species, their breeding, mortality, and health, and the impact of our housing and husbandry regimes.

8.2 The medical records should provide an accurate review of a condition, a record of procedures or examinations carried out, the use of therapeutic or anaesthetic agents, as well as directions for the plan or strategy of management in specific cases. The success or failure of therapeutic regimes should be included. In addition, retrospective review of medical records for a species of medical or pathological condition is essential for the development of our knowledge of the animals in our care.

8.3 The keeping of comprehensive veterinary records is both a Directive requirement and part of normal good veterinary practice. Safari zoo needs to ensure that full and up-to-date records are kept on site, as they will be required to be seen by inspectors. They should also be available for access by any other vet who may be required from time to time to deal with an animal, and for despatch to another zoo, should an animal be moved. These records should be provided to any other vet who takes over a case, or indeed the care of the whole zoo, and so should be clearly regarded as the property of the zoo. If there is any doubt about this, it should probably be made part of the contractual arrangement that any copyright is assigned to the zoo, without which the transfer of records becomes impractical. Zoos Forum Handbook (DEFRA, October 2008).

8.4 Safari Zoo recognises the importance of maintaining quality animal record systems, including those of the medical records.

8.5 Similar to the codes used in the Animal Records a system of codes should be used in the hand written notes to ensure that there is consistency in data submission to the registrar and onto ZIMS / ZIMS Medical. These codes are as follows:

ID	The species and ARKS number must be present on any written notes, keepers must supply this information.
Wgt	Weight of the animal – where possible animals should be weighed, especially when anaesthetised, to allow accurate drug dosing.

GA	General (or other) anaesthesia – details of the anaesthetic agents used, including the pharmacological agent in full, the total dose in milligrammes (mg) or grammes (g) as appropriate, the concentration of the pharmaceutical agent, and the volume given if felt pertinent. The route (location if needed) and method given should also be recorded e.g. ketamine (100mg/ml) 660mg, IM, left hind, blow dart. The use of antagonists and any complications during anaesthesia or in recovery should be recorded here. Other useful information includes position. monitoring equipment, etc, should also be considered.
Hx	History – the pertinent clinical history and reason for the assessment of the animal.
Ex	The findings of any clinical examination should be recorded here, this includes physical examination, surgery, the use of diagnostic modalities and the results, and the taking of blood including the site, the preservatives used and whether smears were made. This should be full and detailed in discussion e.g. for foot trim specific feet should be mentioned with the work performed if there is variation between the individual feet and whether photographs or measurements were taken.
Enq	If an enquiry, but not a physical examination of an animal is undertaken then it should be noted under enquiry. This includes follow ups, or just monitoring of the progression of a case, phone conversations and updates, and the recommendations made.
Tx	When any specific therapeutic agents are given as injections or prescribed then the details should be provided here. The details should include pharmaceutical agent, brand if felt pertinent, dose rate if felt pertinent, total dose in milligrammes or grammes, as well as total volume if injectable or liquid. The route and location of injection should be recorded in case of later problems. If prescribing a course of therapy the frequency and duration should also be recorded here. When prescribing a course of treatment the veterinarian must fill out an animal treatment sheet. If over the phone prescriptions are made then the veterinarian is responsible for ensuring the details are correct on that day's vet treatment record which is sent out via email and if any concerns arise then it is the responsibility of the vet to ensure these details are checked and confirmed to be in accordance with the initial phone prescription. It is the veterinarian's responsibility to ensure the details here are correct and not to rely on the lay staff of Safari Zoo to correctly fill in prescriptions or dispensary forms.
Lab	Results of laboratory or diagnostic testing should be interpreted for the medical records. This can be through email that is copied and pasted into the veterinary treatment record by lay staff at Safari Zoo and these details should be checked remotely on the sheet, with any changes or errors corrected by the veterinarian. A summary of the results should be provided in this section e.g. hypochromic anaemia with a leucopaenia.

	The registrar should not rely on the comments, if present, on the returned diagnostic testing form, as these can sometimes be inaccurate.
PM	When a post mortem is undertaken or an external laboratory undertakes a post mortem then the gross findings, tissues taken for histology and other tests, such as swabs, should be recorded here. When histology is returned this should be entered here. Reference can be made to supplementary post mortem forms if they have been produced.
Plan	A management plan should be summarised at the end of the case notes section to allow other veterinarians or Safari Zoo staff to know the plan of action and recommendations made when managing a case. This allows subsequent veterinarians to ensure continuity with the therapeutic programme.

8.6 The veterinarian or attending member of staff should initial every case note. If under the direction of a veterinarian then this must be recorded as the vet making the recommendation and the member of staff carrying out the action.

ANIMAL TREATMENT SHEETS

9.1 All medication or ongoing animal treatments dispensed by the veterinarian must be accompanied by an Animal Treatment Sheet.

9.2 The Animal Treatment Sheet outlines the animal being treated, the reason for the treatment and the drugs being dispensed for treatment. Each drug clearly noted as to concentration of the drug, amount to be given and the times as to when to give it.

9.4 Keepers must tick the boxes when giving drugs to the animals to ensure compliance with the treatment regime, for those agents given twice daily they can be ticked then crossed for the morning and evening treatments respectively and for those agents requiring more frequent dosing intervals each box can be subdivided into the relevant number of treatment times.

9.5 The treatment sheet is in addition to the treatment log held in the veterinary room which is considered to be the main log of drugs used, the Animal Treatment Sheet being a tool for the keepers to ensure drug regimens are followed and complied with.

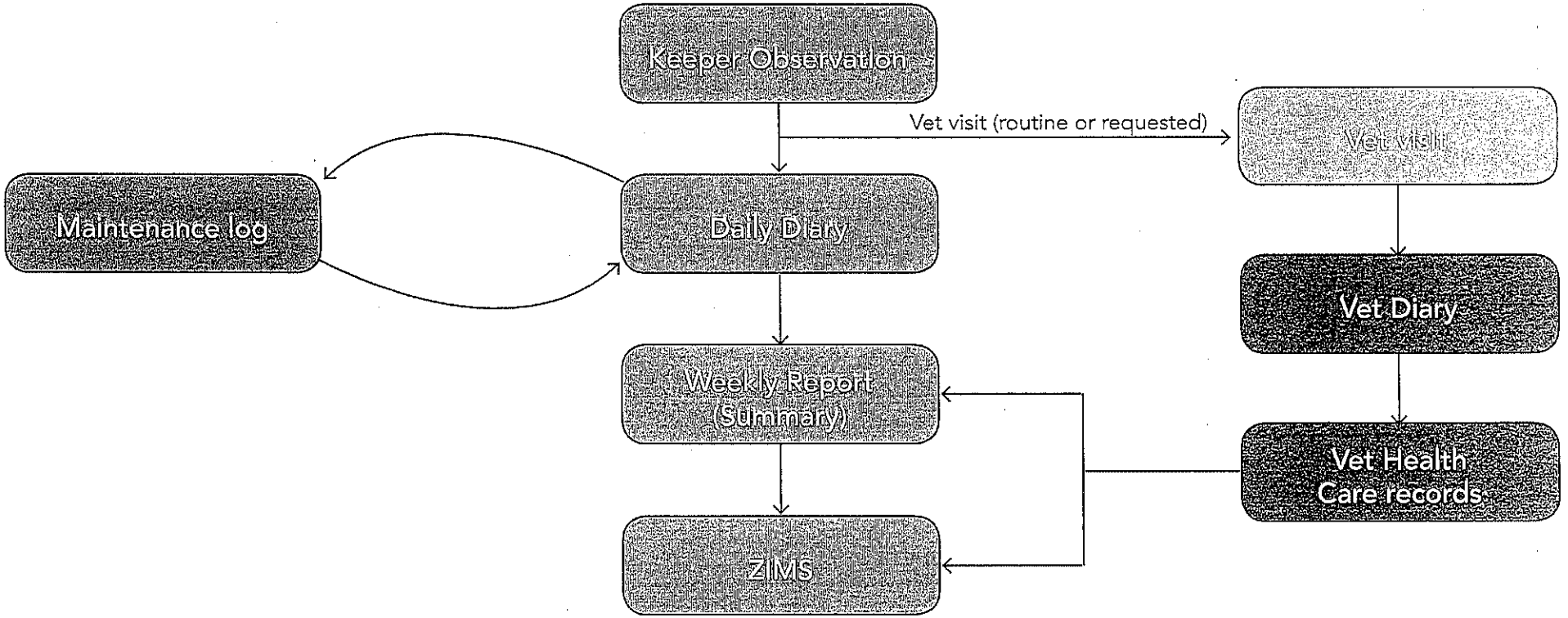
9.6 An example of the Animal Treatment Sheet can be found in the Appendix 4.

9.7 Please see the 'Medicine and Treatment Recordings System' for details on logging the use or disposal of any drugs (found in the current Veterinary Protocol)

APPENDIX ONE

ANIMAL RECORD KEEPING SYSTEM OVERVIEW

ANIMAL RECORD KEEPING SYSTEM OVERVIEW



ANIMAL RECORDS CODES

ID	Animal identification
ENC	Enclosure code
BEH	Behaviour
DIET	Nutrition and diet changes
REP	Reproduction - matings, births, etc
VET	Vet visit / health care
TX	Treatment given
MORT	Death of an animal
ESC	Escape (internal / external)
MOV	Animal transfer or arrival
MAINT	Maintenance request / completed

SOUTH LAKES SAFARI ZOO

APPENDIX TWO

EXAMPLE WEEKLY REPORT SUMMARY

SAFARI ZOO WEEKLY REPORT

SECTION:	
AUTHOR:	

CHANGES IN STOCK (births, deaths, arrivals, departures):

CODE	SPECIES	ID	SEX	SIRE / DAM	NOTES

ANIMAL HEALTH (diet, illness, injury, treatments):

SPECIES	ID	NOTES

REMARKS (behaviour, activity, behavioural changes, observations, other information):

CODE	SPECIES	ID	NOTES

ENRICHMENT

MAINTENANCE REQUESTS:

DATE	REQUEST	BY	COMPLETED

MISCELLANEOUS (section activities, requests, other)

APPENDIX THREE

EXAMPLE ANIMAL ESCAPE REPORT FORM

ANIMAL ESCAPE REPORT

Author:	
Date of report:	

Date of escape:		Enclosure code:	
External to perimeter:	Yes / No	Reported to LA:	Yes / No / NA

SNATCH REPORT

Species:		ID	
		Sex	
Number escaped:		Number in group:	
Area (enclosure):		Department:	
Time of escape:		Time recaptured:	
(Current) risk to public:			
• Any human injuries:			
Housing assessment:			
• Risk of further escape:			

ADDITIONAL

Open to the public:	Yes / No	Public present?:	Yes / No
Individual notified escape:			
Escape coordinator:			
Main office notified:	Yes / No	Who:	
• If not why not?			
Escape log actioned?:	Yes / No	Copy attached?:	Yes / No / NA
Fire arms deployed?:	Yes / No	If yes: calibre:	
		Operator:	
		Time arrived:	
Animal injuries – to or by the animal (if any):			

EVENT ANALYSIS

Reason for escape:

Mitigation action taken to prevent escape initially and by whom (if any):

Method of reporting:

Recapture event described in detail:

ANIMAL ESCAPE REPORT

REVIEW / WASHUP

Staff present at review (initials):

Was the Animal Escape Procedure followed:	Yes / No

Successful aspects of the escape procedure:

Failings in the escape procedure:

Human error:	Yes / No	Person responsible:	
Action taken if yes:			

Action points to prevent escape from occurring again in the same fashion:		
Action	Responsibility	Date complete

APPENDIX FOUR

EXAMPLE ANIMAL TREATMENT SHEET

SOUTH LAKES SAFARI ZOO

Animal Treatment Sheet

Date	
Prescribed	
Dispensed	
Sheet No.	

Species: ______________________________ ARKS: __________

Reason: ______________________________

Instructions for use: ______________________________

____

Section: ______________________________

Drug: ______________ Conc. ______________ Dose: ______________

Frequency: ______________ Route: ______________ Duration: ______________

Month: ______________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	8	19	20	21
22	23	24	25	26	27	28
29	30	31				

Month: ______________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	8	19	20	21
22	23	24	25	26	27	28
29	30	31				

Drug: ______________ Conc. ______________ Dose: ______________

Frequency: ______________ Route: ______________ Duration: ______________

Month: ______________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	8	19	20	21
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Month: ______________

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15	16	17	8	19	20	21
22	23	24	25	26	27	28
29	30	31				

Drug: ______________ Conc. ______________ Dose: ______________

Frequency: ______________ Route: ______________ Duration: ______________

Month: ______________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	8	19	20	21
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Month: ______________

1	2	3	4	5	6	7
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15	16	17	8	19	20	21
22	23	24	25	26	27	28
29	30	31				

Safari Zoo, Dalton-in-Furness, Cumbria, England LA15 8JR

ANIMAL KEEPER – PROFILE of QUALIFICATION

- Perform daily husbandry duties
- Provide daily care and feeding
- Monitor and observe animals
- take measures and action to promote and maintain animal health
- Sense and assess health conditions and significant change in behavior of animals
- Breed, nurse and rear animals
- Knowledge of products, storage, preparation, and application of feed and water
- Ability to adapt, furnish and maintain animal housing, and facilities
- Maintain, refurbish, and use technical appliances, and tools
- Reasonable use of energy sources with respect for environmental protection
- Transportation of live animals
- Abide by national and international laws
- Participate and assist with veterinary procedures
- Sick-nursing of animals
- Assist with scientific projects
- Impart expertise and knowledge on animals
- Detect, assess, and control of relevant emergencies at operational level

Technisches Büro für Biologie - Mag. Andreas Kaufmann | A-8212 Pischelsdorf 166 | T/F: +43-3113-30-479 | M: +43-664-73-860-661 | email: office@gowild.at

ANIMAL KEEPER – VOCATIONAL TRAINING

- **Animal Taxonomy, Anatomy, and Physiology**
  - basic principles of life
  - cytology – organization and function of the animal cell
  - histology
  - morphology and body organs
  - blood circuit
  - respiration
  - heat balance
  - digestion
  - secretion and excretion
  - neurophysiology
  - sensory physiology
  - endocrinology
  - phylogeny
  - age determination, biological signs and means
  - systematical classification of animals
  - theories of evolution
  - basic classes of animals
    - lower animals, fishes, amphibians, reptiles, birds, mammals

- **Animal Geography, Ethology, and Behavioral Ecology**
  - geographical ranges of animals
  - natural and wildlife habitats
  - zoogeographical divisions of the world
  - species distinctions
  - world climate zones and biomes
  - mammals
    - habitats of commonly kept species
    - geographical ranges of particular species
    - dental formulas and sets of teeth
  - birds
    - habitats and geographical distribution
    - bills, beaks, and peckers
    - shape and characteristics of bird feet
  - amphibians and reptiles
    - terraria
  - fishes
    - aquaria

- animal bahavior
- natural lifecycles and zoo conditions
  - appropriate keeping conditions
- animal – keeper interactions
  - human influences on animal behavior
  - misimprinting

- **Animal Care**
  - animal safety procedures
  - occupational health and safety
  - emvironmental protection
  - history of animal keeping
  - the role of zoos
  - usage and maintenance of tools and appliances
  - housing and enclosure requirements
  - measuring population densities
  - adaption, acclimatization and familiarization of animals
  - animal care and hygiene
  - interactions with animals
  - animal handling and management
  - aquaristics
  - terraristics
  - keeping and breeding of live food
  - keeping of venomous animals
  - animal keeping practices and techniques

- **Legal Principles of Animal Protection, Restraint, and Transport of Animals**
  - history of animal welfare
  - animal keeping standards
  - environmental protection
  - EU-zoo-directive
  - international laws
  - veterinary regulations and animal disease control
  - animal transportation legislation
  - considerate methods and tools for the capture and handling of animals
  - preparing animal transports
  - means of transport
  - safety precautions
  - code of practice

- **Genetics, Animal Husbandry, and Domestication**
  - husbandry methods and breeding of animals
  - breeding defects
  - breeding value
  - evolution and selection
  - breeding characteristics
  - conservation
  - reintroduction

- **General and Specific Nosology**
  - identification and description of medical symptoms
  - prohylaxis
    - quarantine and pest control
    - hygiene, cleaning, disinfection, sterilization
  - major diseases and ways of transmission
    - infectious and contagious diseases, zoonoses
    - parasites
  - metabolic and circulatory disorders
  - inflammation
  - pathological growths
  - symptom evaluation
  - veterinary treatment and prophylaxis
  - pathogenes
  - alien objects
  - toxins and toxic material
  - bite, crush, blow, and stab induced injuries
  - improper and inappropriate feeding

- **Hygiene**
  - general hygiene
  - detergents, cleaning agents, disinfectants, and pestizides
  - health hazards, exposure to infectious material
  - hygienic provisions and precautions against zoonoses
  - indoor climatic conditions
  - carcass disposal
  - animal disease regulations

- **Applied Mathematics**

- **Animal Nutrition**
  - animal feed and diets
  - feeding basics
  - evaluation of animal feed
  - hazardous and detrimental substances
  - production and storage of feed
  - development and implementation of diets and feeding plans
  - feeding techniques
  - feeding places
  - feeding times
  - behavioral enrichment
  - ad libitum feeding
  - feed quality
  - feeding hygiene

ANIMAL – GUEST INTERACTION AUDIT

AN INDEPENDENT ASSESSMENT OF ZOONOSES & BITE OR OTHER ANIMAL INJURY MITIGATION STRATEGIES AT SAFARI ZOO

DR. JON CRACKNELL BVMS CertVA CertZooMed MRCVS

SAFARI ZOO LIMITED, DALTON-IN-FURNESS, CUMBRIA, ENGLAND LA15 8JR
Created: 23rd, September, 2016

AIM

This review of animal-guest interactions, the risks of injury through bites, pecks and other means, including the risk of contracting zoonotic disease was undertaken in response to Condition 38 from the previous formal zoo licence inspection which stated:

"In accordance with paragraph 6.14 of Appendix 6 of the SSSMZP, a full written review of the risk of bites or injury to members of the public by animals must be carried out and an action plan adopted to eliminate bites and injuries. A copy of the report and action plan must be forwarded to the Licensing Authority"

"In accordance with 8.14 of the SSSMZP, all contact injuries to visitors from animals must be reported to the Local Authority within 14 days"

An initial review was submitted but deemed inadequate by the local authority and this was subsequently reviewed in the Special Inspection of the 15th August, for which this document forms part of the response and action.

This documented review considered all aspects of potential animal bite or other animal related injury, the risk of contracting zoonotic disease, the risk of zoonotic disease, the processes in place and the compliance with the mitigation strategies, as well as making recommendations where areas were considered to need improvement.

EXECUTIVE SUMMARY

- This Animal-Guest Interaction Audit is a supplement to the previously submitted bite review in response to Condition 38, it expands upon the previous information and consideration provided but has similar numbers, simply updating that supplied in the initial report.
- Multiple sources were used to ascertain the reported level of animal-guest incident as well as the unreported levels: accident records from 2013 -2016, 2376 TripAdvisor reviews, 2057 TripAdvisor images, 9234 data points in the post mortem database, 207 clinicopathological records, staff interviews and policy review to name a few.
- The reported incident found by Safari zoo was an incident rate of between 1 in 50,000 to 1 in 90,000 for guests visiting the park depending on the year, a total of 9 incidents in a three year period.
- Staff interviews and perception complemented the low number of incidents and possibly this is an accurate number when combining both TripAdvisor and Accident Records, however it is likely there is a small margin of error and incidents appeared to be marginally under reported. .
- There is a lack of robust system of near miss reporting or times where staff had to intervene to prevent animal-guest injuries from occurring – to implement one

would improve the data available and either validate the low level of incidents or identify under reporting. Either is possible and will not be known until a reasonable time period has passed e.g. 6-12 months.

- The presence of zoonotic disease is low in the collection but surveillance would benefit from robust reporting systems and compliance with stated policies.
- A total of only 8 confirmed zoonotic disease was reported in the last 4 years, many of which were considered low risk except for one case of chlamydiosis in a military macaw in 2014.
- Mitigation strategies are in place and on the whole are well considered with reviews due in January 2017. However, there are a few areas that need to be reviewed and recommendations are made to improve robustness in risk assessment and identification and mitigation of hazardous critical control points.
- Food outlet and animal-guest interactions risk assessments and mitigation strategies require review.

INTRODUCTION

Safari Zoo offers a unique guest-animal interaction opportunity with the foundation of the park's experience focused on free ranging animals being able to interact with guests in an open and safe environment. This has been a guiding principle of the park since its conception, evolving to the brand of "Hear-Touch-Smell-See: Feed your senses and the animals too" and the concept of a guest experience of a "safari on foot, being close with the animals around the zoo".

This is a challenging animal and guest management model, recognised early on when first introduced: "What we do at my zoo is hard, it's difficult and the paradox is that it is hard because it is simple" (Gill, 2011). The simplicity in that animals are allowed to free range in an expansive environment, free to go where they want, within reason and the confines of the perimeter, with management strategies focusing on ensuring guest safety, animal welfare and working practices compliant with current legislation.

This model raises valid concerns from the Local Authority and the Zoo Licence Inspectors as it is fairly unique due to the size and the scope of the free ranging area where guests can enter, combined with the nature of the species in these areas, namely primates, macropods, ratites and a range of other species. This review audits the current situation with regard to the risks of animal-guest interaction, the risks of contracting zoonoses, and the processes currently in place to mitigate any of these risks.

SCOPE

The scope of this initial audit was given strict parameters to deliver as outlined in the Special Inspection Report from the 15th August, 2016 Inspection. The review must include the following:

1. *A full written review of the risk of bites or injury to members of the public*

caused by animals, to include:

a. *Detailed account of all of the recorded or reported historical occurrences since January 2015 (Author note – due to the small numbers involved this was expanded back to 2013/14)*
b. *The areas in the zoo where bites or animal related injuries tend to occur*
c. *Progress the zoo has made to date to minimise the risk of bites or injuries by animals to the public*
d. *Any other information the zoo feels necessary to add into the report to ensure that it is accurate and complete as possible.*

3. *A costed and timed written action plan, detailing all further changes that will be put in place to eliminate the risks of bites or injuries by animals to members of the public, to include:*

a. *Plan that no food outlets and no public eating anywhere within the park where animals have access*
b. *Demonstration how contact between visitors and animals is to be controlled during feeding encounters, including specific written risk assessments for each kind of encounter (including details of species, location, number of animals, number of visitors, etc)*

MATERIALS AND METHODS

To ensure accuracy and that the audit was reflective of the current situation at Safari Zoo the review took place over a period of 5 weeks: starting on the 16th August and ending on the 22nd September, 2016. It consisted of a mixture of on-site assessment of working practices against policy, a review of the safe systems of work and standard operating procedures, interviews with staff to ascertain whether documented incidents were reflective of actual incidents, reviews of disease surveillance programmes on site, as well as assessments of the actual bite incident reports themselves.

The review considered the following:

- A complete audit of all bite or animal injury incidents as logged within the Accident Record held at Safari Zoo for the period 2013 – 2016 (note 2013 limited data set as most of 2013 Accident Reports currently held off site for a separate review): a total of 12 animal injury incidents were reported out of a total (including bite reports) of 59 Accident Records for the whole site during that period.
- A complete audit of the 2376 English written TripAdvisor reviews (2 Polish and 1 Italian were excluded) using search criteria of related words including bite, bitten, injury, injured, scratch, kick and peck.
- A complete review of the 2057 images accompanying the TripAdvisor reviews. Images being assessed for animal-guest interaction and any inappropriate

interactions based on current policy (noted that many images prior to current policy and comments by Inspectorate).

- A review and critical appraisal of all internal policies, working practices and risk assessments with regard to Animal-Guest interaction as supplied by the current Health and Safety Coordinator.
- A review of all of the post-mortem records from 2013 to current day (ending 19th September, 2016) – a total of 486 post mortem reports and just under 10,000 data entries with assessments in particular of potential zoonotic disease and species found in animal-guest encounters.
- A review of all of the preventative health and clinicopathological testing that forms part of the health care programme and surveillance programmes as outlined in the veterinary programme.
- A review of food outlet locations and potential access or interaction by collection animals.
- Interviews with staff, including health and safety coordinator and the keeping staff, with a focus to ascertain the consistency between reporting of incidents verses the actual frequency of bites during encounters.
- A review of current professional standards with regards to managing zoonotic disease verses current practices on site.
- Formal zoo licence inspection reports were reviewed for comments and areas of concerns highlighted in the reports relevant to bite injuries.

DISCLAIMER: QUALITY OF DATA

This review is accurate to the knowledge of the author and is based on the records provided by the collection. Free access was given to all of the available clinicopathological records, the incident reports and staff interviews. However, it is possible that there is additional policy or procedure in place that was not included in the report as both the veterinary coordinator (FRS) and site veterinarian (RB) were unavailable during the site visits in August and September to confirm the accuracy and current nature of the policies discussed in this document. As such this document must be considered to be a baseline foundation with subsequent documents potentially being submitted challenging some of the comments made with regard to disease surveillance.

In addition interviews with staff were subjective and based on opinion and perception rather than documented, written evidence-based observation and the author considered this aspect to be variable in quality and potentially not reflecting the actual situation. Steps to mitigate this area of weakness in the review are found in the recommendations which attempt to instigate accurate, robust record keeping with regard to animal-guest interaction as currently the records are good but could not be validated as a true indicator of bite or animal injury interaction, simply because there were no formal daily records of near misses or non-reported incidents.

PART 1: REVIEW OF BITES AT SAFARI ZOO PERIOD 2013 to 2016

ACCIDENT RECORDS

All of the Accident Records were reviewed with the Health and Safety Coordinator for Safari Zoo for the period 2013 to 2016 (to the 19th September) with animal related Accident Report forms being identified and summarised in this audit. There was a total of 59 Accident reports over the four-year period but it is noted that this was an incomplete set of data for 2013 due to reports being held off site with regard to a historical incident. Animal bite or other animal injuries accounted for 20% of the incidents on site, however due to an incomplete data set in 2013 this reduces to 15% if only critically appraising 2014 to 2016. The prevalence being:

TABLE 01: ACCIDENT RECORDS RELATING TO ANIMAL INJURIES 2013-2016

Year	Bites	Total Accident Record reports	Bites (%)	Visitor numbers/ year
2016	3	9	33	250,000 TD
2015	6	41	15	336,000
2014	0	9	0	289,965
2013	3	NA	NA	283,479
Total	12	59	20 (15 corrected)	

TABLE 02: ACCIDENT RECORDS FREQUENCY PER VISITOR 2013-2016

Year	Bites	Visitor numbers	Frequency
2016	3	Est 250,000 to date	1 in 83,000
2015	6	336,000	1 in 56,000
2014	0	289,965	None
2013	3	283,479	1 in 94,000

TABLE 03: NATURE OF THE ANIMAL RELATED ACCIDENT REPORTS 2013-2016

See APPENDIX 1

DISCUSSION

There are a number of animal related injuries being reported and recorded on Accident Records at Safari Zoo. These vary from an incidence rate of 1 in 56,000 to 1 in 94,000 reports per visitor/year, with one year in the review period having no accidents reported at all (2014). In total, the number of reported animal related injuries was only 12 in a four-year period. None of these were of a serious nature and

none required reporting under RIDDOR (1995) nor a hospital visit. Obviously this is a small incident rate, for instance when compared to the frequency of death by avoidable causes in the UK in 2013 this was 221 in 100,000, with the risk of non-fatal injury being much higher (Office for National Statistics, 2015).

However, the overall Accident Record recording rate of only 59 total incidents across the park for the period 2014 to September 2016 appears very low for the number of guests that are admitted per year and the nature of the attraction. Simple slips, trips and falls (STF) forming the larger number of incidents at the park but again were surprisingly low. When compared to national statistics in 2013/2014 STF being responsible for more than half of all major/specified injuries with slips or trips estimated at an incident of 190 per 100,000 workers and falls between 48 and 77 per 100,000 workers of all reported incidents. Considering this statistic, which must be noted is not directly comparable to guests visiting an attraction so please accept some leniency in this comparison, would provide accident rates of 500 slips or trips per year based on the number of visitors assuming the rate was the same. The real number would be much lower than this as guests typically are relaxed, not carrying goods, walking on paths designed for ease of walking and are not rushing but it does give an indication of the low level of incident reporting on the site and therefore possible under reporting of accidents, including bite or animal related injuries.

Discussions with health and safety, first-aiders and keeping staff suggest that whilst low the overall rate of accident reporting, including animal related injuries, is perceived to be accurate. An Accident Record is completed for first aid responses at the time any accidents are reported, sometimes some days later over the phone if reported after the event. Compliance is high, primarily from concerns of litigation and ensuring documentation is appropriate as well as ensuring if there are safety issues then these can be addressed in a timely fashion to prevent further accidents occurring.

Why Safari Zoo has a such a low incidence of accidents being reported is unknown. Possibly it is the demographic of the guest and a lack of incident reporting in the general populace. When compared against industry standards of accident reporting it is well documented that as little as only 25% of minor accidents are reported in the work place, it is potentially less with guests that may not want to ruin the day for the family or "waste anyone's time" as there is plenty of warning signage with a large proportion of negative animal-guest interactions being a result of the guest's own actions and harassment of an animal (author's own personal experience when reviewing animal bites at other collections). However, this assumes that bite or animal injury frequencies are higher than reported, it is equally possible that these reported numbers are accurate and reflect the actual risk at the collection.

A reporting system of near miss documentation and daily record keeping would improve data collection to ascertain, possibly even validate, the current reported animal injury frequency.

Taking the reported incidents as an accurate reflection of the risk of bite injury the risk is very low, but it is not completely eliminated and as such it is an area of health and safety where steps can be taken to understand the cause of incidents and implement mitigation strategies.

TRIPADVISOR REPORTS

There is no process of near miss reporting or documentation currently in place at Safari Zoo. As such it is difficult to validate the accuracy of the Accident Record reporting with regards to the frequency of bite or other animal related injury. In an attempt to find alternative sources of animal incident data with guests TripAdvisor, the World's largest travel review site was considered as a potential source of information.

This is not without its risks and interpretation is limited as reviews are often very positive or very negative and may not capture the actual nature of injuries, it is not a site designed for accident reporting but is instead for guest experience, and there is considerable possibility of targeted inaccuracies depending on the perception or experience of the individual guest including 'deceptive opinion spamming' (Ott, 2013; Ott 2012). The following comments assume that the reported accounts are accurate and reflect the situation within the collection, ignoring the fact that the information is anecdotal and lacking in robustness. It does however provide an additional method of supplementing the current data set of the Accident Records.

TripAdvisor has a search engine tool which allows assessment of key words through the online reviews for a location. Specific words were searched for that may allow assessment of animal related injuries. There were 2376 reviews written in English at the time of assessment, with the additional 3 being in a non-English language and excluded from the data set on the grounds that they could not be read. The following words were searched for and details of context and incident were documented, full accounts are outlined in Appendix 2; 'bite', 'bitten', 'injury/injured/injur', 'scratch', 'peck', and 'kick'. The review period was from 2010 to present day. The results were as follows:

TABLE 04: TRIPADVISOR REPORTED ANIMAL INCIDENTS 2010 - 2016

Search criteria	Total reviews	Actual animal injuries	% of all reviews	Average
Bite	23	1	0.04	0.2 /year
Bitten	7	2	0.08	0.3/year
Injury / injured	3	0	0.0	Zero
Scratch	4	0	0.0	Zero
Peck	4	3	0.13	0.5/year
Kick	5	1	0.04	0.2/year

Based on 2376 TripAdvisor reviews for Safari Zoo, period 2010-2016

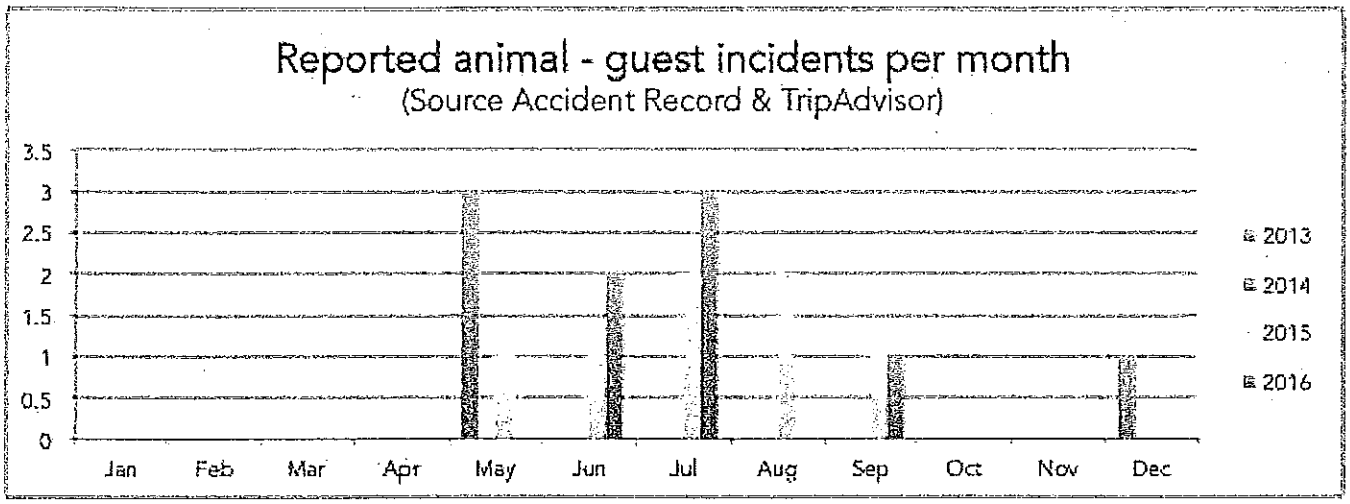
TABLE 05: COMBINATION OF ACCIDENT REPORTS AND TRIPADVISOR REVIEWS ANIMAL INCIDENTS PERIOD 2013 TO 2016 PRESENT

Date	Species	Incident	Source
2016			
18/06/16	Vulture	Daughter bitten by vulture (title)	TA
18/06/16	Vulture	Daughter did get a nip from a vulture though - no broken skin just bruising so it wasn't trying to bite but shook her up. No real harm done and what a fantastic interaction (review)	TA
28/07/16	Vulture	A vulture took a likening to person X, it went for her bag and top and has left a small scratch on her arm.	AR
26/07/16	Vulture	Vulture being inquisitive to bag and coat	AR
25/07/16	Vulture	Vulture inquisitive to walking stick, pecked jacket and lower arm breaking the skin.	AR
Sep-16	Emu	strong peck so beware (emu)	TA
2015			
13/05/15	RT Lemur	Feeding lemur, lemur bite/scratch on finger.	AR
01/06/15	Lemur	Lemurs got excited and bit him by accident (he is fine, only a tiny cut)	AR
19/07/15	Prairie dog	Was feeding prairie dogs and one bit him	AR
22/07/15	Squirrel monkey	Feeding squirrel monkeys and one bit her finger	AR
10/08/15	Condor	Condor felt threatened by camera on ground, approached lady's foot.	AR
24/08/15	Squirrel monkey	Feeding duck and bitten by squirrel monkey	AR
11/09/15	Emu	Beware the emus was only pecked and bitten half a dozen times	TA
2014			
None reported			
2013			
02/05/13	Emus	Feeding the emus, walked away and the emu came up behind the little boy and pecked the boys left ear.	AR
04/05/13	Unknown	Were next to a man with animal food, he was shaking it, it went everywhere and in the excitement the gentleman got caught on his right hand, small cut to middle finger. Gentleman did not know what caused it.	AR
12/05/13	Penguin	He was holding the fish the wrong way whilst feeding the penguins, penguin took the fish but took too much catching the man on the middle right finger.	AR

01/12/13	Donkey	I did see a donkey kick a woman as she was bent stroking a little billy goat	TA
02/05/13	Emus	Feeding the emus, walked away and the emu came up behind the little boy and pecked the boys left ear.	AR

Source: AR: Accident Report, TA: TripAdvisor review

FIGURE 01: COMBINED ANIMAL INCIDENTS BY MONTH 2013 to 2016



DISCUSSION

Whilst TripAdvisor is not a reliable source it does provide a guide for the number, frequency and type of animal related injuries experienced by the guests and to the location where they occurred. To rely on this as an accurate source is questionable, especially considering the scope of the review site not being designed to capture health and safety data. However, as there is no near miss data currently recorded at Safari Zoo it does provide some information that is considered potentially beneficial when compared against the Accident Reports.

There was no cross over between TripAdvisor and Accident Reports demonstrating that there is an under reporting of animal incidents in the Accident Records. The initial number of Accident Records being 12 during 2013 to 2016, with a further 4 TripAdvisor incidents added for the same period. However, as suspected when reviewing the Accident Reports the non-reported TripAdvisor animal incidents were typically considered minor or non-existent e.g. peck from emu (accounting for two), peck from vulture ("no harm done") and a kick from a donkey (no longer in the collection, 2013, noted by another guest) being the only potentially serious one. In all cases where an animal injury was reported the TripAdvisor rating, out of a maximum of 5, was often high with nothing less than a 3 suggesting that the incident had not impacted the day and hence likely not been reported due to the minor nature of the incident. Also interesting was the lack of any animal injuries reported in 2014, the same as that of the Accident Record system.

Seasonality was similar as well, see Figure 01, with, as would be expected, most incidents happening in peak season June to September with a few incidents outside this with 2013 being particularly of note (all non-related).

TRIPADVISOR IMAGES

To augment the TripAdvisor review all of the images associated with the reviews were assessed in an attempt to document the level of appropriate animal-guest interaction, the level of inappropriate guest-animal interaction and the level of compliance with current policy. All of the 2057 images assessed were taken over a period of 2009 to 2016, with a large number being in the last 12 months.

Assessment was based with putting an image into one of four categories:

Not reviewed:	Image of animal or person but no animal-person interaction
Appropriate:	Animal – guest interaction with appropriate, low risk levels of interaction, compliant with park policy.
Inappropriate:	Animal – guest interactions that could potentially result in injury or zoonotic disease risk exposure, this included lying in animal waste, face against or very close to the animal, evidence of fingers in mouth after handling, or grabbing animals
Compliance failure:	Animal – guest interaction failing to meet policy in park organised interactions i.e. animal feeding.

Examples include (note, faces blanked out as no permissions for children or adult likenesses):

FIGURE 02: APPROPRIATE ANIMAL-GUEST INTERACTIONS

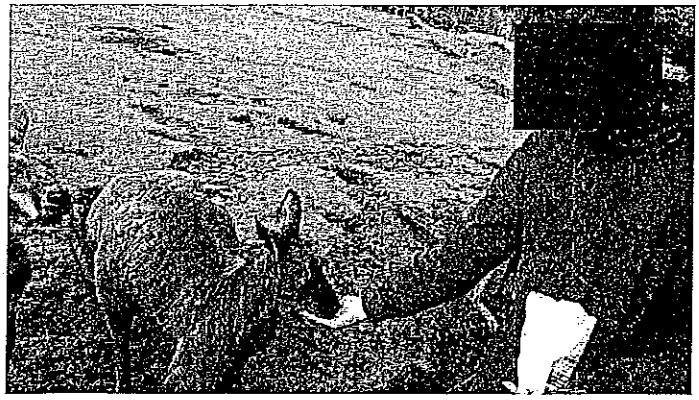


FIG 02: (Top) Feeding the kangaroos with a flat palm and food designed for the kangaroos as per instructions, and (left) walking along with the animals, not touching or inappropriate feeding or touching.

FIGURE 03: INAPPROPRIATE ANIMAL-GUEST INTERACTIONS

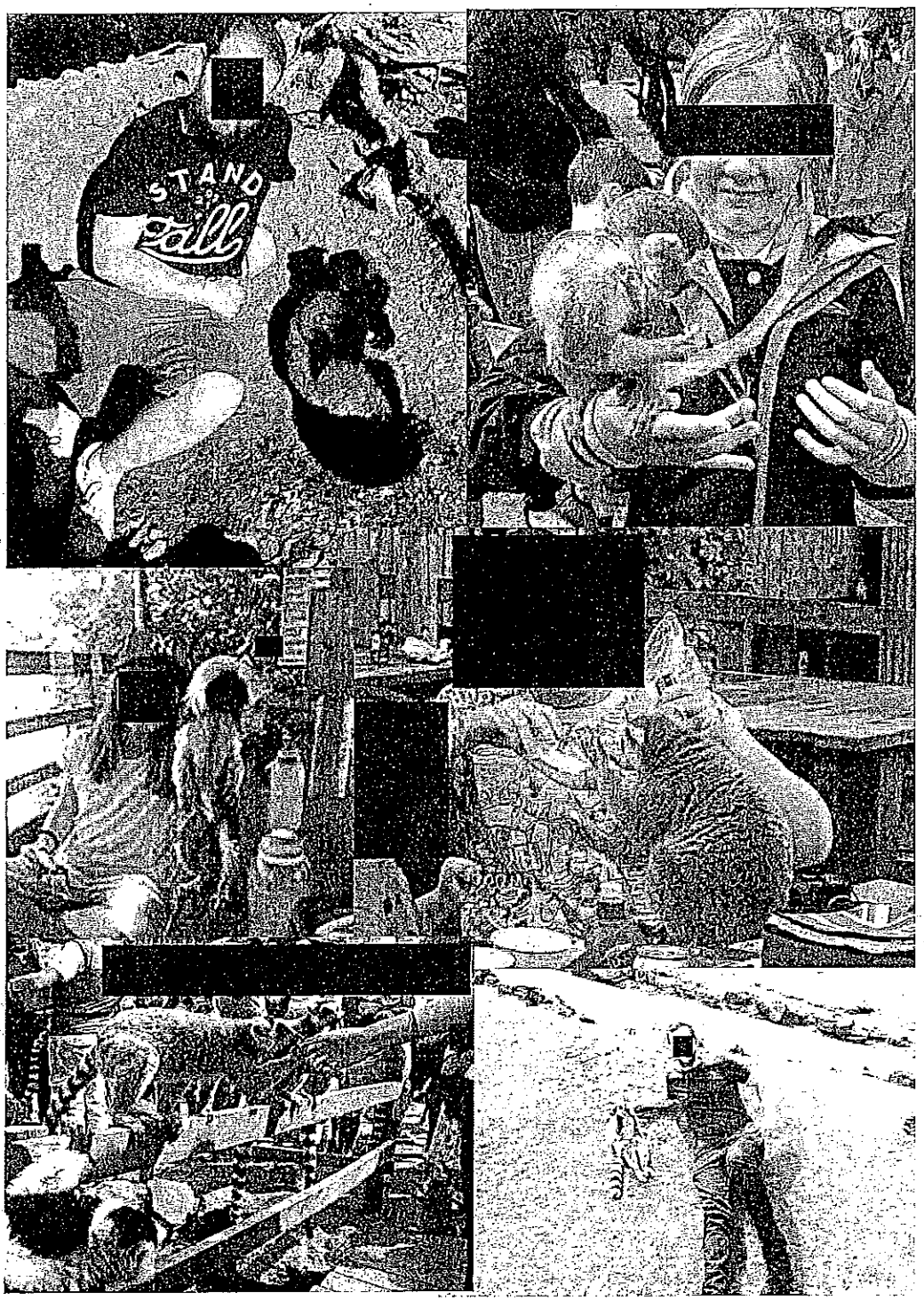


FIG 03: INAPPROPRIATE ANIMAL-GUEST INTERACTIONS NOTE: Many of these are not reflective of current practices and would not be tolerated by today's policies at Safari Zoo, these images reflect interactions over the last 7 years. (Top and bottom right) Guests laying with lemurs on ground where animal faeces maybe present and risk of zoonoses on clothing; (top) squirrel monkeys climbing on guests: strongly discouraged with use of water pistols and now at low to negligible levels; (middle left and right) primates entering the picnic and eating areas – designated areas for feeding are segregated from primates with electric fence, however some risk still present on paths of the park with free roaming primates; (bottom left) naked hands for feeding experiences – this is no longer

TABLE 06: TRIPADVISOR ANIMAL- INTERACTION IMAGES REVIEW

	Appropriate	Inappropriate	Compliance failure
2016 only	152	5	17
2015-2009 grouped	93	28	22
Total images	245	33	39
Percent of all images	12%	2%	2%

Total number of images reviewed 2057

DISCUSSION

The majority of the images (80%) on TripAdvisor demonstrated good compliance with the posted rules of the park and guest safety during animal-guest interaction. A small number demonstrated minor risks, using a severe interpretation, where members of the public had put themselves in a position where they could become injured or contract a potential zoonotic disease. Faces near animals for selfies was particularly common in the last 18 months with it rarely being seen prior to that. The increase in numbers of images increasing the frequency of 'Inappropriate' or 'Compliance Failure' images in 2016 was thought to be simply because there were more images in 2016 to review. This is a growing trend with the need for typically younger guests to have a picture with the animal for their social media sites. Grabbing or stroking animals was uncommon but present in a small number of cases. Failure of compliance with policy was limited to a period ranging from 2009 to early 2016 with no evidence that policies such as wearing appropriate PPE at supervised feeding were not being followed post the middle of 2016 (probably a result of the mid-year formal zoo licence inspection and changes in policy as a response).

A very small number of individuals were undertaking what was deemed stupid risks but were unlikely to be aware of the consequences despite the heavy signage at the entrances to the walk-throughs e.g. individuals lying on the ground with animals. Again these were considered likely for social media pages, including uploading to review sites.

Of particular concern were the two images of primates in public feeding areas. These images are historical and reflect previous failures to separate animal access to guest eating areas. This is reviewed in detail later in the second part of this review. Both showing food or drink items and one with a ring tailed lemur (*Lemur catta*) directly interacting with a guest whilst they feed their young son.

In summary, despite a small number of mostly historical, concerning images as outlined above, the majority of the images demonstrated normal animal-guest interactions with the animals in their walk through exhibits that are comparable to many other collections. At feeding times, especially, in the last 6 months keeper presence is high and visible in most images with policy on animal feeding generally being followed. There was only one image showing a primate sat on a person (image above) and two with parrots actually on people. There were no major concerns raised

following the image review that haven't already been addressed with recommendations following the Accident Record and TripAdvisor review audits.

ANIMAL-GUEST INCIDENTS: LOCATION AND SPECIES INVOLVEMENT

The information collated from the Accident Records and TripAdvisor comments was utilised to identify any common features as to location, species involvement and any possible causative factors in the recorded bite incidents. The Accident Records had more detail to assess due to the nature of the form and interview with the guest involved, whilst the TripAdvisor comments were often made in passing with little detail except for species and nature of the injury (if any).

FIGURE 04: SAFARI ZOO WALK THROUGH EXHIBITS

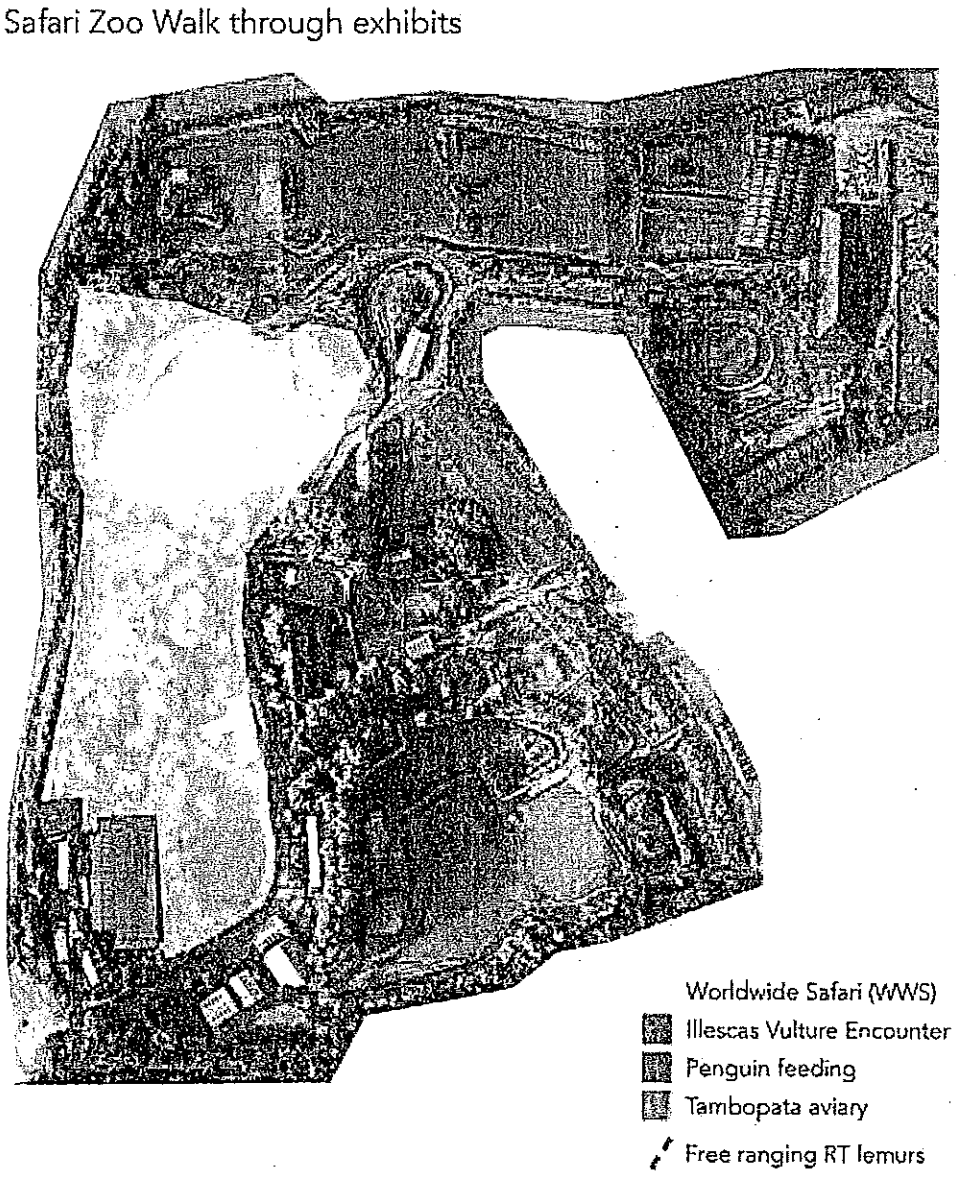


FIGURE 05: ANIMAL-GUEST INTERACTION INJURIES LOCATION 2013 – 2016

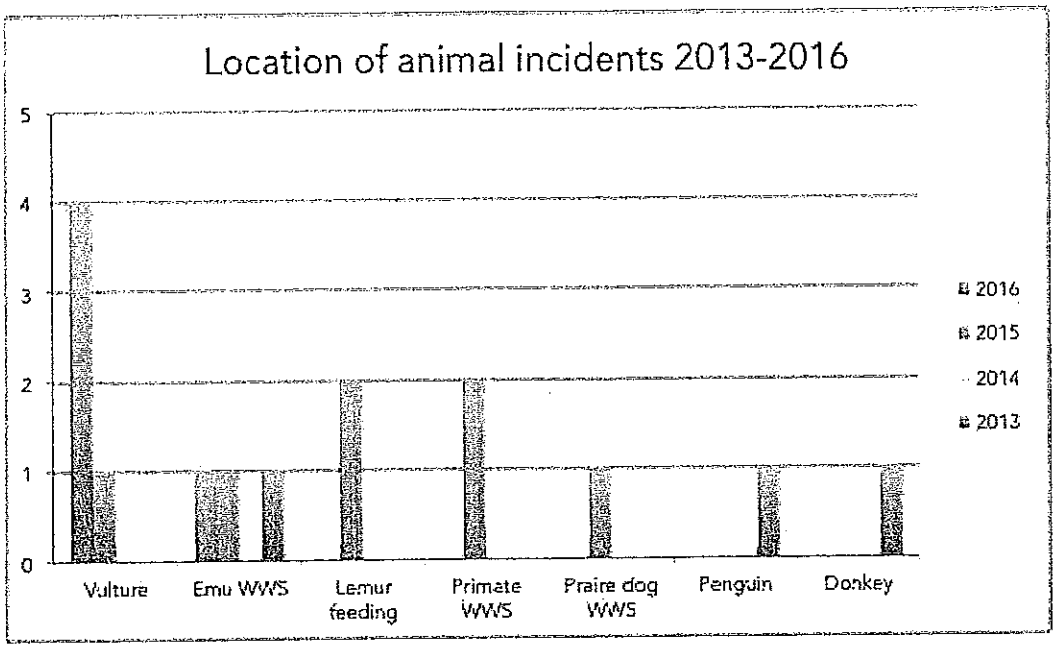
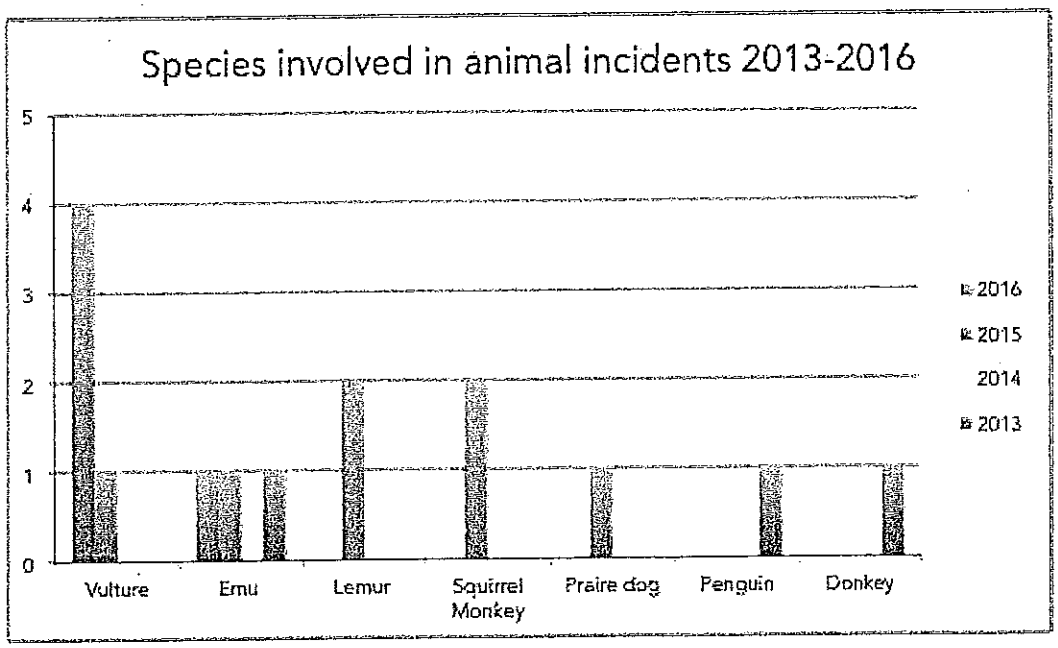


FIGURE 06: ANIMAL-GUEST INJURIES: SPECIES INVOLVED 2013-2016



DISCUSSION

The most common species, which is only found in the Illescas Vulture Encounter, were the vultures. This is a relatively new exhibit that is only 18 months old and therefore does not feature in data prior to 2015. Looking at the spread of the vulture incidents these appear to be at the beginning of the peak season and are thought to be the

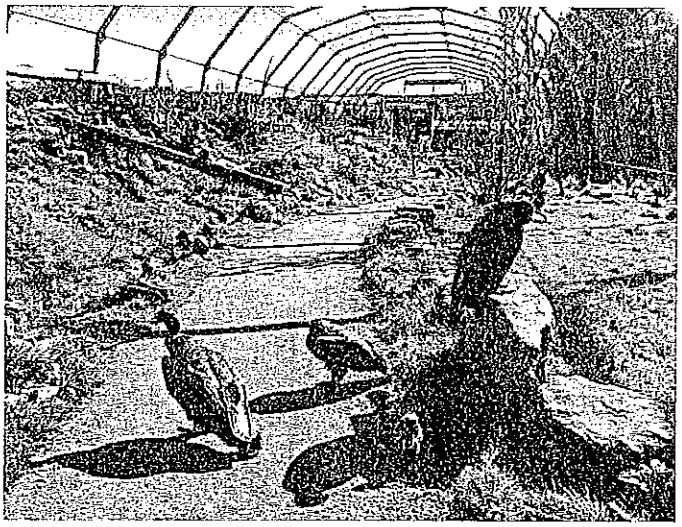


FIGURE 07: Vultures and Condors using the path in the Illescas Vulture Encounter aviary – it is thought that the incidents related to them was caused by inquisitiveness as numbers increased early in the season this year. Manning the aviary when it is open has reduced the number of incidents to zero since July.

vultures responding inquisitively to increased numbers of people compounded by their using the path as a resting place when it is quiet (see figure 07). These soon dropped off in frequency as the numbers of guests increased and the aviary was manned throughout the opening period.

The second biggest groups were the animals being fed namely the emus, penguins, lemurs and the squirrel monkeys (which were not meant to be fed and represented failure of guests to follow the clearly sign posted rules). All of these incidents, squirrel monkeys aside, occurred during park organised feeding events – either unmanned in the case of the emus or supervised in the case of the lemurs and the single penguin incident. With regard to the penguin incident this was an isolated incident with the guest failing to hold the fish adequately and the penguin catching his finger in the process. Processes were reviewed and instruction made clearer and similar incidents have not been reported since 2013.

With regard to emus these are considered minor incidents – three reported animal-guest interactions between the Accident Records and TripAdvisor. Primarily these are the emus being inquisitive and having a relatively strong peck which is equivalent to a hard tap. The one incident in the Accident Record was unfortunate and the young boy was pecked on the ear whilst walking away from the bird once feeding had been terminated. This was assessed by a first aider and was considered the most severe of the emu pecks.

The two lemur bites occurred during feeding in 2015 – these both reported the lemurs biting/scratching and in one case they got excited. The policy has been updated to ensure that lemurs aren't crowded, guests stand back from the rail and lemurs are not to be fed unless they are on the rail. This last point prevents large numbers of lemurs congregating and individual guests being overrun with lemurs. The process of handing out gloves and food, the latter not received until the former is put on, is also much quicker so there is less frustration between lemurs and all animals fed at a similar time. These changes were instigated early 2015 based on lessons learnt from historical feeding and the result has been no reported injuries this year at lemur feeding.

Squirrel monkeys are not a species fed and would on rare occasions mob a guest if they had food. Whilst they are still inquisitive and like to watch guests from the trees in Worldwide Safari (WWS) they are now trained not to come close to the visitors with the use of water pistols. This was quickly learnt and the water pistols are still employed by trained staff members in WWS to ensure that the squirrel monkeys are gently encouraged not to climb on guests.

The prairie dog and donkey were both single incidents, with unknown instigating factors. The donkeys no longer form part of the collection. The Prairie dogs are not considered a problem with the stocking levels reduced in 2015 and monitored, the incident taking place before the population management was instigated.

STAFF PERCEPTION

To augment the quantifiable data set with regard to animal related injuries at Safari Zoo the final part of the assessment was interviews with key members of staff involved in first aid, health and safety as well as keeping staff involved in guest animal experiences as well as policing pf walk through areas.

A total of 6 staff were interviewed (health and safety coordinator, two senior keepers (one of which was a first aider) and three keepers). They were asked initially how common were bite, scratch or other injuries in their opinion, once answered they were asked the same question against the actual data.

In all instances the staff believed that the incident rate was low and that the stated figures were probably accurate, one member of staff hazarded a guess at 5-6 incidents a year which whilst higher than the Accident Records is comparable with the collected incidents of Accident Records and TripAdvisor reports.

The interviews were subjective and based on perception rather than documented reviews. However, they did correlate with the documented accidents. This lack of clear documented evidence highlights the requirement for a robust record keeping policy with regards to near misses and actual reports by staff on site within the walk through areas. This is not to say that the numbers are accurate or inaccurate, just that they cannot be validated because the process lacks robustness and statements are based on opinion rather than being evidence-based.

ADDITIONAL INFORMATION

ZOONOSES SURVEILLANCE

An important aspect of any review of Animal-Guest Interactions is the knowledge of a collection of the potential zoonoses contained within the collection. Zoonoses are disease that can be passed from animals to man, or reverse zoonoses that can be

passed into the collection animals direct from guests or staff. There are four principle sources of zoonoses in a collection:

- Wildlife Vectors – native wildlife, especially in Safari Zoo's case seagulls, ducks and passerines, can potentially act as vectors of disease that can be passed directly to guests or via collection animals
- Collection animals – disease is a normal part of husbandry management and surveillance programmes are undertaken to ensure checks are made to ensure the health of the collection but also to mitigate and manage the presence of zoonoses where required.
- New imports – it is especially important, especially with large complex collections to ensure adequate health checks are made of any animals coming into the collection. Quarantine and isolation form part of the checks as well as testing before they arrive and in some cases after they arrive to ensure biosecurity of the collection and legislative compliance in some cases e.g. balai.
- Guests – often overlooked and extremely hard to police, guests bring in potential zoonoses that can infect the animals (reverse zoonoses) and pass back to other guests, there are many documented cases where this has happened.

Preventative and Curative Health Care Programmes primarily focus on the second and third routes of transmission, with the others being extremely difficult to manage. Preventative health care programmes are put in place to mitigate the risk of zoonoses in animal encounters, balanced with surveillance programmes that consider the causes of disease, the causes of death and the presence of normal or subclinical pathogens that may cause disease if guests were to be exposed. Such a programme of surveillance forms a critical part of the written health care programme and that is not different at Safari Zoo.

VETERINARY HEALTH CARE PROGRAMME

The Veterinary Protocol Document, as submitted at the previous formal zoo licence inspection, outlines the surveillance programme carried out at Safari Zoo. It states that:

"Checking for the presence of internal and external parasites is a routine process with a written schedule of testing for each species needing testing. Keepers are responsible on a daily basis to closely observe the animals in their care. Any abnormal symptoms or behaviour must be noted and reported to the Veterinary coordinator who is the direct link between Keeping staff and the Vet. Veterinary advice may then be sought and suitable action taken to treat any abnormal conditions. Regular veterinary visits at a minimum of once a week, allow good checks to be maintained on the general health and welfare of the animals. These visits enable discussions on veterinary management to take place with the Veterinary coordinator or management. All treatments administered to the

animals are recorded and the reason for treatment is to be given. Laboratory sample testing will allow for accurate diagnosis of disease. The veterinary surgeon carries out the following testing: haematology, parasitology, bacteriology and faecal analysis when he feels fit. Routine faecal samples of all animal groups are performed to check efficacy of anti-parasitic treatments as noted above. Necropsy or post mortem examination of animals that die is routinely carried out on all specimens by the veterinary surgeon or other laboratory at the discretion of the Vet or Authorities and the results recorded. All primates will be sent to Laboratory for post mortem. All birds will be tested for a complete avian scan, including, e.coli, psittacosis, salmonella. All animals will have a detailed clinical record, including all illnesses, treatments, drug used and dose. Animals will be tested every 6 months for parasites, this will be done by a group faecal sample. Samples will be taken from all enclosures indoors and outdoors. Bacteriological tests will be done every 6 months."

It goes on to state, in the Bacteriological Screening Policy that:

"The zoo has implemented a Bacteriological Screening programme to follow the Balai Directive guidance. We are sampling specific risk areas and species routinely to a written protocol. For infectious diseases see PM policy and live sampling as appropriate if suspicion by ill-health. Specialist advice will be sought from e.g. Chester Zoo/Defra/AHVLA in the event of infectious disease suspicion under our Balai Agreement. Sampling for infectious disease (Chlamydiosis, E. Coli and Salmonella) will take place every 6 months in the following areas:

- *Kangaroo Section*
- *Lemur section*
- *Bird section*
- *Giraffe and rhino section*
- *Primate section*
- *Bear and cat section*

Samples will be taken on swabs and sent to a laboratory approved for such testing. Monitoring of Chlamydiosis, E. Coli and Salmonella will take place every 6 months. If positive results found, animals will be isolated and treated. All results to be recorded on Animal Management file and in ZIMS"

The Veterinary Protocol Document outlines a comprehensive programme of surveillance and has additional components including a disease surveillance protocol and post mortem policy. The Animal Management file, clinicopathological records, post mortem records and associated documentation were assessed as part of this review to ascertain the level of risk of zoonotic disease identified by the 6 monthly surveillance programme as outlined above.

SURVEILLANCE & CLINICOPATHOLOGICAL RECORDS

The Animal Management Files were reviewed and every laboratory report, both internal and external, recorded to an excel file to allow comprehensive analysis. Evidence of a similar system existed within the zoo with actions taken in response ot positive results on lab testing but this was not available until the end of the review period.

Note: It is possible that other test results exist and are stored elsewhere, however no evidence was found on the veterinary computer of electronic records in addition to the hard copies and the Veterinary Coordinator and park Veterinarian were both off of the week of the site visits when the clinicopathological records were reviewed. To the authors knowledge these are an accurate record of the clinicopathology records. In addition in the last month of the data period reviewed some tests were still awaiting review and had not been signed off and therefore not placed into the permanent record.

The hard copy records made available were for the period 2014 to current day (23rd September, 2016). These included surveillance programme documentation, clinical case diagnostic tests and importation laboratory testing. A total of 207 records were identified for this period, with tests being assigned to one of four categories, excluding post mortem data which was recorded separately (see later). Categories tests were assigned to included:

Parasitology: Either in-house or external, often forming part of a health screen where a faecal may have both parasite and bacteriology burden assessed (in such cases these were recorded as two separate tests by category).

Microbiology: Bacteria or viral testing, Avian chlamydiosis testing included in this as typically performed on faeces, however specifically separated when reviewing relevant species individual and put into 'other (PCR)' category

Bloods: Any biochemistry or haematology results that were undertaken as part of diagnostic tests or export/import procedures.

Other: Any test that did not fall into the categories above.

SURVEILLANCE & CLINICOPATHOLOGICAL RECORDS – REVIEW

The Veterinary Protocol Document highlights specifically 6 areas that are to undergo 6 monthly parasite and bacteriology screening which would be counted in the above system as 13 tests (6x Parasitology and 6xMicrobiology 1x Chlamydiosis PCR). For the three-year period of assessment this would equate to 13 x 2 (6 monthly) x 3 years which is a total of 78 tests minimum surveillance testing. In addition, in the period 2014 to present day there was a total of 349 animals imported into the collection [2014 (155), 2015 (172), 2016 (22)] which would have been expected to have a minimum import testing regime, although these maybe recorded elsewhere or tested

as groups this was not clear in the documents reviewed. On top of that would be day-to-day clinical and diagnostic tests.

Considering the number of new imports and exported animals the import and export testing was considered lower than expected. There was good evidence of psittacines being assessed on importation but little else and only one animal (a gentle lemur) clearly categorised as an export health screen faecal for parasitology and bacteriology.

TABLE 07: SUMMARY OF NATURE OF CLINICOPATHOLOGY TESTS 2014 – 2016

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	28	3	0	0	31
2015	53	40	2	0	95
2016	58	18	5	0	81
Total	139	61	7	0	207

Current September 22nd, 2016 – independent of microbiology from post mortems

See Appendix 2A for summary data sets for individual species.

Parasite screening on the whole was at a reasonable level, especially the walk through areas but was lacking in frequency of testing in some areas including macropods, and vultures. This was primarily to a reasonable standard and carried out in-house. Documented photographic records were kept of the parasites found in a well-documented reporting system with occasional misidentification e.g. grass roots mistaken for parasites. However, actions were taken and animals treated with anthelmintics when positive and misidentification at worse resulted in animals being wormed when not needed which is preferred in zoonosis management rather than no action when suspected pathogens were present.

Microbiology screening, based on the documents identified, appears to be opportunistic based on clinical disease and some imports or exports. The testing regime did not appear to be consistent with 6 monthly testing of the suggested groups on the whole and there did not appear to be much in the way of faecal bacteriology checks of walk through animals e.g. primates were either non-walk through or were clinical/export cases which may not have been representative of the collection as a whole e.g. no ring tailed lemurs had surveillance faecal bacteriology carried out despite free ranging across the site.

This oversight being identified as part of the review and highlighted to senior management resulted in immediate faecal bacteriology surveillance carried out on the primary walk through exhibit risk animals, namely:

- Illescas vulture aviary
- Tampopata aviary
- RT lemurs free ranging group

- Lemur middle house
- Lemur feeding area
- Squirrel monkeys
- Capybara
- Macropods
- Peacocks
- Emus

The results of which are still awaited at the time of writing (sent 22nd September).

Chlamydiosis (Psittacosis / Ornithosis) screening was carried out, particularly on imports but again appeared to be missing as part of the structured surveillance programme. As a result, the pooled three-day collection of faeces was also added to the testing samples listed above. All chlamydia testing carried out as part of the living collection was negative.

When considering potential zoonoses the following were found in the limited testing carried out:

WALK THROUGH SPECIES

2015	Lemur	Haemolytic *E.coli* (Bacteria)
2015	Lemur	*Pseudomonas spp.* (Bacteria
2015	Lemur	*Hymenolepis nana* (Cestode)
2015	Lemur	*Campylobacter spp.* (Bacteria)
2016	Squirrel monkey	Round worm larvae (Nematode)
2016	Lemur	Tape worm (not speciated – suspect *Hymenolepis nana* as same species affected)

NON-WALK THROUGH BUT ANIMAL EXPERIENCE SPECIES

2014	Carnivores (many sp)	*Toxascaris leonina* (Nematode)
2015	Spider monkey	*Enterobius vermicularis* (Pin worms)
2015	Carnivores (many sp)	*Toxascaris leonina* (Nematode)
2016	Carnivores (many sp)	*Toxascaris leonina* (Nematode)

In summary there is a surveillance programme in place which predominantly uses in-house assessments of parasite burdens to reasonable effect. The microbiology and import/export testing is poorly documented, unless held elsewhere and not located during this review. This is an area that needs improvement, simply by complying with the stated Veterinary Programme suggested routines. In addition, it is recommended to aggressively assess the subgroups in the walk-throughs as outlined in the testing above to ensure robust assessment of the potential pathogens in the walk through areas and the creation of a well-documented audit trail demonstrating that there are no pathogens of a zoonotic nature in the collection, which is not possible at this present time of writing.

SURVEILLANCE & POST MORTEM RECORDS – GENERAL TRENDS

Post mortems are a useful form of assessing the prevalence of potentially infectious and zoonotic diseases in a collection and enable proactive steps to be taken for the remaining living collection.

The Veterinary Protocol states that:

> *"Under guidance from AHVLA under the Balai Directive we Post-Mortem examine every animal that dies in the collection. These are conducted by one of the park vets, and will be done within 24 hours after death of animal. In case of weekends there is a fridge available where dead animals could be placed double bagged. Based on results of Gross PM, appropriate samples will be taken for histopathology if necessary (samples sent to e.g. IDEXX, AHVLA or International Vet Group as appropriate). If death unexplainable by PM and considered suspicious the park vet will seek specialist advice and follow the Balai Directive requirements for determining whether further investigations into disease risk are needed."*

A well-documented veterinary post mortem system was available and all of the paper records were sorted and reviewed. The review period was 2013 – 2016 (to 19th September, 2016) with a total of 486 deaths reviewed, totaling almost 10,000 data points including species, location and cause of death.

The complete data set is located in Appendix 3B.

The most common cause of death annually was a diagnosis of 'open' where a firm diagnosis is not reached because there is little of the body remaining, the tissues decomposed and unable to be assessed fully, or other reasons that prevent a diagnosis being made. This was in the region of a quarter of all deaths within the collection. This has slowly decreased with improvements in the postmortem system being implemented in 2013/2014 where the 2013 'open' category accounted for 66% of all deaths. Predated by native wild animals are likely grouped in here as historically there have been stoat issues on site and many of the water fowl were eaten and unable to be postmortemed. Predation is often included in the category of 'trauma' but no actual diagnosis was made except where other collection animals had predated species and these were included in 'conspecific injury'.

Infectious disease accounted for the next biggest group with approximately 20% annually of animals succumbing to infectious disease. This is not an unusual level of mortalities attributed to this group and will be discussed in detail below. This group would include the zoonotic diseases, where present.

Other causes of mortality which are made note of due to the high level included 'conspecific injury' where collection animals either killed the same species or other species predated animals of another species either in mixed exhibits or when free

ranging lemurs came too close to carnivores. This accounted for a massive 18% in 2015 and 15% to date this year. Even with the species in the collection this was considered high. It is mentioned here as a large proportion were primates and galliformes and possibly suggest social breakdown in the large primate populations or overpopulation with the pheasants. It is not inconceivable that species fighting may take place close to members of the public resulting in them getting scratched or even bitten. Population reviews and appropriate demographic structure would alleviate this welfare issue as well as mitigate any risks of guest and staff injury.

RTA / trauma also accounted for an unusually high number of deaths with 7% (2015) and 14% (2016). Some were due to the road train running animals over but many were unexplained fractures and or other traumatic lesions that ultimately led to the death of the animal.

The overall mortality events for the size of the collection were not considered high, however the distribution of deaths by category was considered unusual and supports comments made at the last formal inspection.

FIGURE 08: SAFARI ZOO POSTMORTEM DIAGNOSIS DISTRIBUTION 2013-2014

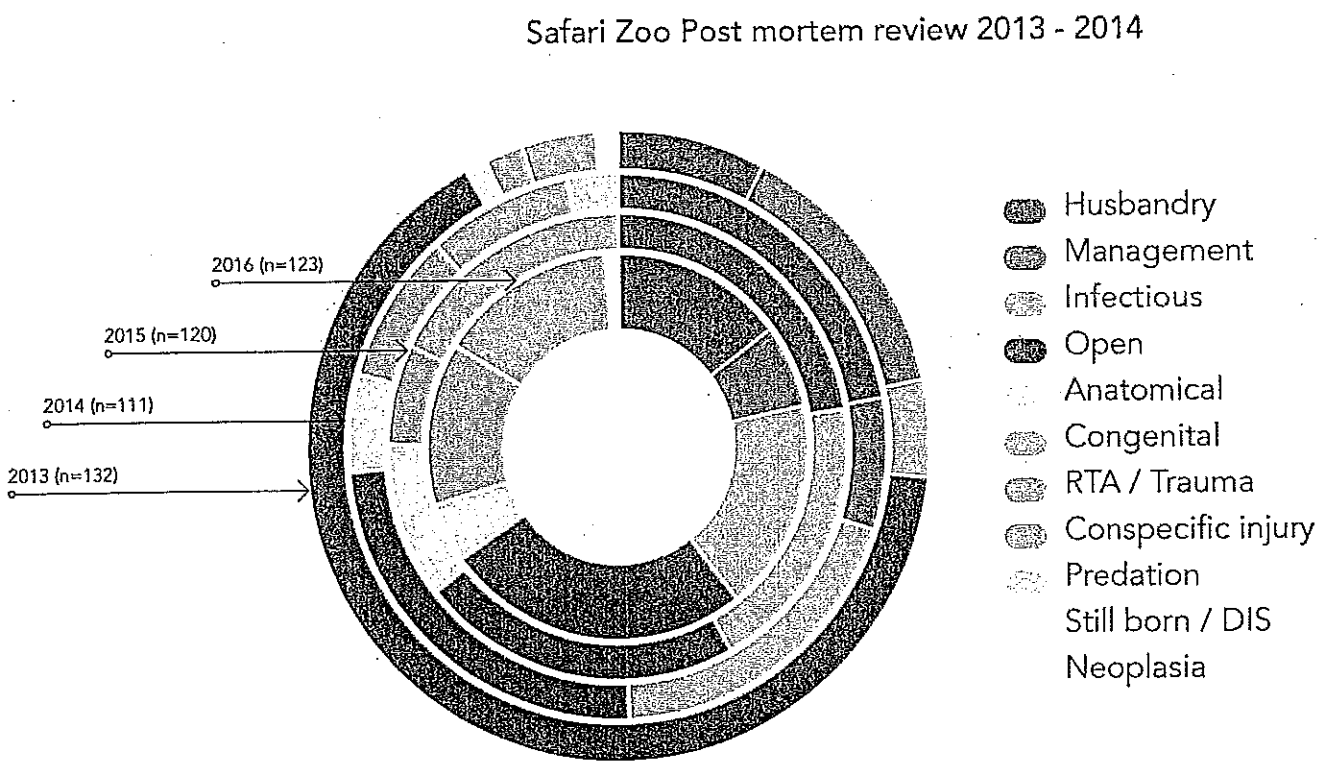


FIGURE 09: CONSPECIFIC INJURY

Fig 09: Relatively speaking the level of conspecific injury was high, some of these were due to the free ranging lemurs entering carnivore enclosures, here the Sumatran tiger exhibit.

There has been a considerable investment in time and resources towards the post mortem surveillance programme over the last four years and it continues to grow. All animals are accompanied by a deaths submission form and in recent years this is accompanied by a post mortem report which was introduced by the Veterinary Coordinator (FRS):

FIGURE 10: IMPROVEMENTS IN PME DOCUMENTATION & REPORTING

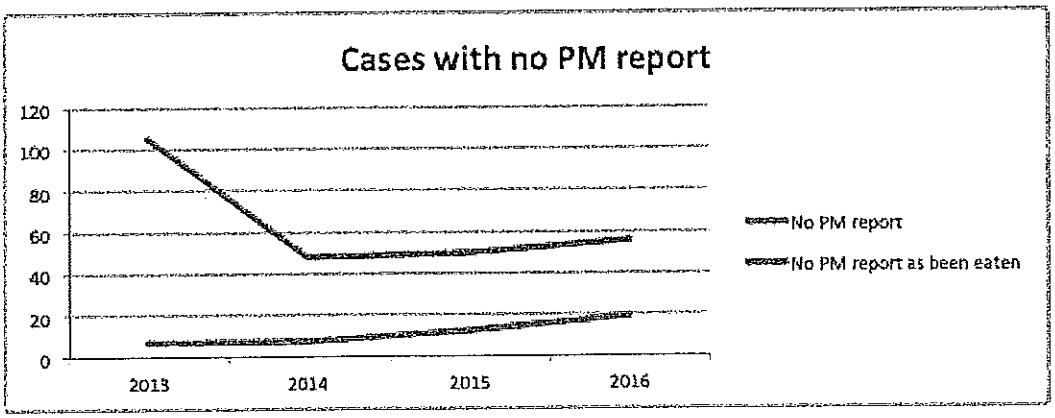
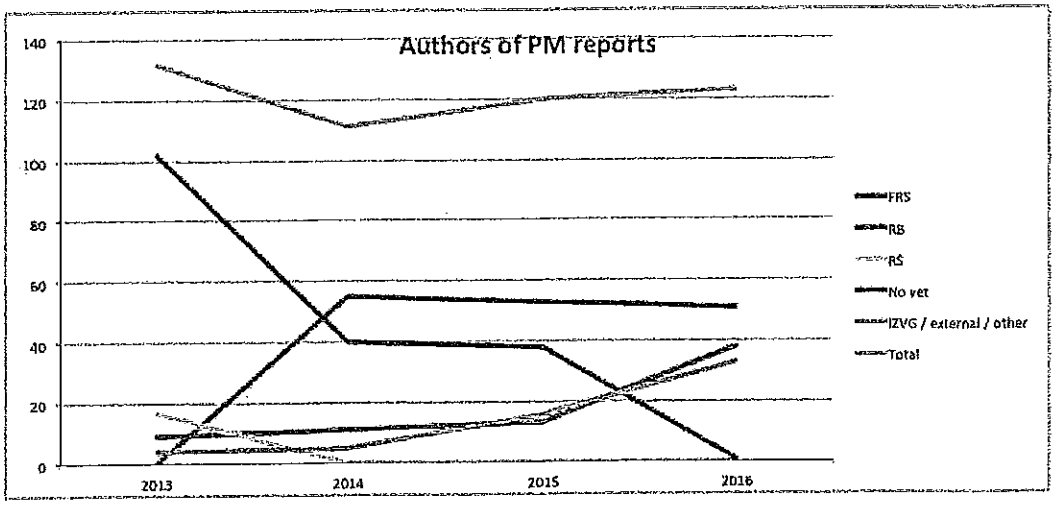
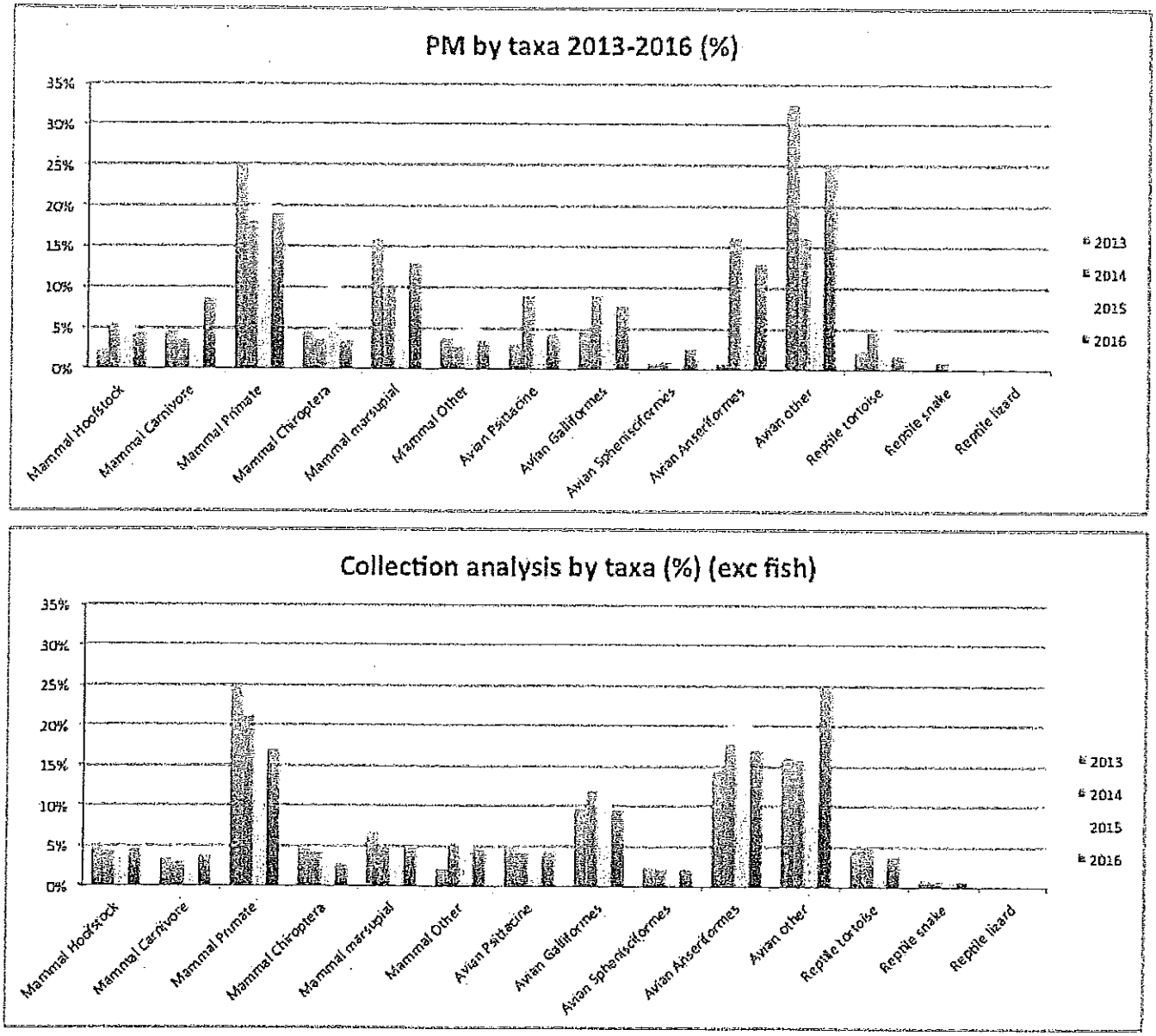


FIGURE 11: AUTHORSHIP OF PME REPORTS



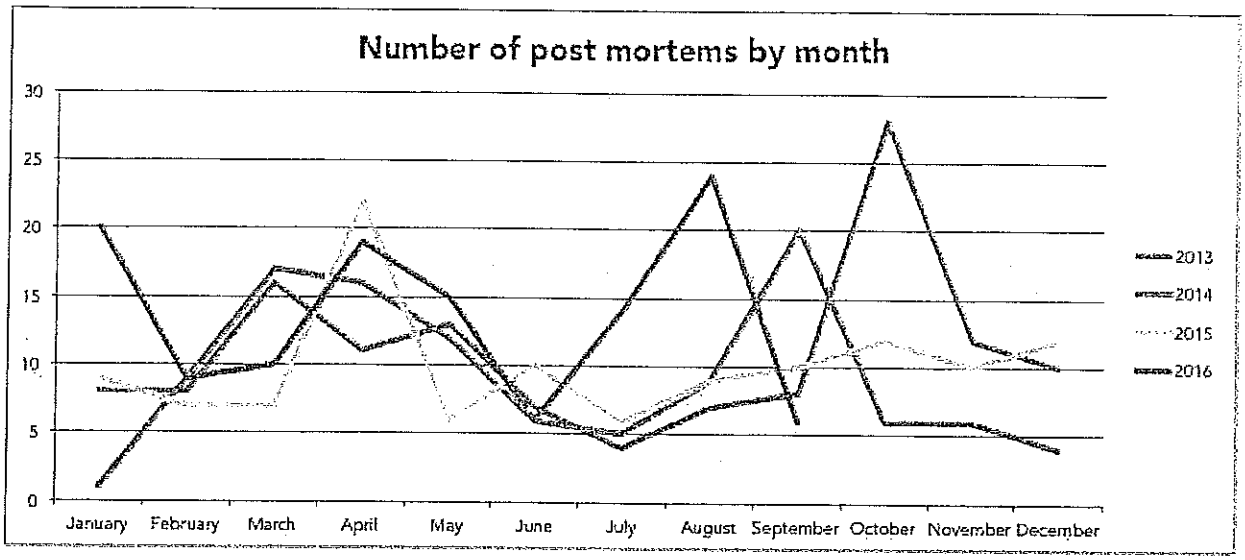
The post mortem submissions representation of the collection as a whole is reasonable and the findings at post mortem examination can be used as a marker for the presence of zoonotic pathogens in the wider collection. It should be noted that the primate and macropods are actually over represented as the percentage of deaths of total death population is higher than the percentage that these species make-up of the collection as a whole (see Figure 12):

FIGURE 12: PME BY TAXA COMPARED TO COLLECTION STRUCTURE



The annual trends and mortality patterns are reasonably consistent year on year and represent environmental changes and adverse weather related exposure or increased susceptibility to disease (see Figure 13):

FIGURE 13: PME DISTRIBUTION BY MONTH



SURVEILLANCE & POST MORTEM RECORDS – ZOONOSES

Zoonotic disease, if the primary cause of death, would be found in the 'infectious' category. However, surveillance requires that all animals be assessed for the presence of disease as an animal may succumb to another cause of death but be a carrier or show evidence of subclinical disease. Reviewing the PME reports, unless in the 'infectious' disease category no statements were made to the presence or lack of presence of other findings at post mortem unless they had been sent away to an external laboratory (an increasing practice in the last 12 months – see figure 11). As such the surveillance comments are limited to the 'infectious' category for the purposes of this review.

Infectious disease was sub-categorised into different categories including:

Low or no zoonotic potential: Deaths that were considered unlikely to be zoonotic, despite being infectious due to the species and the location of the lesion e.g. necrobacillosis in a macrpod.

Unconfirmed potential zoonoses: Deaths of animals in higher risk groups e.g. primates or animals that had potential to spread the organism e.g. profuse diarrhea, but had no further diagnostic testing undertaken and causative agents were not identified.

Confirmed potential zoonoses: Animal where confirmed bacteria or other pathogens were identified which had potential zoonotic disease implications e.g. salmonellosis, Chlamydiosis, etc.

Unknown Insufficient data to assign to a category

Interpretation and assignment to each category was done on a harsh interpretation to ensure worst case scenario implications were considered as part of this report. It must be noted that confirmation of a zoonosis does not mean that there is zoonotic risk e.g. an animal maybe off show and not exposed to the guest or it may have been under treatment. Unfortunately, this could not be confirmed due to the historical records and the limitation of the time allowed for this review.

TABLE 08: ZOONOTIC POTENTIAL OF INFECTIOUS DEATHS 2013 - 2016

Category	2013	2014	2015	2016
Total infectious deaths	6	21	24	22
Number of infectious deaths in walk through exhibits	5	19	15	22
Low or no zoonotic potential	0	4	4	10
Unconfirmed potential zoonosis (no culture)	4	7	8	8
Confirmed potential zoonosis (culture)	0	5	1	2
Unknown	1	3	2	2

Discussion – reviewing the postmortem data reveals a very small number of confirmed zoonoses represented by a total of 8 cases over the last four years. These were typically normal faecal flora that had resulted in disease with the main pathogens of concern noted as:

Salmonellosis Primarily in the parrots but also occasional waterfowl
Chlamydiosis Single case in a Military macaw in 2014
E.coli Primarily non-haemolytic species.
Suppurative meningioencephalitis
RT lemur (no cause), Squirrel monkey (Pasteurella multocida)

All primates diagnosed with infectious disease being the cause of death were placed into the potential zoonoses category if no cause had been confirmed.

ZOONOSES SURVEILLANCE SUMMARY

As expected in any collection, especially one containing primates and psittacines, there were a small number of zoonotic infectious agents found as part of the health surveillance programmes. Whilst all had zoonotic potential most were considered those that cause digestive complaints, although there were some which had much greater potential for serious illness e.g. psittacosis.

This low level of incidence of zoonotic disease is consistent with the levels expected in a collection of this size. However, the lack of robustness in the documentation, pre-movement testing and compliance with the Veterinary Protocol means that it is

impossible to state that the actual prevalence is not higher. It is likely not but this is speculative and the outlined surveillance programme must be followed to the letter to ensure that the unique Safari Zoo experience is as safe as possible. The lack of documentation results in a failure of checks and validation of zoonotic potential in the collection and steps need to be taken to rectify this weakness in the surveillance systems.

With regard to the nature of the animal interactions and the reported animal-guest interactions that resulted in injury the risk of zoonotic disease having been spread in any of these incidents is low to negligible considering the information supplied.

PART 1: REVIEW OF BITES AT SAFARI ZOO PERIOD 2013 to 2016 – SUMMARY

This comprehensive review of the available data is suggestive that the incidence of animal-guest interaction resulting in a bite or other related animal injury or zoonotic disease is low to negligible with an approximated incident rate of 1in 50-100,000. In the majority of these cases the animal injury was considered mild with none of the reported injuries to the public requiring hospital visit nor RIDDOR reporting.

The general consensus of the staff is that the reported incident rate is perceived to be accurate, however this could not be validated due to a lack of robust recording systems of near misses or animal-guest negative interactions at the location they occurred, only actual accidents being reported.

The review of the clinicopathology and post mortem records indicated a very low level of potentially infectious disease that had potential to be zoonotic (7% of all deaths and 3% of all clinicopathology results). However, the documents available did not comply with the stated Veterinary Protocol of 6 monthly testing and as such this may represent under reporting, again this being unable to be validated due to a lack of robustness in the processes on site.

Out of the potential zoonotic diseases only a single case of Chlamydiosis was considered to pose a significant concern (2014) with all others risk assessed at the time of identification and deemed low to negligible risk due to the species or location and potential contact routes with the public.

In summary, despite the lack of robust documenting systems, the general consensus of the assessed documentation is that the risk of animal related injury or disease is relatively low due to low levels of reported negative animal-guest interactions and low levels of reported zoonotic disease. Confidence can be improved with the development of improved robustness in observation, reporting and recording of animal related injuries or diseases.

PART 1. RECOMMENDATIONS

The following recommendations are made based on perceived gaps in the processes reviewed as part of this audit. The aim being to improve reporting and increase robustness in the process of documenting animal-guest interactions and disease surveillance at Safari Zoo:

1. Robust record keeping

Manning all walk through areas with trained staff during opening times is useful in monitoring, preventing and responding to animal-guest incidents. However, to give the low incident reporting credibility a process of near miss and incident reporting should be instigated. A daily pocket book that accompanies the staff when manning a walk through should be used to document the following: (i) times exhibit manned, (ii) member of staff manning the exhibit and any changes in personnel, (iii) the documentation of near misses where an animal had the potential to cause an accident with a member of staff but did not or staff intervened, including species, time, nature of incident, and (iv) actual incident reporting if it occurs. These are then compiled on a spreadsheet for each day documenting no, near miss and incidents for each year to form the basis of annual audits.

2. Annual audit of processes and documentation

Documented annual audits to review the frequency, trends and nature of any animal-guest incidents should be undertaken. Reviewing the data produced through point 1 as well as that of the Accident Record, ensuring the zoo knows the actual incidence of animal-guest incidents. This will validate the current documented levels or demonstrate under-reporting allowing management to instigate steps to review and mitigate further incidents.

3. Ethical and Health and Safety Review of the Free Roaming Lemurs

Undertake an ethical review with regards to the free roaming primates, primarily the ring tailed lemur group. Not only are there the welfare implications of annual predation verses the benefits of free ranging to be considered but also the zoonotic potential and management systems needed to mitigate the risks posed by the animals across the park for both visitor and potentially other animals. This is an area that should be reviewed and if continued a robust system to ensure compliance and welfare is maintained, balanced verses potential zoonoses management and strict adherence to disease surveillance.

4. Internal audits and spot checks for policy compliance

It is recommended that middle and senior management undertake documented spot checks to ensure compliance at animal experiences, including feeding

events. These can augment the annual audits to demonstrate compliance with the processes and policy and if not, instigate management systems to ensure they are. It is noted that compliance was high by staff during the review period.

5. Quarterly clinicopathology records review including zoonoses assessment

It is recommended that a documented review of all of the clinicopathological records are undertaken on a quarterly basis with a specific focus on zoonotic disease trends in the collection. It is noted that the last documented review, independent of this audit, was May 2016 and did not consider reviews of the zoonotic elements or walk through animals but focused on mortality issues within the collection.

6. Documented 6 monthly bacteriology and parasitology for all significant groups in walk through or animal experience areas of the zoo

It is recommended that the collection adhere to its surveillance programme of 6 monthly testing for bacterial and parasite pathogens in the walk through enclosures. It is recommended that specific groups are tested due to the nature of the species and walk through nature of the exhibits, which are exacerbated by feeding opportunities which may increase risk of contact and therefore zoonoses spread where present. The recommended groups are: Illescas vulture aviary, Tampopata aviary, RT lemurs free ranging group, Lemur middle house, Lemur feeding area, Squirrel monkeys, Capybara, Macropods, Peacocks, and Emus as a minimum.

PART 2. MITIGATION STRATEGIES REVIEW

SCOPE

The second part of the review, as requested at the last Special Inspection was that:

1. *A costed and timed written action plan, detailing all further changes that will be put in place to eliminate the risks of bites or injuries by animals to members of the public, to include:*

    a. *Plan that no food outlets and no public eating anywhere within the park where animals have access*
    b. *Demonstration how contact between visitors and animals is to be controlled during feeding encounters, including specific written risk assessments for each kind of encounter (including details of species, location, number of animals, number of visitors, etc)*

The second part of the review is formed on the basis that the animal-guest injuries incidence must be higher than that reported. General consensus is that the previous bite review document (see appendices) did under report the incidence of animal-guests incidents through lack of reporting internally by the public. However, this audit has not changed the fact that the documented evidence still demonstrates a low level of reported animal-guests incidents and that, despite the lack of robust reporting processes, there is little evidence that the animal-guest incidents are in fact higher than that reported.

As such recommendations have been made (see part 1 above) to improve accuracy and robustness in documenting near misses as well as accuracy in data collection to validate or confirm that these incidents are being under reported. To do any more than this with regards to animal bite and injuries management may not be required if the data set is accurate i.e. no make drastic further changes may not be required, simply ensuring policies are adhered to maybe sufficient.

This second part of the review critically appraises the policies of the collection in an attempt to answer this and the specific points raised in the scope as outlined above.

CONDITION 34 DISCLAIMER

Currently the main focus of the operational staff is to resolve to the local authority's satisfaction Condition 34. Until this Condition has been resolved and a clear operational team is in place then the following actions will not occur as they require the direction and appropriate budget allocation as maybe required. Small, low resource or training implementation will be instigated immediately, independent of Condition 34, where health and safety risks are noted.

RISK ASSESSMENTS & RELATED DOCUMENTATION

Risk assessments and associated working practices were made available as part of this inspection. They included:

- **Operational Codes of Practice: Accidents, Injuries (inc bites) Action Plan** – general reporting process and monitoring systems for accidents, including bites.
- **Staff Health Programme** – general occupational health with majority of the document focusing on zoonotic disease
- Safe Working Procedure – Worldwide Safari
- Safe Working Procedure – Illescas Aviary
- Safe Working Procedure – Carnivore Category 1 Animals / Big Cats
- Risk Assessment – Zoonoses
- Risk Assessment – Supervised hand feeding lemurs
- Risk Assessment – Illescas Aviary
- Risk Assessment – Supervised hand feeding penguins
- Risk Assessment – Adult keeper for the day (inc hand feed big cats)

On the whole the risk assessments and consideration of the Safe Working Procedures are adequate and fit for purpose. They would benefit from being reviewed but represent current working practices and delivery of animal-guest interaction in a safe manner.

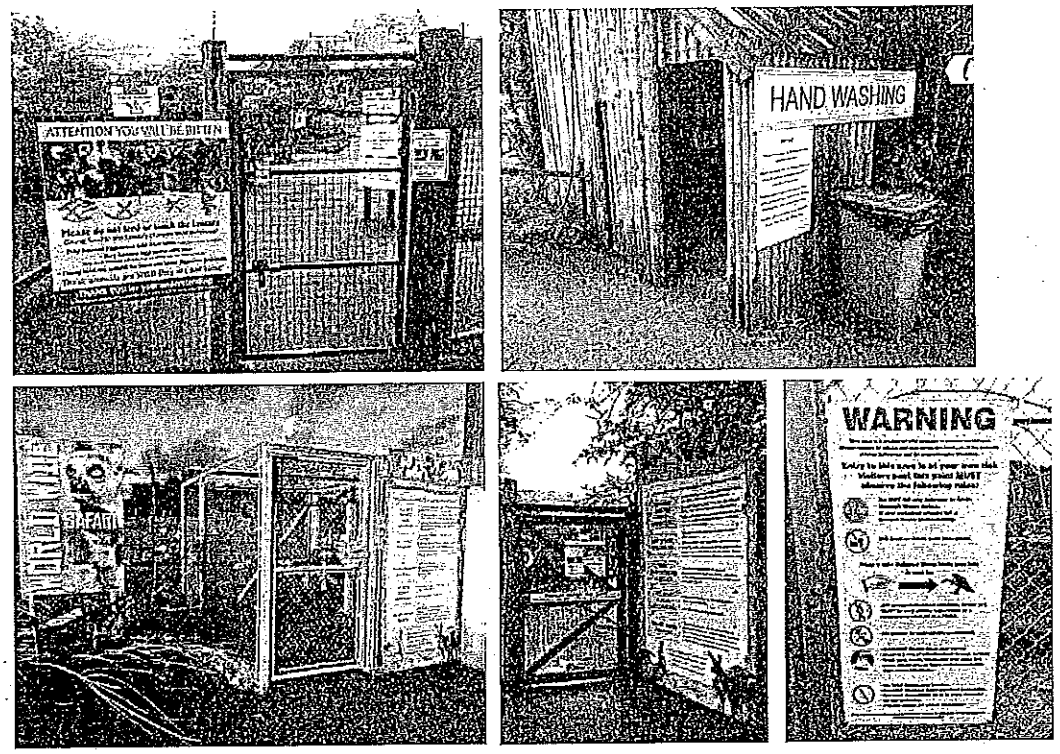
It is recommended that a complete review of all health and safety documentation, risk assessments and associated policies is undertaken to ensure that all aspects of the operation are covered. The supplied documentation had a few areas missing e.g. risk assessments for junior keepers for the day, unsupervised feeding in Worldwide Safari and a few other areas. Most of the safe systems of work and risk assessments were due for review in January 2017 and this would appear appropriate and fit in with the timelines suggested in the Special Inspection Report when these become conditions.

SIGNAGE AND RISK COMMUNICATION TO GUESTS

Animal-guest interaction, both permitted and denied, potential risks are well communicated across the site through multiple media which include:

1. Signage – from the entrance ramp throughout the park
2. Tannoy – oud speakers at the entrance tot eh WWS area communicate the risks of touching animals and the need to wash hands
3. Verbal communication – all animal experiences start with a safety briefing from staff, outlining correct methods of interaction and the need to wash hands afterwards, including direction to the nearest sinks
4. Guidebook – the guidebook includes a section on zoonoses management and safety rules.

FIGURE 14: VARIOUS WARNING SIGNAGE AT SAFARI ZOO



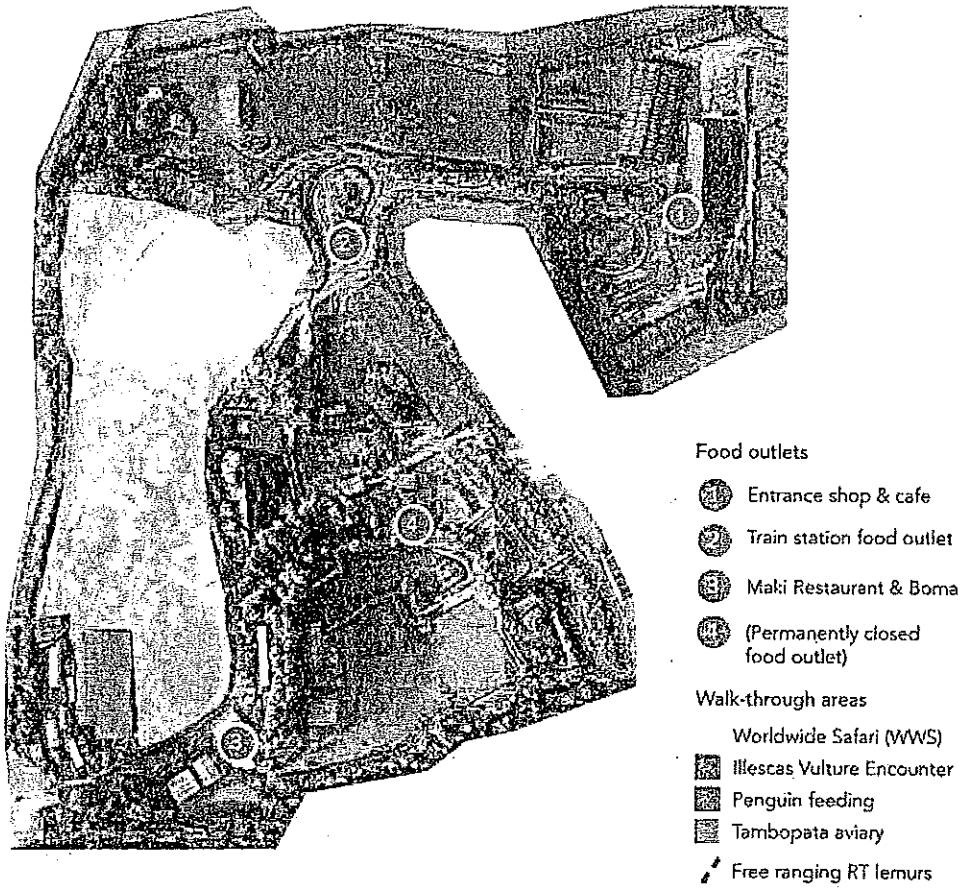
The warning signage was considered appropriate and consistent with recognised standards of warning signage, including the use of pictorial elements. Whilst this does not deliver confirm efficacy of the warning messages, responsibility of guest safety is shared by the guests themselves where practicably possible when provided with a safe environment or an environment with some risk that is well communicated to them.

FOOD OUTLETS & FREE RANGING ANIMALS

The author has interpreted this as 'the collection animals must be segregated from areas where the members of the public have access to food', rather than all animals e.g. wild birds.

There are currently three food outlets:

Safari Zoo Walk through exhibits and food outlets



All food outlets are outside of the walk through exhibits and adequate signage is in place to prevent guests taking food into these areas. The only exception is the free ranging ring tail lemurs and cotton-top tamarins. The practice of free ranging primates across the whole site and not in designated areas is to be reviewed at the next Ethical Review Meeting on October 12th. Whilst this is a practice that Safari Zoo does not wish to stop steps must be taken to ensure that whilst it persists the primates cannot be allowed to interact with guests whilst consuming their own food (see figure 03) and primates must be prevented from accessing human food stores e.g. the reported incident where ring tailed lemurs were directly eating from the nozzle of the Mr Whippy machine in the Maki Restaurant ice cream parlour (non-confirmed).

PART 2. MITIGATION STRATEGIES REVIEW – SUMMARY

Part 1 identified, based on the evidence available, that the risk of animal related injuries or infection was low. Part 2 identified that the Health and Safety systems are effective and may in some way account for the low incident of incidents.

However, there are gap in the risk assessments and a complete review is needed in the near future. Discussions identified critical control points in zoonoses control that need to be addressed, particularly with regard to the free roaming primates and a thorough health and safety and ethical review must be undertaken to validate the concerns raised as well as ensuring guest safety, particularly with regard to food outlets interactions.

Until Condition 34 is resolved to the satisfaction of the local authority the progression in this area is considered low, excepting the concerns raised with regard to the food outlets which was being managed at the time this report was discussed with the senior management of the zoo.

PART 2. RECOMMENDATIONS

The following recommendations are made based on the observations, verbal reports and policy documents provided:

1. Complete review of health and safety documentation

Whilst to a high standard the health and safety systems would benefit from a complete review with consideration given to (i) ensuring all animal-guest activities are reviewed and current, (ii) free roaming primates are risk assessed by species, (iii) severity and likelihood or similar scores are included on the risk assessments, and (iv) documented reviews are undertaken at each animal-guest incident to ensure they are fit for purpose or if it were a failure in published processes.

2. Complete review of segregation methods between free roaming primates and the food outlets

Free roaming primates must be segregated from food outlets and unable to contaminate food preparation areas or equipment. This must be reviewed immediately and steps taken to prevent access by primates or primates confined to designated enclosures such as WWS.

3. Discussion with staff areas of improvement (if any) with delivery of animal experiences

Review regularly with staff methods to improve safety balanced against guest experience for Animal Experiences, this can form part of RA/SSOW annual reviews or incident investigations.

4. Integration of surveillance programmes (see Part 1.) with health and safety mitigation processes

Have senior staff present at clinicopathology reviews, including food outlet staff so all stakeholders are aware of the risks on site, if any.

5. Develop HACCP model for zoonoses control at Safari Zoo

Review critical control points from disease entering the collection through to potential infection of guests and the mitigation strategies in place to prevent them from occurring.

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Incident no.	Date	Species involved	Area	Description	Details of injury	Hospital required
1	02/05/13	Emus	WWS	Feeding the emus, walked away and the emu came up behind the little boy and pecked the boys left ear.	Graze to left ear, antiseptic wipe given, no plaster needed.	No
2	04/05/13	Unknown	Squirrel monkey walk by enclosure	Were next to a man with animal food, he was shaking it, it went everywhere and in the excitement the gentleman got caught on his right hand, small cut to middle finger. Gentleman did not know what caused it.	Cleaned up and plaster put on.	No
3	12/05/13	Penguin	Penguin enclosure	He was holding the fish the wrong way whilst feeding the penguins, penguin took the fish but took too much catching the man on the middle right finger.	Cleaned up, plaster given and blue glove to wear.	No
4	13/05/15	RT Lemur	Lemur feeding supervised	Feeding lemur, lemur bite/scratch on finger.	Cleaned, bite to top of finger, drew blood.	No
5	01/06/15	Lemur	Lemur feeding supervised	Lemurs got excited and bit him by accident (he is fine, only a tiny cut)	Not reported	No
6	19/07/15	Prairie dog	Kangaroo field	Was feeding prairie dogs and one bit him	Small cut on thumb	No
7	22/07/15	Squirrel monkey	Bush arch walkway	Feeding squirrel monkeys and one bit her finger	Very small cut on finger, not too deep (no mention of response)	No
8	10/08/15	Condor	Illescas aviary	Condor felt threatened by camera on ground, approached lady's foot.	Small puncture wound to foot.	No
9	24/08/15	Squirrel monkey	Bush arch walkway	Feeding duck and bitten by squirrel monkey	1cm cut on finger (no mention of response)	No

APPENDIX 01: NATURE OF THE ANIMAL RELATED ACCDIENT REPORTS 2013 - 2016

Incident no.	Date	Species involved	Area	Description	Details of injury	Hospital required
10	28/07/16	Vulture	Illescas aviary	A vulture took a likening to Claire, it went for her bag and top and has left a small scratch on her arm.	Mark on her arm, cleaned with antiseptic wipe.	No
11	26/07/16	Vulture	Illescas aviary	Vulture being inquisitive to bag and coat	Graze to right leg, bottom broken skin, given antiseptic wiped cleaned cut.	No
12	25/07/16	Vulture	Illescas aviary	Vulture inquisitive to walking stick, pecked jacket and lower arm breaking the skin.	Lower graze - broke skin.	No
END						

- A total of 12 bites reported over the period 2013-2016
- Frequency of bite reported to staff range 1in 46-96,000
- No bites reported in 2014
- 2015 seeing an increase in animal related injuries, primarily from primates
- 2016 no primate related injuries reported – primarily vulture inquisitiveness at beginning of the peak summer season

SUMMARY OF NATURE OF TESTS 2014 – 2016

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	28	3	0	0	31
2015	53	40	2	0	95
2016	53	18	5	0	81
Total	139	61	7	0	207

Current to September 22nd 2016 – independent of microbiology from post mortem testing

SPECIFC SPECIES GROUPS TESTING 2014-2016

Note: Start population is per year or if grouped samples then 2016.

MACROPODS (Kangaroo Section)

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	0	0	0	0	0
2015	1	1	0	0	2
2016	2	1	0	0	3
Total	3	2	0	0	5

Start pop	Arrivals	Exports
48	5	0
48	3	0
54	1	0

PRIMATES (ALL – Lemur Section and Primate Section)

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	10	0	0	0	10
2015	9	8	0	0	17
2016	14	7	5	0	26
Total	33	15	5	0	30

Start pop	Arrivals	Exports
213	2	7
215	6	20
184	3	7

PARROTS

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	0	2	0	0	2
2015	7	7	0	7	21
2016	2	2	0	2	6
Total	9	11	0	9	29

Start pop	Arrivals	Exports
42	10	1
40	21	9
46	0	0

ILLESCAS VULTURE EXPERIENCE

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	0	0	0	0	0
2015	1	1	0	12	14
2016	1	1	0	0	2
Total	2	2	0	12	16

Start pop	Arrivals	Exports
17	30	2
39	23	0
58	0	1

Note: 12 Avian virus testing for import from Chile

ALL OTHER BIRDS (Total for each for period 2014 – 2016)

Species	Parasitology	Microbiology	Bloods	Other (PCR)	Total
Ibis	0	0	0	0	0
Peacock	1	1	0	0	2
Egret	0	0	0	0	0
Pheasant	0	0	0	0	0
Duck	1	1	0	1	3

Start population (2016)
36
36
40
103
184

GIRAFFE AND RHINOS

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	4	0	0	0	4
2015	5	0	0	0	5
2016	7	3	0	0	10
Total	16	3	0	0	19

CARNIVORES

Year	Parasitology	Microbiology	Bloods	Other	Total
2014	9	0	0	0	9
2015	12	1	0	0	13
2016	17	0	0	0	17
Total	38	1	0	0	39

Start pop	Arrivals	Exports
30	7	3
35	7	0
40	7	4

Raw data supplied in Appendix 2B direct to Zoo Licence Inspectors to prevent release through FOI.

Appendix 3B provided direct to Zoo Licence Inspectors to prevent release through FOI.

Available to review on site as required

AIM

Following on from the Special Inspection Report of the 15th August, 2016 one area of concern was raised with regard to Condition 38. A review was undertaken and submitted on the 26th September, 2016. This review audited the situation as of September, 2016 and did not take into account the changes that had been introduced since over the last 18 months, since the formal inspection and original submission of the concerns of Condition 38. This oversite is addressed with the following document which outlines the additional changes made to reduce the incident and risks of primate bites which were the primary concern at the time as well as demonstrating the changes planned which are considered independent of the animal-guest interaction audit specifically.

ADDITIONAL READING

This is an Addendum to the Animal-Guest Interaction Audit, 23rd September 2016 and should be read in conjunction, rather than separately.

CHANGES MADE IN RESPONSE TO HIGHLIGHTED CONCERNS

The following changes had been made and actioned prior to the internal audit outlined in the Animal-Guest Interaction Audit, these should be considered complementary to the action plan and are already in place rather than waiting for them to be approved by the local authority. The efficacy of these new steps are demonstrated by the reduction to zero of primate related animal injuries this year (2016) but also highlights areas of improvement, as set out in the recommendations of the above report.

It is noted that many of these actions were available to be inspected at the formal and informal recent inspections and some were discussed in detail, these are simply recorded in writing for convenience.

LEMUR FEEDING

- Historical instances listed in 2015 that resulted in animal injuries occurred in the presence of supervising keepers prior to the busy season.
- Reviews were undertaken with staff to understand the potential causes behind the incidents and how to mitigate them in the future.
- All staff involved in the lemur feeding underwent refresher training with an increased focus on managing guests at lemur feeding as well as managing lemurs, the following being specific reinforcement points:
    - Lemurs not to be fed if not on the raised fence – training increases behavioural modification to ensure that lemurs not able to grab or interact away from the site lines – currently no lemurs are fed and numbers of lemurs limited due to the small nature of the fence
    - Guests to be 1m (approximately one step) away from the fence line during the experience and this is verbally reiterated with reminders throughout the experience
    - Gloves to be passed out to guests and only when worn are they given food items and these are passed to the lemur closest to them with staff supervising the actual feeding of the animal – again animals are trained to associated the fence, the keeper and the food bucket thereby reducing any of the uncontrolled

experiences of previous lemur feeding

- Animal Contact Situation risk assessment reviewed for appropriateness and reinforced to staff as part of the refresher training
- Managers attend feeding sessions as observers as well as spot checks by other members of staff or consultants to ensure compliance and on script with health and safety briefing
- Clarity that disciplinary action to be taken for staff if non-compliant following refresher training – none to date.
- Recruitment of more staff to the lemur feeding are through the use of automated warning messages on entry to the Worldwide Safari area meaning the lemur feed is policed by more staff – normally with a team managing the feeding and a team policing the guests-animal interaction away from the feed point.
- Additional areas of recommendation is improvement of near-miss reporting – see main document.

Planned additional actions:

- WWS perimeter fence currently under review with areas of weakness and internal escape being replaced in 2017 with standard metal fencing to prevent animals leaving this area – at time of writing still awaiting quotes
- Ethical review of free ranging lemurs and guest and animal welfare concerns to be reviewed October 12th at the next ethics meeting with actions implemented as needed as a result
- Near miss recording policy to be implemented across this and other animal interaction opportunities
- Population review and assessment with regards to mitigating possible conspecific fighting potentially resulting in guests becoming involved
- Nutrition and diet review – ensure ample access to premium food items to prevent conspecific fighting and potential guest involvement
- Audit of policy in any animal related injuries as well as annual audit of findings to identify trends and possible mitigation steps to be taken
- Complete review of risk assessments and policy for effectiveness and appropriateness, this includes signage and guest communication reviews

WORLDWIDE SAFARI WALK THROUGH

- Refresher training for all staff involved in policing the Worldwide Safari (WWS) area with a focus on
    - HS briefing at point of sale of animal feed on entrance to the park
    - squirrel monkey management and retraining to discourage squirrel monkey-guest interaction)
    - Refresher training on the "do not touch monkeys" policy
    - primate (lemur) feeding only in designated areas
- Volunteer Information pack developed to include "spotter" information and HS rules for when they take on supervisor roles and briefings e.g. if supporting lemur feed.
- Improved communications to guests which included:
    - Automated zoonoses and animal injury risk warning at both entrances to WWS, including hand wash recommendation
    - Improved signage communicating the risks from the animals in general as well as specific species – reinforces the verbal automated risk warning both in writing but also in pictures for younger or non-English speaking guests
    - Food items for unsupervised feeding provided in bags that specify the specific animals it can be fed to

    - Guidebook site safety rules reinforcing signage
    - Verbal targeted reinforcement of signage warnings by staff to guests that are not following the don not touch primates policy, including the ejection of guests if welfare or other guest safety potentially at risk through their actions
- Comprehensive zoonoses assessment and surveillance programme audited and steps taken to improve the current surveillance programme (see main audit for details).

Planned additional actions:

- As for lemur feeding as cross over similar
- Staffing review with the new operator for optimal staffing verses management of animal-injury risks across WWS ensuring that the number of staff deployed is appropriate to number of guests (peak v out of season), areas to cover and range of the number of animals remaining after population reviews have been carried out
- Complete review of risk assessments and policy for effectiveness and appropriateness, this includes signage and communication reviews

ILLESCAS AVIARY (VULTURES)

- Review and installation of appropriate warning signage at the entrance of the aviary
- Change of signage to include a physical height measure with the statement that guests under the height must be carried e.g. small children
- Staffing of aviary during opening times (introduced August 2016) whilst training of birds occurs; monitoring programme – of effectiveness of training; monitoring by staff during busy weekends and holidays.
- Comprehensive zoonoses assessment and surveillance programme audited and steps taken to improve the current surveillance programme (see main audit for details).

Planned additional actions:

- As for lemur feeding as cross over similar

GENERAL POLICY IMPLEMENTATION CHANGES

- All picnics stopped within the zoo area – these being moved to designated picnic areas away from animal exhibits including removal of picnic tables from the 'zoo' animal areas.
- Additional warning signage across the site warning of food policy and zoonotic or animal-injury signage – starting from the entrance and reinforced across the site.
- Lemur proofing the 'Boma' restaurant eating area to prevent interaction between the lemurs and guests eating food
- Free ranging tamarins have been moved to areas where there are no public food outlets or available for guests to provide food – either they are enclosed on islands with no free ranging potential or are located in the west aspect of WWS where limited to a small area of trees close to the middle lemur housing.

Planned additional actions:

- Free ranging animals to be critically reviewed at the next ethics meeting (12th October 2016) with consideration of zoonotic and animal-guest interaction being one aspect to be reviewed with steps taken as required
- WWS perimeter has been reviewed and initial works carried out to prevent non-ring tailed lemurs from free ranging (primarily tree works) and subsequent reviews of fencing identifying the southern perimeter as an area of risk which has been planned to be replaced late 2016-early 2017 – this is currently out for tender and awaiting prices.

- General implementation of near miss and improved reporting to validate incident and risk frequency of animal-related injury as well as enabling identification of the underlying causal factors.

The Care of Trees
Arboricultural Consultancy
Working with people, caring for trees

Tree Survey at South Lakes Safari Zoo

30th August 2016

Matthew Jones
Bsc (Honours) For, Cert.Arb (RFS)

Summary

Ten trees that have been requested by the Local Authority following a notice, in accordance with the Health and Safety Act were surveyed in total.

Of these ten trees, six have been recommended for removal due to their poor condition. One tree is highly likely to blow over during the next strong winds in the direction of the restaurant due to the severance of its roots. The remaining five are in poor condition and their safe useful life expectancy is short and therefore they have been recommended for removal.

The remaining trees have been recommended for tree pruning works due to the affect that the trees selected for removal will have on wind loading. Trees growing in close proximity create group shelter from the wind and therefore removal of some trees can affect the stability of others.

This work is therefore essential to lessen the likelihood of other trees blowing over in strong winds.

1. Introduction

1.1 Work Instruction

The work was instructed through Anna Gillard, Health and Safety Co-ordinator at South Lakeland Zoo. Recently the Local Authority Served a Health and Safety notice to the Zoo, over a number trees near to the Maki Restaurant concerning their condition. They have requested a independent tree survey to assess the condition and safety of these trees.

This report aims to assess the structural health and condition of the trees and the potential for them to cause damage to property and people. Where the risk is deemed significantly high work recommendations have been given to reduce the likelihood of tree failure.

1.2 Report Limitations

The trees were inspected from ground level unless otherwise indicated. All visual recommendations relate to the condition of the trees on the date of the survey and are valid for one year. The recommendations in this report should be carried out to manage the risks posed by the trees and reduce them to an acceptable level.

Trees are dynamic living organisms whose health and condition can change rapidly and therefore no tree can be guaranteed one hundred percent safe. However they are unlikely to cause significant damage or harm once the recommendations in this report have been implemented, unless the weather have been extreme or the conditions on the ground have changed rapidly.

2. Site Visit and Observations

2.1 Conditions at Time of Survey

The trees were inspected on Wednesday the 30th of August. The weather was overcast but dry. All dimensions of diameter and height were estimations only.

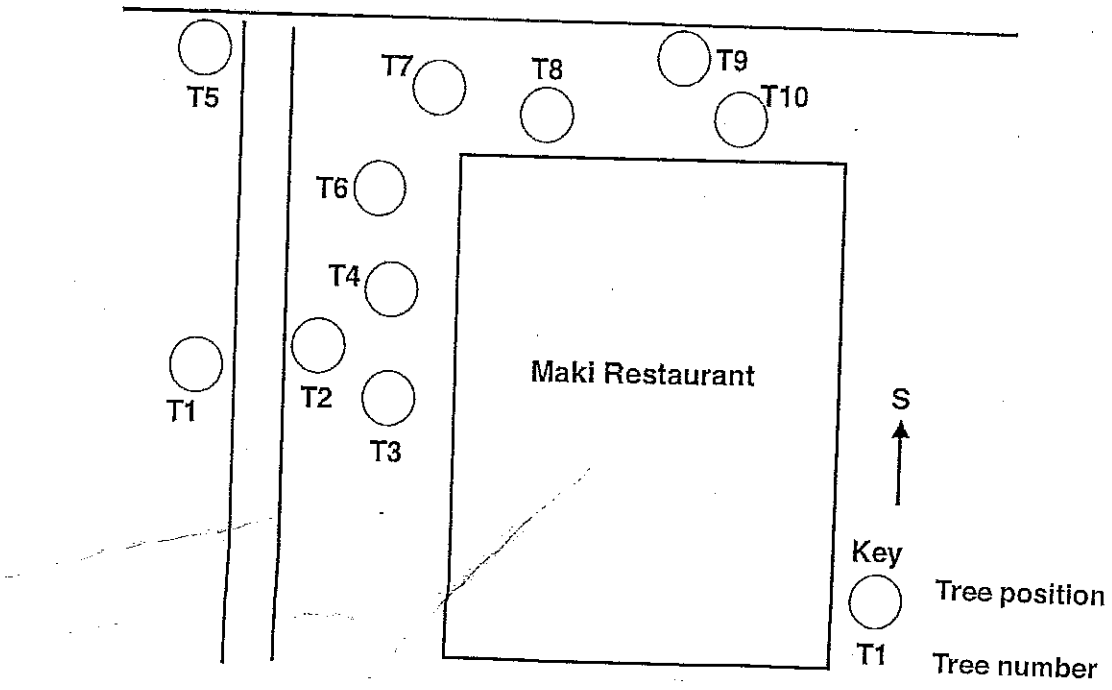
2.2 Site Description

South Lakes Safari Zoo is a 51-acre zoo established in 1994 by David Gill, and located in Cumbria, England. It is one of the top attractions in Cumbria.

The zoo is covered in many places by trees which form small patches of woodlands. The area in which the request for a tree survey has been given by the Local Authority is an area of trees which is next to the Maki restaurant. There are approximately ten trees in this area which are growing in close proximity to the building which appear to be in less than optimal condition. The construction of a new path has crossed a number of rooting areas from several trees and some damage appears to have occured.

2.3 Location of Trees and Identification

The trees surveyed within the site can be seen identified on the map below. The map is not to scale and is for reference purposes only. This is also located in the appendix.



3. The Tree Survey Method

The tree survey method was carried out using the Quantified Tree Risk Assessment (QTRA) system which quantifies and combines the components of tree failure risk. It is possible to calculate with some accuracy the usage of vehicular and pedestrian targets upon which trees could fail. It is also possible to estimate the repair or replacement cost of property that could be damaged in the event of a tree failure. The probability that a tree or branch will fall can be estimated. The potential impact from a failing tree or branch can be estimated on the basis of the comparative assessment of the branch or stem diameter.

The Quantified Tree Risk Assessment system is based on mainly estimated values and whilst the system is numerically self consistent, the 'risk of harm' outcomes are based on observations made by tree inspectors, surveyors and land managers. The system provides a method for the probabilistic risk assessment of harm from tree failure but is not predictive in an absolute sense and does not seek to provide an absolute threshold. However the system does provide a statistical assessment of tree failure risk.

Where land is constantly occupied by people or by valuable property, a moderately small tree might, by virtue of its position, represent a significant 'Risk of harm'. On the other hand, a large tree in an area of low access such as a remote woodland or country park will represent only a very low 'Risk of harm' even where its stability is substantially compromised. In the latter scenario, access to a remote area will be considerably reduced during the high wind events that are most likely to result in failure of trees and as a result the risk from tree failure in these areas is further reduced.

The use of quantification in the assessment of tree failure risk enables property owner and managers to operate, insofar as is reasonable practicable, to a predetermined level of acceptable risk without expending disproportionate resources on either risk assessment or reduction.

3.1 The Method

The QTRA system produces a Risk of Harm figure, calculated from combining three components:

1. The Target
2. Size of part most likely to fail
3. Probability of failure

The system assesses the probability of significant harm from failure within a period of one year.

3.2 Risk of Harm

A probability of death or serious injury of 1/10,000 is suggested by the health and safety executive as the limit of acceptable risk to the public at large from the failure of any individual tree within one year of assessment. Using the 1/10,000 limit, risk exceeding 1/10,000 should be considered for urgent remedial action to reduce the risk to less than 1/10,000.

The key figure in the tree survey is the risk of harm. This figure represents the probability of a tree causing harm within the next twelve months.

3.3 Managing Risks

Current guidelines suggest that risk management should be proportional to the benefits conferred by trees and the costs of reducing risk levels. For example many trees may contain defects which could be deemed as a low risk. It is disproportionate to expect trees to have zero risk. This expectation would lead to hundreds of trees being removed for minor defects with huge cost involved.

The QTRA outputs can be measured against the HSE's Tolerability of Risk framework to aid decision relation to risk reduction works. The different categories of risk are as follows:

1. The unacceptable region should be set at a risk of harm greater than 1 in 10,000
2. The tolerable region would fall between 1 in 10,000 and 1 in 1,000 000. Risks in this category should be managed as low as is reasonably practicable (ALARP).
3. Risks less than 1 in 1,000 000 should be regarded as broadly acceptable.

4. The Tree Survey

The tree survey was carried out using the Quantified Tree Risk Assessment Method. All trees in this area which have been affected by the development of a new footpath, erection of the fence and picnic area have been assessed.

Due to the high usage of the restaurant, picnic area and footpaths the likelihood of any part of a tree or a tree falling and striking either the restaurant or a person is considerably higher than for example, a tree next to a field where there is no footpath under the tree and therefore any damage or harm is remotely small.

The risk assessment process has taken this into consideration along with the safe useful life expectancy of the trees which is determined in this case, by the tree species and the conditions of the trees which include decay and damage.

4.1 Overview of Tree Species

Tree species identified within the site consist of predominantly broadleaved species principally Goat Willow (*Salix caprea*), one Alder (*Alnus glutinosa*) and two Larch trees (*Larix decidua*).

4.2 General Condition of Trees

The trees surveyed are in poor condition. The trees predominantly consist of Willows which are known to have soft wood and poor decay resilience when compared to that of an Ash or Oak. Many of these trees have decayed stems and damage caused by the trees having objects fastened to them. This has damaged the bark and wood in many cases.

The recent construction of a new footpath has cut through a number of structural roots on four of the trees to the degree that some of them will be liable to blow over in the wind.

A summary of the findings are given below.

4.2.1 High Priority Trees - Risk of Harm Greater than 1:10,000

T2 Goat Willow

A Goat Willow with a stem of 400mm and approximately 15 meters high has had its roots severely severed on the east side of its trunk (see appendix 5, figures 1 and 2). This has happened during the construction of the footpath. There are no roots on this side to provide support for this tree. This tree is one of the tallest in this collection and therefore is likely to be loaded by the wind substantially.

Its proximity to the restaurant directly to the west and the roots being severed on the east side of the tree put the likelihood of this tree being blown onto the restaurant as exceptionally high. In my opinion this tree is likely to blow over in the next windy period and has a risk rating of 1/4 which is one of the highest risk ratings.

This tree should be removed as soon as is possible ideally within a few days to a week.

T8 Goat Willow

A similar sized tree to the above has had one of its stems removed in the past and has decay at its base. There is soil cracks on the upward side of the slope suggesting that the root plate of this tree has shifted recently (see appendix 5, figure 3). With the decay and soil movement the likelihood of it falling is high and has been calculated as 1/1000.

This tree should be removed within the next month.

T3 Goat Willow

This tree has decay at its base and bark dieback throughout the canopy (see appendix 5, figure 4). With time the decay within this tree is likely to reach a point where the wood strength will have decreased significantly that the tree will need to be removed. It location adjacent to the restaurant is significant as if it were likely to fall it will strike the restaurant. The risk rating has been calculated at 1/3000 I have therefore recommended that this tree should be removed. This should be removed within the next month.

T9 Goat Willow

This tree has significant bark damage due to the attachment of an object to the bark at approximately 2.5 meters. This area of damage has some decay. The tree is showing signs of adaption wood, which the tree produces when it senses weakness within its structure. It lays down new wood in areas where it feels this weakness in order to strengthen itself. Although the tree is doing its best to compensate for the damage caused, the likelihood of the tree ever healing the damage done to this area of the stem is small and therefore the decay is likely to progress. Given its species and location and from a long term perspective I believe it will be best removed.

The risk rating has been calculated as 1/5000.

4.2.2 Medium Risk Trees - Risk of harm Between 1:10,000-1:50,000

T5 Goat Willow

This Willow has had its roots trenched to the west of the tree as the construction of the footpath has crossed under its canopy. At 3 meters up the stem there is a large area of bark damage which spreads over 75% of the stem diameter leaving only 25% for physiological functions.

The area damaged on the tree is likely to decay significantly over time. The stem also has large areas of bark dieback strips throughout the crown and stem and a covering of the fungus *Stereum* which principally decays dead tissue and is a indicator of compromised health (see appendix 5, figures 5 and 6).

The risk assessment for this tree has been calculated as 1/10,000 which is on the borderline of tolerable/ unacceptable and therefore I have recommended this for removal because its condition is likely to worsen.

T7 Goat Willow

This tree is adjacent to T5 and has had a number of its roots severed on its eastern side. The tree also has decay at its base and is likely to be affected by the removal of T5 (see appendix 5, figure 7). The risk rating has also been calculated at 1/10,000.

4.2.3 Wind Loading On Other Trees And Recommended Tree Work

This collection of trees together buffer the wind. The wind loading on the trees is distributed evenly throughout all the tree canopies with each tree canopy buffering wind from others.

The removal of one tree changes the way that the other trees are loaded by the wind. Trees adapt slowly by wind loading, this starts from when they are small and therefore they have time to adapt to the forces placed upon them.

The removal of trees will open up other trees to the wind loading from different directions and angles which they are unaccustomed. This can lead to branch breakage and at its worst, trees being blown over by the wind. Willows and trees with weak wood are particularly susceptible.

Changing wind loading can exacerbate small defects for example, decay which is not yet substantial or damaged areas on stems.

Therefore it is unwise to remove trees without attending to the others within the group.

The two larches T10 and T6 have much more durable wood than willows. T10 has bark damage where an item has been attached to the stem in the past and the wood is now exposed to the elements. Due to the durability and resistance of its wood to decay there is less concerned with regards stem breakage at this point compared to the willows.

The wind loading on this tree will change when the other trees surrounding it are removed therefore this has been recommended that the crown is reduced by 1.5 meters which is a 10% reduction for a 15 meter tree. Research has shown that reducing a tree by 10% reduces the wind loading by double that amount or 20% which will be significant.

The same recommendation has been given T6. Some roots have been cut during excavation but the majority of these roots will be on the upper slope area which will provide substantial support.

T1 a Goat Willow which is adjacent to T2 which has had its roots cut on the eastern side. This tree will have had some roots severed while the path was constructed and the concrete footings for the sign were laid. This tree is likely to receive significant wind loading due to its size therefore this has been recommended for a reduction in height to lessen the wind loading affect upon it.

All work recommendations can be seen in the appendix 4 - Tree Work Schedule and the trees positions can be found in appendix 2 and at the beginning of this report.

4.2.4 Work Priority

T2 must be removed within a week, if not days due to its current condition. All other work in high priority must be removed within a month and the remainder of the work, the medium priority work and lower priority work should be carried out within 3 months.

5. Legal Considerations

5.1 Tree Preservation Orders and Conservation Areas

The trees are not protected by a Tree Preservation Order and are not located in a conservation area.

5.2 Felling License

The work recommended in this report is exempt from a felling license due to the trees being either dangerous or requiring tree pruning works.

5.3 Carrying out tree work

Any tree work should be carried out by a suitable qualified arborist/ tree surgeon to British Standard 3998:2010 Tree work - Recommendations. They should also abide by Health and Safety legislation and be suitably insured to carry out such work.

5.4 Future tree surveys

I would recommend that the trees are surveyed every two to three years or after a severe storm.

5.5 Highway Law and Trees

Landowners Responsibility

The Highways Act 1980 states that a public highway should be kept clear of obstructions. Trees are living and growing organisms that can grow, in time, over a highway and impede the movement of pedestrians and vehicular traffic. Therefore landowners who have properties adjacent to the highway should be aware of their responsibilities to keep vegetation and trees clear.

Height Clearance over highway

Minimum clearance should be 2.4m over a footpath and 5.2m over a road (measured from the centre line). As a guide, these minimum clearances should be sufficient to allow a 2m person with an umbrella up to walk unimpeded along a footpath and a double-decker bus to travel along a road without hitting any overhanging branches.

Street lights and signs

The landowner also has a responsibility to ensure that vegetation is kept clear of road signs and street lights.

Dangerous trees

The landowner has a 'duty of care' to ensure that trees in their ownership do not pose a danger to highway users. This includes dead trees, dangerous trees, and dead and dangerous branches etc.

5.6 The Occupiers Liability Act

The Occupier's Liability Act 1957/1984 lays down a duty for landowners to take reasonable steps to ensure that their premises are reasonably safe for visitors. In relation to trees, steps should be taken to ensure that the trees are inspected and kept in reasonable condition.

5.7 Duty of Care

The landowner has a 'duty of care' to ensure that trees in their ownership do not pose a danger to passers by and property. This includes dead trees, dangerous trees, and dead and dangerous branches etc.

5.8 Wildlife Protection Legislation

Any tree work carried out should comply with the following legislation:

Bats and Birds

Wildlife and Countryside Act 1981: Certain plant and animal species are scheduled in the Act, and in addition all wild birds are protected during nesting (Schedule 1 Birds, Schedule 5 other animals, Schedule 8 plants). It is an offence to ill treat any animal; to kill, injure, sell or take protected species (with certain exceptions): or intentionally to damage destroy or obstruct their places of shelter. Bats and their roosts enjoy additional protection including when found in a dwelling house, and their discovery must be reported to Natural England

The Conservation (Natural Habitats, etc.) Regulations 1994 (the Habitat Regulations):

This Act implements the requirements of the European Habitats Directive and affords additional protection to animals and plants listed in Annex IV of the Directive. It is an offence to deliberately kill, injure, take or disturb listed animal species; to destroy their resting places or breeding sites; or to pick, collect, cut, uproot or otherwise destroy listed plant species.

Countryside and Rights of Way Act 2000: Part III of the Act strengthens the protection of SSSIs and the enforcement of the Wildlife and Countryside Act. It also supports the growing importance of Biodiversity Action Plans and the role of local wildlife sites in contributing toward Biodiversity Action Plans.

Appendix 1

1. Qualifications and Experience

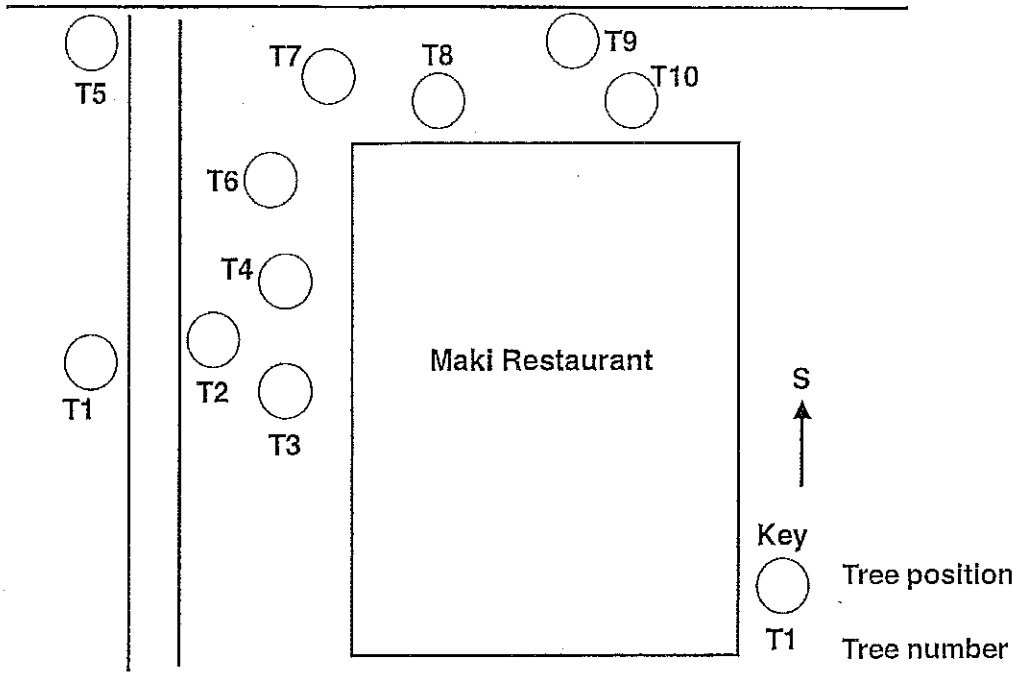
1.1 Qualifications

Matthew Jones has a BSc in Forestry and Woodland Management from the University of Central Lancashire and has The Royal Forestry Certificate in Arboriculture. He is also a certified QTRA (Quantifiable Tree Risk Assessment) licensed user.

1.2 Practical Experience

Matthew Jones has spent over ten years working in the Arboricultural industry. Firstly as a tree surgeon in the UK, America and New Zealand, later in a tree management role for Oxford County Council managing thousands of trees within their care. He has also worked for Capita Symond's, one of the largest consultancy companies in the UK. In 2011 he set up his own company The Care of Trees specialising in providing tree reports and surveys.

Appendix 2 - Tree Identification Map



Appendix 3 - Tree Survey Data

Tree no.	Species	Age class	Height (m)	Crown spread (m)	Diameter (mm)	Physiological condition	Structural condition	Significant defects	Comments	Target Rating	Size of part likely to fail	Likelihood of failure within one year	Risk Of Harm	Work required
1	Goat Willow	M	15	10	350 x 2 stems	M	M	Snapped out and hanging branch at east of tree over toilet block roof, bark dieback strip throughout tree.	Concrete post installed next to base of tree likely to have cut some roots, path dug out to west, likely to have severed some surface roots	1	2	5	1/30,000	Reduce tree canopy by 4m and remove hanging branch and deadwood
2	Goat Willow	M	15	5-10	400	M	P	Decay at base, bark damage to 3.5m, roots trenched significantly on eastern side to trunk.	Major structural roots severed on eastern side, highly likely to blow over onto building during next strong winds	1	2	1	1/4	Fell
3	Goat Willow	M	10-15	5	300	F	P	Bark damage strip on east side to 5m, decay at base	Significant wood strength at present at base of tree, but likely to decay further with time due to species and current condition	1	2	4	1/3000	Fell
4	Alder	SM	10	5	200	F	F	Low branching over roof, leader is growing horizontally over roof due to slightly suppressed under large willows		1	4	6	1/300,000	Crown lift over roof leaving 2-2.5m clearance and reduce leader growing over building roof by 3.5m to retrain new leader.
5	Goat Willow	M	15	5-10	300	M	P	Bark dieback strips through tree, strangulation of main stem at 3m caused by past object in tree which has caused bark dieback over 75% of stem circumference	Roots trenched to west side	2	2	3	1/10,000	Fell
6	Larch	M	10-15	5-10	350	F	M	Bark damage at 3m on north side, low branching over roof		2	2	4	1/100,000	Reduce canopy by 2-2.5m
7	Goat Willow	M	10-15	5-10	350	M	P	Roots trenched on south side, decay at base, bark dieback strips within tree, snapped out hanging branch 40mm diameter		2	2	3	1/10,000	Fell
8	Goat Willow	M	10-15	5-10	300	M	M	Deadwood to 50mm x 3m long, basal decay, damage to trunk on south side at 2m	Soil movement present, crack at rear of tree to north indicating recent root plate movement.	2	2	2	1/1000	Fell
9	Goat Willow	M	10-15	5-10	250	M	M	Damage to bark at 2m, sever damage and bark dieback with some decay, tree shows sign of compensation growth		2	3		1/5000	Fell
10	Larch	M	15-20	5-10	250	F	F	Damage to stem at 2m covering 50% of circumference, shows sign of adaption wood,		2	3	4	1/500,000	Reduce tree height by 1.5m and cut back from window

Appendix 4 - Tree Work Schedule - Prioritised Risk of Harm

Tree no.	Species	Age class	Height (m)	Crown spread (m)	Diameter (mm)	Physiological condition	Structural condition	Significant defects	Comments	Target Rating	Size of part likely to fail	Likelihood of failure within one year	Risk Of Harm	Work required
2	Goat Willow	M	15	5-10	400	M	P	Decay at base, bark damage to 3.5m, roots trenched significantly on eastern side to trunk.	Major structural roots severed on eastern side, highly likely to blow over onto building during next strong winds	1	2	1	1/4	Fell
8	Goat Willow	M	10-15	5-10	300	M	M	Deadwood to 50mm x 3m long, basal decay, damage to trunk on south side at 2m	Soil movement present, crack at rear of tree to north indicating recent root plate movement.	2	2	2	1/1000	Fell
3	Goat Willow	M	10-15	5	300	F	P	Bark damage strip on east side to 5m, decay at base	Significant wood strength at present at base of tree, but likely to decay further with time due to species and current condition	1	2	4	1/3000	Fell
9	Goat Willow	M	10-15	5-10	250	M	M	Damage to bark at 2m, sever damage and bark dieback with some decay, tree shows sign of compensation growth		2	3		1/5000	Fell
5	Goat Willow	M	15	5-10	300	M	P	Bark dieback strips through tree, strangulation of main stem at 3m caused by past object in tree which has caused bark dieback over 75% of stem circumference	Roots trenched to west side	2	2	3	1/10,000	Fell
7	Goat Willow	M	10-15	5-10	350	M	P	Roots trenched on south side, decay at base, bark dieback strips within tree, snapped out hanging branch 40mm diameter		2	2	3	1/10,000	Fell
1	Goat Willow	M	15	10	350 x 2 stems	M	M	Snapped out and hanging branch at east of tree over toilet block roof, bark dieback strip throughout tree.	Concrete post installed next to base of tree likely to have cut some roots, path dug out to west, likely to have severed some surface roots	1	2	5	1/30,000	Reduce tree canopy by 4m and remove hanging branch and deadwood
6	Larch	M	10-15	5-10	350	F	M	Bark damage at 3m on north side, low branching over roof		2	2	4	1/100,000	Reduce canopy by 2-2.5m
4	Alder	SM	10	5	200	F	F	Low branching over roof, leader is growing horizontally over roof due to slightly suppressed under large willows		1	4	6	1/300,000	Crown lift over roof leaving 2-2.5m clearance and reduce leader growing over building roof by 3.5m to retrain new leader.
10	Larch	M	15-20	5-10	250	F	F	Damage to stem at 2m covering 50% of circumference, shows sign of adaption wood.		2	3	4	1/500,000	Reduce tree height by 1.5m and cut back from window

Appendix 5 - Photos of Tree Findings

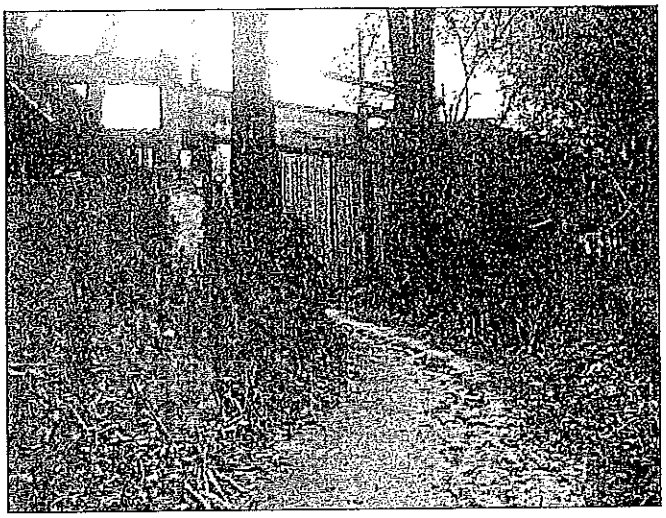


Figure 1 - T2 showing trenching and extent of root damage from south

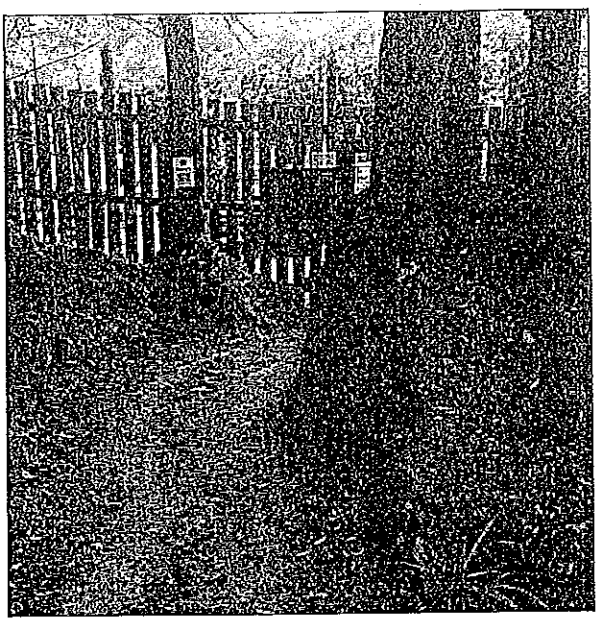


Figure 2 - T2 showing trenching and extent of root damage from north

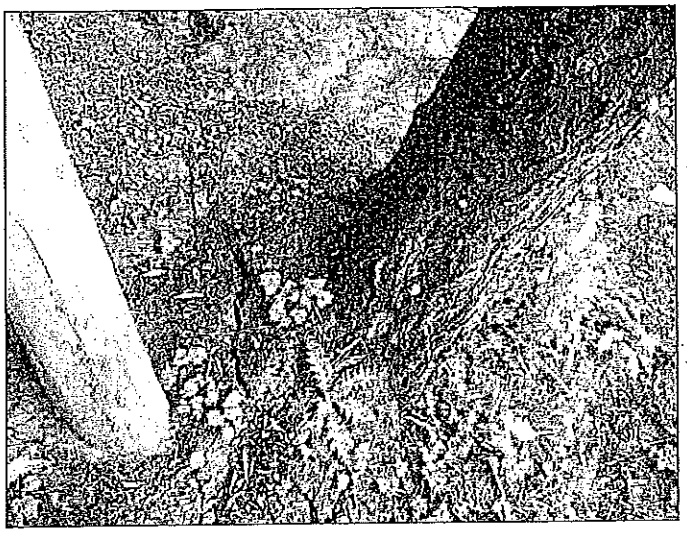


Figure 3 - T8 showing soil crack on upper side of slope indicating root plate movement

Figure 4 - T3 showing Willow with decay at base

Figure 5 - Showing trenched roots on T5

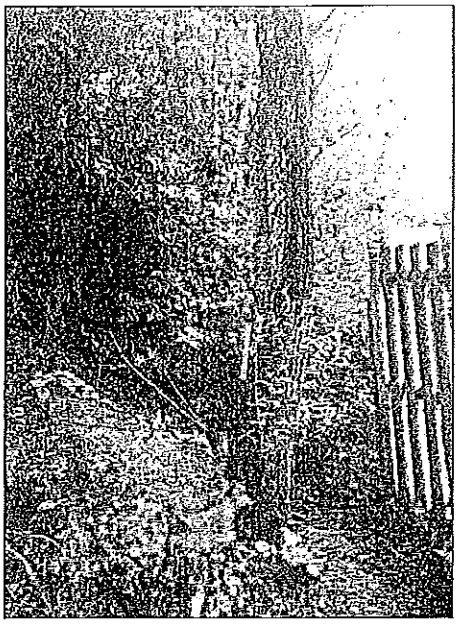


Figure 6 - Showing *Stereum* fungus on T5

Figure 7 - Showing root trenching on T6 and T7

Table 3. QTRA Target Ranges

Target Range	Property (repair or replacement cost)	Human (not in vehicles)		Vehicle Traffic (number per day)	Ranges of Value (probability of occupation or fraction of £1 500 000)
1	£1 500 000 – >£150 000	Occupation:	Constant – 2.5 hours/day	26 000 – 2 700 @ 110kph (68mph) 28 000 – 2 900 @ 100kph (62mph) 31 000 – 3 200 @ 90kph (56mph) 32 000 – 3 300 @ 80kph (50mph) 36 000 – 3 700 @ 70kph (43mph) 42 000 – 4 300 @ 60kph (37mph) 47 000 – 4 800 @ 50kph (32mph)	1/1 – >1/10
		Pedestrians & cyclists:	720/hour – 73/hour		
2	£150 000 – >£15 000	Occupation:	2.4 hours/day – 15 min/day	2 600 – 270 @ 110kph (68mph) 2 800 – 290 @ 100kph (62mph) 3 100 – 320 @ 90kph (56mph) 3 200 – 330 @ 80kph (50mph) 3 600 – 370 @ 70kph (43mph) 4 200 – 430 @ 60kph (37mph) 4 700 – 480 @ 50kph (32mph)	1/10 – >1/100
		Pedestrians & cyclists:	72/hour – 8/hour		
3	£15 000 – >£1 500	Occupation:	14 min/day – 2 min/day	260 – 27 @ 110kph (68mph) 280 – 29 @ 100kph (62mph) 310 – 32 @ 90kph (56mph) 320 – 33 @ 80kph (50mph) 360 – 37 @ 70kph (43mph) 420 – 43 @ 43kph (37mph) 470 – 48 @ 50kph (32mph)	1/100 – >1/1 000
		Pedestrians & cyclists:	7/hour – 2/hour		
4	£1 500 – >£150	Occupation:	1 min/day – 2 min/week	26 – 4 @ 110kph (68mph) 28 – 4 @ 100kph (62mph) 31 – 4 @ 90kph (56mph) 32 – 4 @ 80kph (50mph) 36 – 5 @ 70kph (43mph) 42 – 5 @ 60kph (37mph) 47 – 6 @ 50kph (32mph)	1/1 000 – >1/10 000
		Pedestrians & cyclists:	1/hour – 3/day		
5	£150 – >£15	Occupation:	1 min/week – 1 min/month	3 – 1 @ 110kph (68mph) 3 – 1 @ 100kph (62mph) 3 – 1 @ 90kph (56mph) 3 – 1 @ 80kph (50mph) 4 – 1 @ 70kph (43mph) 4 – 1 @ 60kph (37mph) 5 – 1 @ 50kph (32mph)	1/10 000 – >1/100 000
		Pedestrians & cyclists:	2/day – 2/week		
6	£15 – £1	Occupation:	<1 min/month – 0.5 min/year	None	1/100 000 – 1/1 000 000
		Pedestrians & cyclists:	1/week – 6/year		

Vehicle, pedestrian and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of >1/1 000 and 1/10 000 (column 5). Using the VOSL £1 500 000, the property repair or replacement value for Target Range 4 is £1 500 - >£150.

Table 6. QTRA Probability of Failure Ranges

Probability of Failure Range	Probablility
1	1/1 - >1/10
2	1/10 - >1/100
3	1/100 - >1/1 000
4	1/1 000 - >1/10 000
5	1/10 000 – >1/100 000
6	1/100 000 – >1/1 000 000
7	1/1 000 000 – 1/10 000 000

The probability that the tree or branch will fail within the coming year.

Table 5. QTRA Size Ranges

Size Range	Size of tree or branch	Impact Potential
1	> 450mm (>18") dia.	1/1 - >1/2
2	260mm (10½") dia. - 450mm (18") dia.	1/2 - >1/8.6
3	110mm (4½") dia. - 250mm (10") dia.	1/8.6 - >1/82
4	25mm (1") dia. - 100mm (4") dia.	1/82 - 1/2 500

* Range 1 is based on a diameter of 600mm.

CHILEAN FLAMINGO FOOT HEALTH REVIEW

SAFARI ZOO LIMITED, DALTON-IN-FURNESS, CUMBRIA, ENGLAND LA15 8JR
Created: 17th September, 2016

AIM

This review of the Chilean flamingo (*Phoenicopterus chilensis*) feet condition is part of the general welfare and health surveillance programmes here at Safari Zoo and in response to a comment made in a previous formal zoo inspection report which stated; *"A number of lame flamingos were observed, and the flooring of the new flamingo house is plain concrete. In accordance with 2.2, 4.3 and 4.4 of the SSSMZP the floor in the Flamingo House must be the subject of review by the veterinary consultants and suitable flooring/substrate put in place to improve the health of the flamingo's feet, Condition 20, December 2015"*. This documented review considered the flamingo housing, substrates and current foot health and outlines the potential steps required to address these elements where required.

EXECUTIVE SUMMARY

- Complete review of foot and related health care was undertaken on the 19th August 2016, in combination with literature review over the following 4 weeks.
- A total of 55 Chilean flamingos were examined, 28.27.0.
- Foot scoring was based on the published flamingo foot scores of Nielsen, 2010.
- A total of 3850 separate data points were collected as part of the review.
- Comparison to published literature found that Safari Zoo had a similar level of hyperkeratosis and fissures to many European zoos, falling in the middle of the published data.
- Age appears to increase severity, assumed to be due to the chronic nature of pathology and continued exposure to causal factors.
- Origin of birds had no significant effect on current foot health, with all birds coming from a single collection with excellent facilities.
- Distribution of lesions consistent with European data sets.
- Small number of deaths of birds since arrival, most due to trauma related events and no mention of foot care health issues.
- No signs of lameness noted during the review period in any of the birds, including one that subsequently died of exertional myopathy.
- Concrete flooring in indoor consistently identified as a significant factor in foot health, surprisingly covering this in vinyl or PVC was found to increase problems with foot health. Current recommendations strongly consider fine particle sand as a substrate, although data is scarce. Grass also found to be related to higher incidence of certain foot pathologies.
- Safari Zoo has a large proportion of birds impacted by severe scores for both hyperkeratosis (56%) and fissures (42%) and husbandry changes must be instigated with an aim to reduce or at a minimum prevent progression of these lesions.
- Recommended that enclosure is reviewed in design and initially substrate, with welfare assessment of choice of substrates offered to ensure suitable and preferred substrate introduced.

INTRODUCTION

A primary concern of flamingo husbandry across the commonly kept species in captive zoological collections is the issue of husbandry related foot pathology. These vary in nature, type and pathology. Little is published with regard to the aetiology and management of these lesions, with published reviews attempting to quantify and identify causal factors only being available in the last 6 years. Despite the identification of the need to better understand the aetiology of this problem foot lesions are still reported as a major welfare problem in the flamingo literature (Kear, 1979; Brown, 2005; Nielsen 2010; Wyss 2015). It is considered that severe foot lesions compromise animal welfare and can be a port of entrance for bacterial infections, potentially leading to joint infections and septicaemia (Nielsen, 2010). Comparisons have been made to similar problems in the poultry industry and in raptor medicine, however the underlying factors are likely very different and as yet poorly understood.

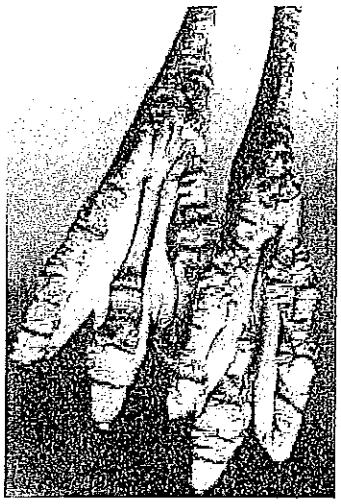


FIGURE 01 – Image of flamingo foot pathology from 1970s, Slimbridge, Kear

The main factors that can potentially impact flamingo foot health are thought to be primarily husbandry led and include climatic factors and substrate-surface factors (Nielsen, 2012; Wyss, 2013), although the data set is limited in both cases the conclusions appear logical when compared to other avian species. Other husbandry factors noted as risk factors in developing foot lesions in flamingo are weight and age of the birds (Wyss, 2013), although Nielsen saw only a small difference as birds aged, presumably thought to be due to the chronic, progressive nature of the lesions where husbandry changes were not made.

This review aims to review the current situation for the Chilean flamingo foot health at Safari Zoo; compares the institutional foot health against published foot care scores from multiple other collections; audits risk factors across the collection; and reviews the housing design, including substrate, against husbandry guidelines and published environmental risk factors.

CHILEAN FLAMINGO NATURAL HISTORY

The Chilean flamingo (*Phoenicopterus chilensis, 1782*) is found in central Peru southwards through to the Andes to Tierra del Fuego, extending eastwards to south Brazil. It is approximately 1m high with an average weight of 2300g. There primary habitat is coastal mudflats, estuaries, lagoons and salt-lakes from sea level up to 4500m. Most lakes being highly saline and/or dry periodically. The species normally breeds on islands of mud or gravel, but also on stony islands in Chile, and on margins of large, sediment covered icebergs in Bolivia. Classed as Near Threatened by the

IUCN, in mid 1970s thought to number 500,000. More recent figures put total population at no more than 300,000 (Marconi, 2011). Numbers decline likely due to improvements in census techniques but also some habitat loss with flooding of nest sites.

MATERIALS AND METHODS

Initial clinical examination of the 55 (28.27.0) Chilean flamingos at Safari Zoo was undertaken on the 19th August, 2016 to assess the birds and to document any foot lesions. Examination included:

- confirmed identification (darvic and/or microchip) based on current ZIMS data,
- body condition score,
- brief clinical examination, including confirmation pinioned
- photographs taken of the darvic ring, microchip (where present) and the plantar aspect of both distal hind limbs (feet)
- assessment of evidence of lameness over a period of 4 days through observation (a total viewing period of 2 hours split with random assessment times)

Birds were then immediately released into the outside enclosure, each procedure taking approx. 1-2 minutes.

The images were used to confirm each animal's identification and then, using a published flamingo foot scoring system as per Nielsen (2010), was applied to each foot. In summary this consisted of the foot being broken into seven areas, each assessed for the presence of hyperkeratosis, fissures, nodular lesions, or papillomatous growth, with each lesion applied a score of 0, 1, or 2 with regards to severity of lesions (see figure two and table one for details of scoring system). The scoring was undertaken by one individual, the author, to ensure consistency in its application, but noting that scoring may differ from the original scores given by Nielsen, 2010.

FIGURE 02: FOOT SCORING REGIONS

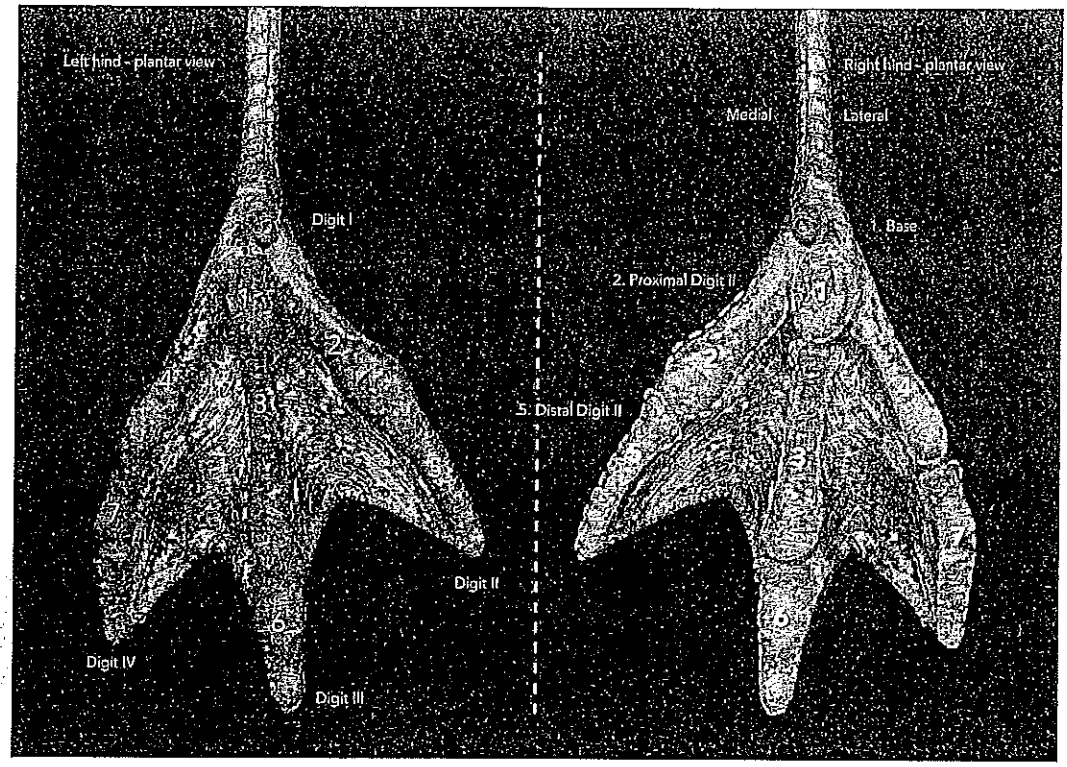
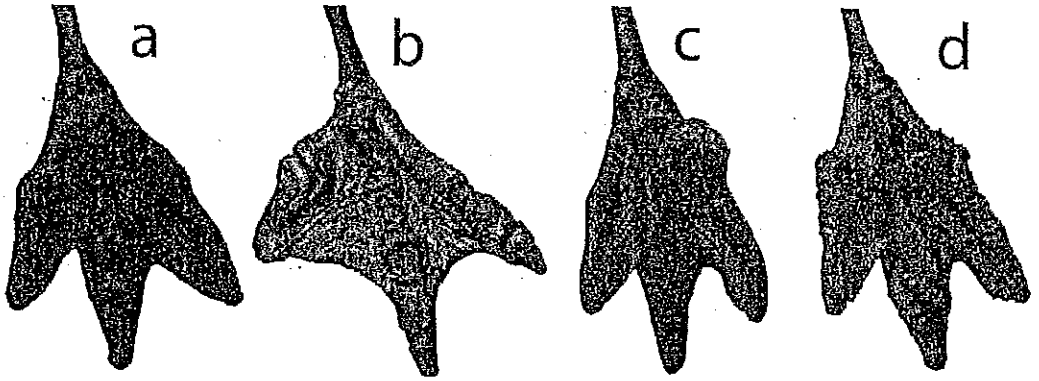


TABLE 01: FOOT SCORING CRITERIA



Pathology	Score		
	0	1	2
A. Hyperkeratosis	No lesion	Flat or slightly overgrown	Overgrown
B. Fissures	No lesion	<2mm deep	>2mm deep
C. Nodular lesions	No lesion	Closed, no necrosis	Open, with necrosis
D. Papillomatous growths	No lesion	Small, finger-like projections	Clusters or lumps of proliferation

From Nielsen, 2010

Birds were then assigned categories using the methods outlined in Nielsen, 2010, as well as those of Nielson 2012 to allow a comparison, accepting that there would be some variation. The categories were prevalence of lesions, worst affected lesion prevalence, distribution of lesions, age and relationship to lesion prevalence, substrate comparison, and a new category of origin of birth which attempted to assess the impact of variation and duration of stay in previous collections to ascertain if there were a historical impact underlying the current foot health.

Post mortem records were also assessed to include and document any mention of foot pathology or potentially related disease.

The second part of the review focused on the flamingo enclosure which was assessed and compared against the current Flamingo Husbandry Guidelines (AZA / EAZA / WWT) (2005) as well as husbandry and evidence based design literature reviews (Wyss, 2014; Wyss, 2013). The current design was critically appraised against the findings from the clinical examination and foot scoring.

PART 1. FOOT SCORING

RESULTS

For foot scores all 55 birds were considered, however where animals are grouped based on age or previous collection history only 51 birds were used as specific individual assessment was not possible for four birds (microchip failure in one and novel darvic rings in three). One bird has a darvic ring removed due to wear and tear and replaced, this was marked in the ZIMS records (PCC020 – Blue FUK).

Appendix 1	Prevalence of flamingos affected by foot pathology at Safari Zoo compared to data from Nielsen, 2010
Appendix 2	Percentage of area affected by foot pathology among flamingos at Safari Zoo compared to data from Nielsen, 2010
Appendix 3	Age distribution of foot pathology in flamingos at Safari Zoo
Appendix 4	Relationship between foot pathology and birth place of the flamingos received by Safari Zoo
Appendix 5	Post mortem summary of Chilean flamingo deaths at Safari Zoo since their arrival, March 2015

Appendix one: in general, there was only one bird with a papillomatous lesion and only five birds with nodular lesions, and even these were considered mild. All of the birds (100%) exhibited hyperkeratosis lesions of score 1 or 2, with 31 (56%) demonstrating hyperkeratosis lesions of severity 2 on at least one of the seven areas assessed. Fissures had a similar, if not slightly lower prevalence with lesions classed as 1 or 2 being present on 53 (96%) of the birds in at least one of the seven areas assessed, with 23 (42%) of these birds having fissures of score 2.

The prevalence of the hyperkeratosis and fissure lesions was comparable to other European and American zoos, however the hyperkeratosis of score 2 for Safari Zoo was significantly lower than that for the average number of hyperkeratosis for the European zoos (-11%), however the fissure score of 1 or 2 was 10% higher than the average for the European zoos. The papillomatous growths and nodular lesions of score 1-2 were significantly lower than the average for European zoos, 2% v 46% and 9% v 17% respectively.

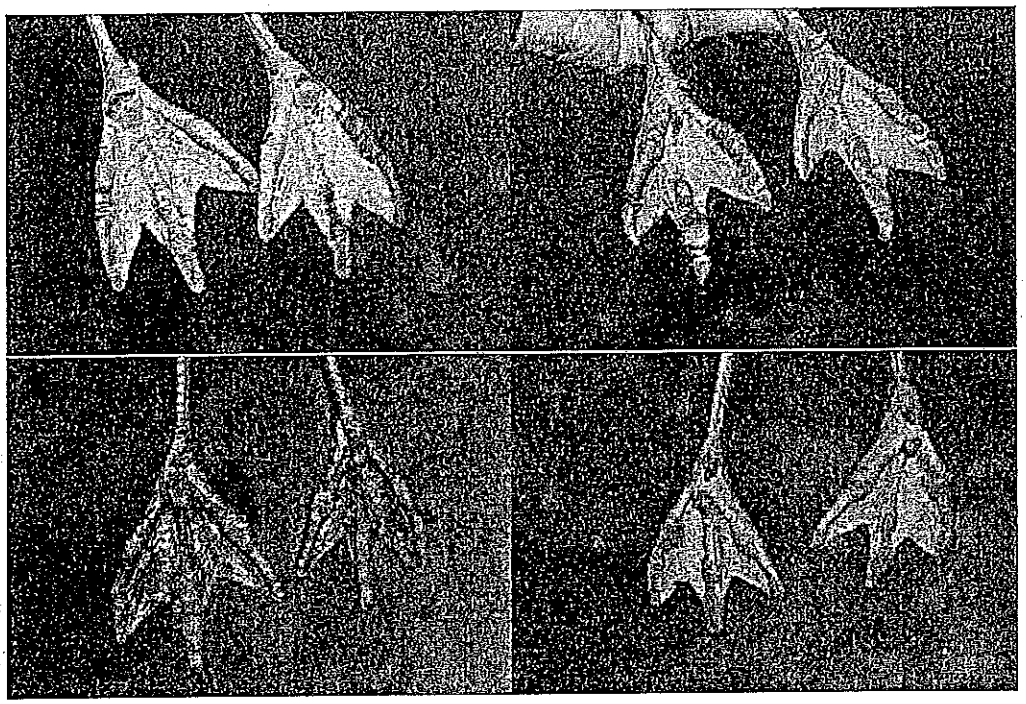


FIGURE 03: Selection of feet demonstrating various foot pathologies and distribution at Safari Zoo (clockwise top left); (a) left fissures and hyperkeratosis, mild, (b) left fissures and hyperkeratosis severe, (c) bilateral hyperkeratosis and fissures sever, (d) bilateral hyperkeratosis severe, fissures mild.

Appendix two: hyperkeratosis lesions of score 1 or 2 were most frequently found on the proximal digit II, followed by proximal digit IV, then proximal digit III. Scores of 2 had a similar distribution with proximal digits II and IV worst affected. Fissures were equally worst on proximal digit II, for lesions of 1 or 2 and 2 on its own; but distal digit IV demonstrated a larger number of fissures, then distal digit III before distal digit II.

Appendix three: no birds had bred since they had arrived in March 2015 and as such there were no birds in the <1 year and the 1-3 year categories. As birds aged the percentage of birds with severity scores of 2 for both hyperkeratosis and fissures increased, whilst nodular lesions were only found in the 4-9 year and 10-19-year age groups, albeit a small number. Papillomatous lesions were limited to an individual in the 20-29-year-old age group. Average, accumulated foot scores for the group also increased as the age group of the birds increased.

Appendix four: all of the birds originated from Zoo Parc de Beauval (ZPB). However only 25 (45%) were born there. Four other zoos were known to have supplied birds to ZPB prior to their arrival at Safari Zoo, with the shortest period spent at ZPB 4 years and the longest 18 years prior to the animals leaving ZPB for Safari Zoo. The single bird born at Les Geants du Ciel exhibited the worst hyperkeratosis and fissure scores. Birds from Parc Zoologique de la Palmyre had similar worst affected scores to BioParc de Doue despite a difference of 9 years of average age and a similar period of time spent at ZPB. ZPB birds born at ZBP had the lowest worst affected scores for both hyperkeratosis and fissures but were also the average youngest age group. When solely looking at average total foot scores the collections that had provided the lower numbers of birds to ZBP had the highest average accumulated foot scores, namely UNK origin, Les Geants du Ciel, BioParc de Doue followed by Parc Zoologique de la Palmyre, irrespective of average age or duration at ZPB.

The average body condition score was 3.5/5 for all of the 55 birds, and during the assessment period no birds were noted to be lame.

Appendix five: reviewing the post mortem records: one bird was noted to be separate from the group on the night of the 23rd August 2016 and found dead the following morning. At post-mortem bird PCC016, with histology confirming, was found to have succumbed to an exertional myopathy. It is possible this was a result of catch up five days earlier, however other events may have occurred during the time period between catch up and death that led to the demise of this bird. Historical review of the post mortem records demonstrated that one other bird had died in the preceding 12 months: bird PCC019 had died following an open fracture of the right radial aspect of the carpus where it was found dead in the group of birds. The former bird was scored and is included in the grouped data set, the second made no mention of the condition of the feet and no comment can be made. In 2015 bird PCC008 (DOD 12/04/15) had died a month after arrival with a swollen TT-TMT joint and a deep wound to the 'tibio-femoral' (presumed stifle) joint and subsequent infection and necrotic myopathy. PCC Unknown (DOD29/05/15) was noted to stand on its own and was found dead with a comment that the bird was thin. No PM report was found for this bird. Prior to this for the period 2013-2014 the post mortem records demonstrate only a single Caribbean flamingo (*Phoencicopterus ruber*) with renal gout (PRC027), no mention was made of the foot health and this bird was located in a separate house to the current one.

DISCUSSION

The method of scoring used by Nielsen 2010 was not clear in the segregation of the seven areas used in scoring and as such a decision was made to divide the foot into the seven areas as outlined above. This may have led to some variation in comparison but the overall picture is similar to the distribution noted by Nielson, 2010 and as such it is believed that the methodology is comparable.

The foot lesions prevalence of hyperkeratosis and fissures is similar or improved when compared to other collections when scored against data taken from the Nielsen 2010 paper. All of the birds have hyperkeratosis to a level of severity 1 or 2 and a slightly increased level of fissures of severity 1 or 2, but slightly less of severity 2 only. Whilst this demonstrates that the birds are in a comparable situation to most European collections this is not a validation that conditions are acceptable. Nielsen (2010) states that "severe foot lesions compromise animal welfare and can be a port of entrance for bacterial infections". When looking across the range of scores, and not focusing on the average prevalence rates, there are single institutions that have foot scores a third or half of those of the birds at Safari Zoo, even those at similar latitudes and climate. In the case of hyperkeratosis of score 2 there were 7/18 zoos with improved prevalence compared to the Safari Zoo birds. In the case of fissures of score 2 there were 8/18 birds with improved scores. Solely considering these two parameters this points Safari Zoo in the middle of the 18 assessed zoos. This is not to take away that the scores are comparable to other collections but merely to state that improvements have been made in other collections and as such the husbandry situation could be reviewed to understand why there are issues and what changes can be made to overcome them or at least maintain and mitigate progression of lesions as birds age.

The prevalence of nodular lesions and papillomatous growths was very different when compared to other collections across Europe and Safari Zoo demonstrates a much better foot condition with regards to this type of pathology than many other collections. There were very minor nodular lesions and papillomatous growths in a very small number of birds. Whilst these are often more chronic lesions papillomatous growths can occur in short time periods and if to occur with the current husbandry set up at Safari Zoo they would have been expected to have occurred in the last 18 months, or at least be able to demonstrate initial signs of development. However, there were none. This is similar to a few other zoos when reviewed separately, e.g. Dublin zoo or Durrell zoo, and may simply reflect latitude or environmental differences as well as husbandry as there are very different systems used in both collections. Whilst nodular lesions and papillomatous growths are impressive and obvious lesions the fissures are considered more significant from a welfare perspective and as a port of entry of infection as the natural defences of the skin barrier are compromised potentially leading to other orthopaedic or systemic infections (Kear, 1979).

Consistent with Nielsen, 2012, the presence of concrete flooring does demonstrate an increase in hyperkeratosis and fissures as seen here at Safari Zoo, with no effect on nodular lesions or papillomatous growths. Interestingly Nielsen notes that the presence of vinyl or rubber lining actually increases the presence of papillomatous growth, with no improvement on the management of fissures. The rationale considered to be that bare concrete allows facilitated cleaning and reduction in potentially infectious agents that may be involved in the aetiology of the lesions.

In the outside enclosure there is a mixture of grass, soil and a pool. This variety of substrates was once assumed to improve foot care through improved blood flow through dynamic mechanical movement of the foot (Nielsen, 2012). However,

Nielsen, goes on to demonstrate in his survey group that exposure to wet or dry soil actually increased the risks of nodular lesions but reduced papillomatous growths and fissures. Grass, surprisingly, increasing the risk of fissures (Nielsen, 2012). Both grass and concrete linings both appeared to negatively affect the feet in this study.

Safari Zoo sits north of the 53rd latitude which is again consistent with Nielsen's (2012) findings in that there appears to be a higher prevalence of hyperkeratosis and fissures north of the 53rd latitude, however Nielsen also found that there was a large increase in papillomatous growths which was not noted in Safari Zoo's case.

Nielsen, 2012, considered various substrates including bare concrete, vinyl or rubber lining, soil or grass and none could be identified as particularly suitable for flamingo health (Wyss, 2014). Wyss goes on to demonstrate that appropriate sized sand can be considered suitable and a preferable substrate for indoor housed flamingos and also demonstrate an improvement in foot health in certain cases (a reduction in papillomatous growths and fissures), however Brown and King (2005) advise against using sand as there have been reported impactions (typically Lesser flamingos) and other foot related problems (although they do not go on to state what they are). This maybe a historical issue with improved knowledge and access to various types of sand and improved knowledge for other flamingo species, other than extrapolating from what appears to be a problem solely with Lesser flamingos which may not be relevant to the situation at Safari Zoo. Whatever the case maybe the improvements noted in Wyss's 2014 paper are impressive and within a relatively short time period.

The distribution of the lesions is comparable to the findings of Nielsen, 2010, with proximal digit II followed by proximal digit IV being worst affected. This is to be expected as these are the major weight bearing structures of the foot and therefore will have the most contact time with substrates as well as the most weight distributed across the foot supporting structures. However, there was a slight variation in the distribution of the lesser lesions when looking at the more distal aspects of the foot but this was minor and simply considered variation in scoring or assessment rather than any significance in the substrate and husbandry systems used at Safari Zoo.

Of particular note was the relative absence of nodular lesions and papillomatous growths. This was similar to other collections at this latitude but was much lower than the average for the whole European group. Nielsen postulates that both of these lesions are exacerbated by certain substrates but no link could be found to the husbandry set up at Safari Zoo as to why these lesions were not present. Papillomatous growths have been reported in animals as young as 4 weeks old (Wyss, 2015) with possible bacterial invasion in young birds creating an environment that then leads to foot changes later in life. Dietary zinc was also considered as a supportive agent to improved foot care. One hypothesis is the the hypha-forming bacterium *Arsenicicoccus dermatophilus sp. nov.*, a dermatophilus like bacteria may be significant in early health and later predisposition to foot problems (Gobeli, 2013). It is likely, as in other birds, that there is a multifactorial aetiology to foot problems in flamingos and as such all aspects of husbandry must be considered.

When considering the origin of the birds and early foot health the results were not considered significant, primarily due to small sample sizes and no direct reviews being possible. All of the birds had spent a significant time at Zoo Parc de Beauval, independent to the originating source, with a range of 7-9 years at ZPB prior to transfer to Safari Zoo. Reviewing the literature on husbandry changes and the changes noted in a short time period (as little as 4 weeks) the influence of the originating collection was not considered significant due to the good conditions maintained at ZPB and this likely removing any influence of historical management systems, whether or not they set the foot up for later problems as suggested above.

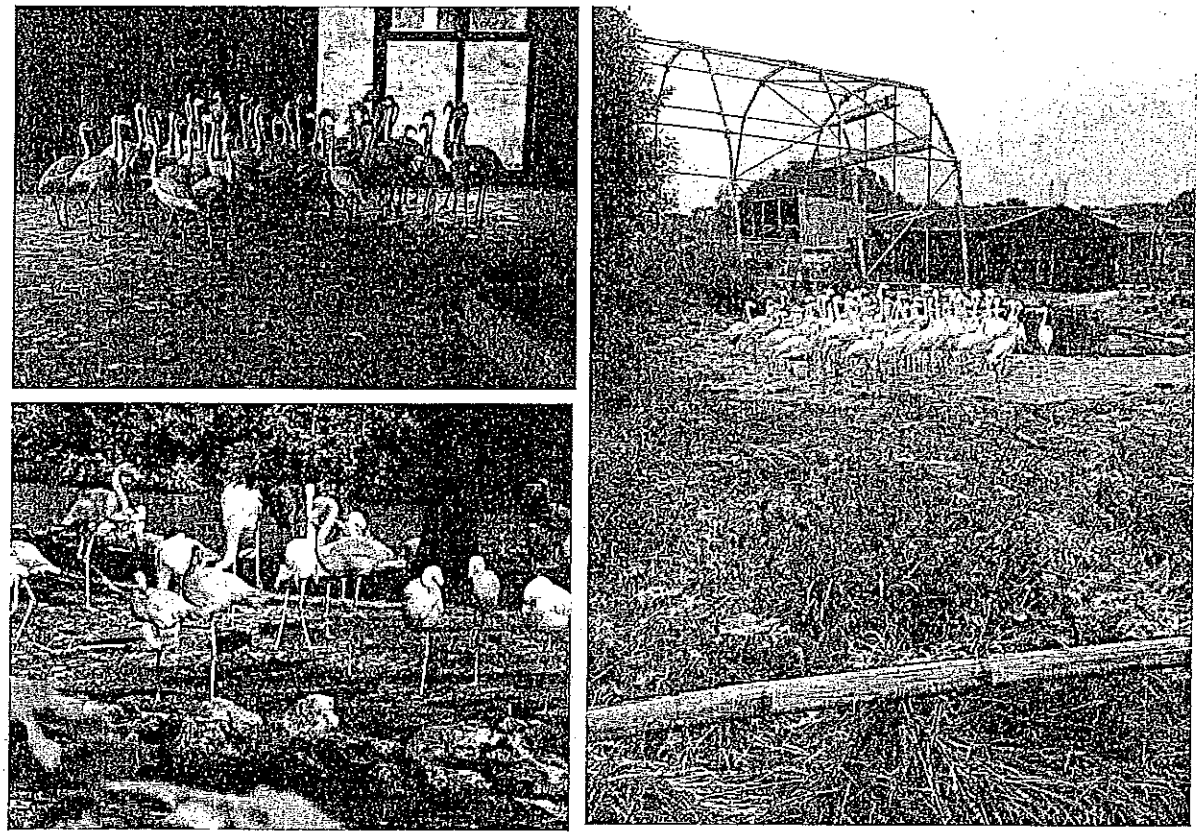


FIGURE 04: Housing Design: Indoor Safari Zoo (top left) concrete floor with pool; Outdoor Safari Zoo multiple substrates including pool (right); and Zoo Parc de Beauval (source of birds at Safari Zoo) (bottom left)

None of the birds appeared clinically to be lame nor exhibit any pathology possibly related to compromise of the foot-skin barrier e.g. tenosynovitis or septicaemia as reported in the literature. Historically there was a single case of tenosynovitis and infection with subsequent myonecrosis but this was considered traumatic in origin. Other bird deaths in the group were also related to trauma e.g. exertional myopathy or fractured wing. Although one bird was not post mortemed (or no report was found). Only one of the post mortem reports mentioned the foot health and this animal is already in the data from the survey, having died post catch up.

All of the birds were in good body condition and none were considered obese. Weight is considered by some as an factor in the level of pathology noted, presumably due to the increased weight load on the limbs and foot structures (Wyss, 2013). In the animals at Safari Zoo none were considered overweight and this was not considered a contributory factor to the current condition of the feet.

In summary the Chilean flamingos at Safari Zoo have foot pathology consistent with that at other surveyed major European collections, with a similar level of prevalence, distribution and severity. Safari Zoo's flamingo foot health care at best, when compared to other collections, is considered average when considering hyperkeratosis and fissures. Whilst this does not validate that the position is acceptable it does justify that the foot care is comparable to other EAZA members. However there are a large number of collections with foot scores that demonstrate more acceptable levels of pathology and these should act as markers to achieve to ensure improved welfare and foot care. No evidence of lameness was noted during the review period or in discussion with the staff nor were any foot related pathologies identified at post mortem examination. The primary cause of death appears to be traumatic in origin, with 75% of the birds suffering trauma related injury (one of which was considered probable as a result of this review) and one that had no diagnosis made.

As such the husbandry and environment needs assessment with changes made considering best current practices for flamingos. This should be a considered approach reviewing current literature but also an evidence based approach to what suits the birds at Safari Zoo. The current substrate types are likely to have led to the development of these foot pathologies and is considered consistent with more global reviews across Europe.

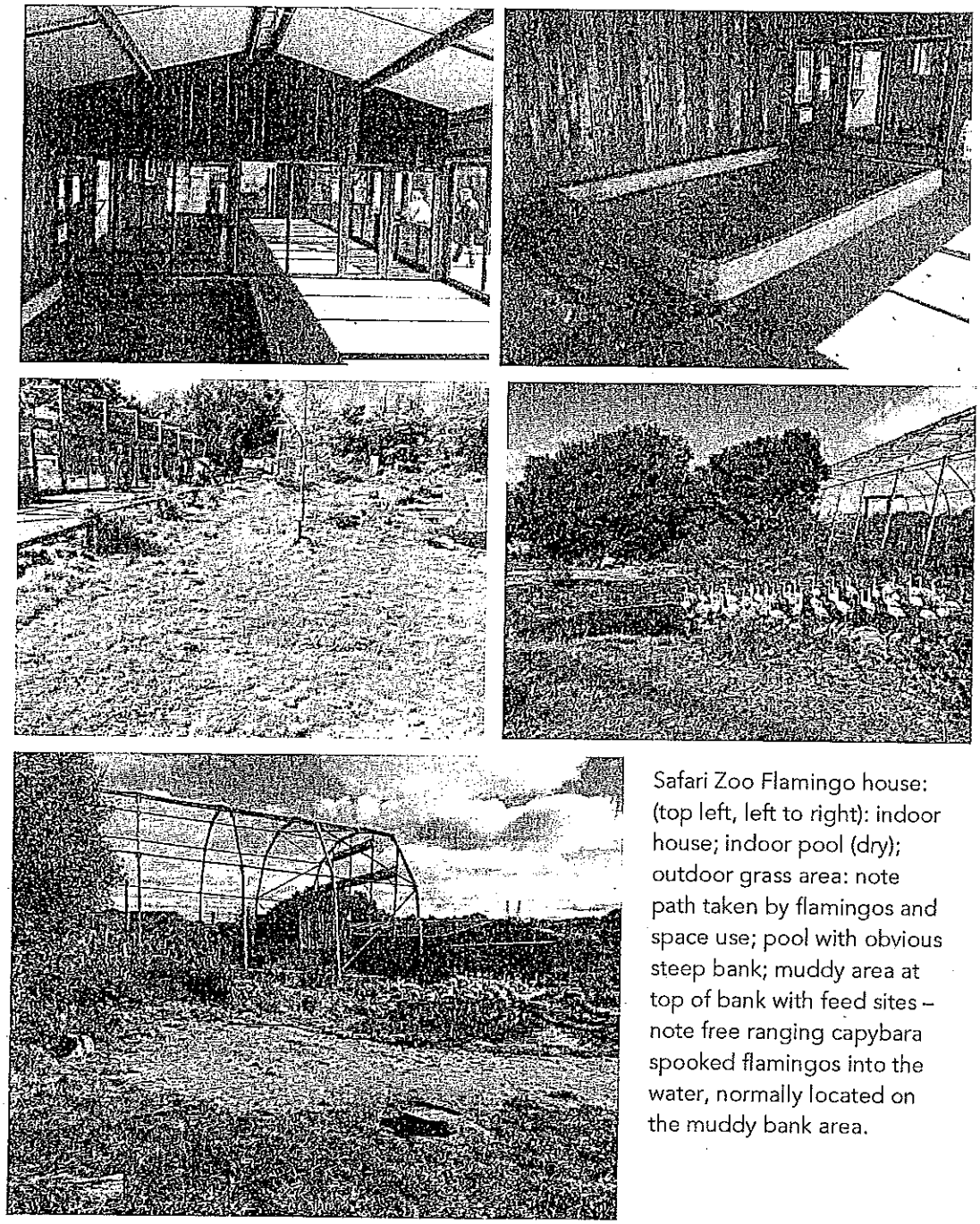
PART 2. ENCLOSURE DESIGN

SAFARI ZOO FLAMINGO ENCLOSURE

The current flamingo enclosure is part of the exit complex of the vulture aviary in the middle of the zoo. The outdoor area consists of a relatively small grassed area with a moderate sized pool with a mudded bank area on the south aspect of the pond. The pond is fed by run off from the indoor of the house but is relatively stagnant and does not have free flow. The mudded area does not gently slope into the pond but forms a relatively steep bank into the water approximately 80-100cm higher than the water. There is a path of worn grass to the east side from the bank to the indoor house and water. The primary substrates are grass, mud/earth and concrete lined pond. There is a small, 30cm high standoff with large rocks to the east aspect. Pool is approx. 60cm deep.

The indoor house is a rectangular square building with glass windows to three of the four sides, wood planks on the fourth. The floor is rough concrete with a 25cm high

concrete pool 2.6 x 3.8m in size. The indoor area has lights but no heating, and is ventilated by windows in the glass walls. The doors have standard door handles.



Safari Zoo Flamingo house: (top left, left to right): indoor house; indoor pool (dry); outdoor grass area: note path taken by flamingos and space use; pool with obvious steep bank; muddy area at top of bank with feed sites – note free ranging capybara spooked flamingos into the water, normally located on the muddy bank area.

TABLE 02: APPROXIMATE ENCLOSURE SIZES

AREA	SIZE	EAZA Guidelines (2005)
Indoor area	60m² / 1.1m² per bird	1.4m² per bird
Indoor pool	10m²	
Outdoor area	1350m² / 24m²per bird	1.4m²
Outdoor pool	170m²/ 3m² per bird	Whole flock at same time
Outdoor pool depth	0.6-0.8m	0.46-0.7 (or deeper)
Nesting area	NA	0.9m²

The approximate size of the current enclosure is consistent with the current flamingo husbandry guidelines, although the house is close to maximal capacity with the 55 birds, if a little overstocked if shut in over winter.

SUBSTRATE

The primary substrates found within the current flamingo house are:

- Rough concrete (indoor)
- Grass
- Concrete pool
- Mud / earth bank nesting area

DISCUSSION

When considering the EAZA / AZA joint Flamingo husbandry guidelines hard abrasive substrates should be avoided. Concrete is considered abrasive and caustic when wet, depending on the nature of the concrete material used. It was thought, and there is considerable anecdotal evidence to this effect, that concrete is related to the poor condition of flamingo feet. However, Nielsen 2012 reviewed the prevalence of foot lesions against substrate types and noted that whilst concrete is not considered appropriate nor is grass and rubber or vinyl covered concrete. In Nielson's study, and others subsequently, there were failings in most substrates used in flamingo enclosures, each having foot health issues associated with them, be it hyperkeratosis (concrete / vinyl flooring), fissures (grass / concrete / vinyl flooring), nodular lesions (wet or dry soil), or papillomatous growths (vinyl flooring).

Considering the substrate choice is both concrete, grass, water and mud then the foot scores were remarkably good considering. The impact of the indoor house concrete floor could not be assessed as the animals had predominantly been outside for the 4-6 weeks prior to the date of assessment. There are concerns on assessing the finish of the concrete floor that this has potential to be excessively abrasive due to the rough finish and potentially foot scores could deteriorate over the winter period, as seen in published papers in a period as sort as 4-6 weeks.

Wyss's work (2014) is interesting when considering their findings with regard to the use of fine, granular sand and the huge and relatively rapid (4wk) improvement in foot scores and condition. Sand is fairly controversial and is advised against in the husbandry guidelines following WWT experiences with Lesser flamingos, however this work and the benefits in this one paper could possibly outweigh the risks of impaction, especially when considering the native habitat these birds often live in.

A model which could be considered would be that highlighted in the Wyss paper – namely that the birds could be provided with a variety of indoor substrates e.g. two or three and they have the choice as to what they prefer. Document this, assess foot scores and then consider the choice as a permanent solution rather than simply electing for one substrate over the other. This would provide optimal welfare, choice and to some degree enrichment during the winter period and allow evidence based selection of substrate appropriate to the specific birds here at Safari Zoo.

Whilst not related to the specific foot health it is prudent to comment on certain aspects of the enclosure design when compared against the husbandry guidelines, the behaviours noted with the Safari Zoo birds and some of the more current literature.

A few areas stand out as potential issues that could benefit from a longer term review of the enclosure and highlight areas for development as part of a wider master-planning strategy for the zoo as a whole. These include:

1. The steep bank from the 'breeding area' to the water – this is incredibly steep and is not appropriate for flamingos. Whilst they can traverse this rise the preferred route is the shallow gradient on the grass. This is supported by the wear patterns on the grass and simply watching the movement behaviour of the birds. The EAZA husbandry guidelines suggest that the topography of the exhibit should be as flat as possible. This may have some impact on breeding success if the area were levelled out.
2. The outdoor pond – levelling the adjacent land would allow birds a clearer view around and increase security. Efforts to maintain water movement and flow would be beneficial in reducing stagnant areas and therefore reduce the risk of botulism or similar disease which have been reported in the literature.
3. Consider increasing the size of the pool and the breeding area site – the husbandry guidelines recommend that the pool is the most important part of the exhibit and is used for feeding, courting, copulating, sleeping and even swimming if deep enough. The grass, whilst aesthetically pleasing actually reduces the available space that is usable for the birds and as such consideration should be given to what is effective enclosure size verses actual enclosure size. This could have major impacts on breeding success, especially if considering reduction in viewing opportunities i.e. they have areas where they are not on public view (currently three out of four sides).
4. Consider prevention of free ranging species into the flamingo area – flight (or fight) responses were noted during the review period when free-ranging

capybara entered the enclosure (see pictures above). It is possible that such activities, especially at night, could potentially be the cause of the traumatic injuries noted in the post mortem database, although other reasons could account for this also e.g. thunder storms.

In summary the enclosure design does meet most of the aspects outlined in the current EAZA / AZA husbandry manual on a basic level. This combined with the foot scores which were comparable with other European collections is suggestive that the current facility is adequate. However, this is not to validate the enclosure as meeting the needs of the animals within and recommendations are made that could potentially increase the welfare of the flamingos and attempt to further improve foot care but also basic husbandry and other behavioural welfare parameters considering more current husbandry recommendations that replace the somewhat outdated EAZA husbandry guidelines.

RECOMMENDATIONS

- Review substrate choice and enclosure design to facilitate current best practice in welfare management of flamingos – considering flooring substrate, water management, and areas 'off show' or 'limited viewing opportunities' to facilitate opportunities for natural behaviour, including reproduction.
- Recommend experiment with various substrates rather than commit to one type e.g. trial fine sand and astro-turf areas verses concrete in the house and assess behavioural responses to preferred substrates.
- Review enclosure design for potential sources of injury e.g. door handle design, catch up areas, reduction of birds being spooked, etc
- Implement a plan of annual or biennial review, health check and foot care scoring to document foot care changes balanced against reproductive stresses and enclosure catch up and assess responses to change in environment
- Review temperature delivery indoor areas as well as ventilation during the winter – it is noted that flamingos are hardy and can cope with low temperatures
- Ensure all birds are microchipped and records up-dated on ZIMS to ensure no bird identifications are lost over time – note tow of the four birds have been identified but two are outstanding at the time of write up (this was not amended in the data set)

CONDITION RESPONSE

One of the reasons for this review was in response to the condition provided in a previous zoo inspection, namely:

"A number of lame flamingos were observed, and the flooring of the new flamingo house is plain concrete. In accordance with 2.2, 4.3 and 4.4 of the SSSMZP the floor in the Flamingo House must be the subject of review by the veterinary consultants and suitable flooring/substrate put in place to improve the health of the flamingo's feet, Condition 20, December 2015"

SSSMZP section 2.2 refers to the requirement for an enclosure to have sufficient shelter and refuge areas that allow an animal to escape the permanent gaze of the public.

The first aspect of this section is complied with the current facility in that the birds have access to the indoor house area if they wish. Flamingos will often stay out in bad weather and are extremely hardy birds, however they do have free access into the house at all but exceptional times. The second part is considered a concern, albeit a minor one following assessment of behaviour. As part of master planning it is recommended that the enclosure have the planting and visual barriers reviewed as outlined above.

SSSMZP section 4.3 is similar in some respects to 2.2 and builds on the concept that accommodation must take account of the natural habitat of the species and seek to meet the physiological and psychological needs of the animals. To some degree the current enclosure meets this when considering the current husbandry guidelines, however there are failings in certain areas that are outlined in the recommendations above that could facilitate welfare improvements for these birds.

SSSMZP section 4.4 states that enclosures must be equipped in accordance with the needs of the animals...and goes on to outline what this must consider. Again these areas are highlighted in the report and the recommendations.

The specific condition is that "the floor in the Flamingo House must be the subject of review by the veterinary consultants and suitable flooring/substrate put in place to improve the health of the flamingo's feet". This report builds on previous assessments of the floor and recommendations with regards to its suitability. This report fully documents the foot care health and highlights that the foot health demonstrates environment related lesions, particularly hyperkeratosis and fissures, that are comparable or in some cases better than many European collections. In addition these are not, at least during the review period or in discussion with keeping staff, related to any clinical signs of lameness in these birds.

With respect to the condition, the question of a suitable flooring/ substrate is a challenging one in that recent published research into suitable flamingo flooring raises problems with most floor types. As such, considering the results of this report, it is the author's recommendation to undertake a review of substrate options, using best current practice and allow the birds to choose a suitable flooring type and review the bird's selection choices rather than install a substrate that may meet the requirement of the condition but not meet the welfare needs of the birds.

This could simply be the installation of two or possibly three temporary substrate types and document the preferences of the birds with permanent installation of the preferred substrate occurring following review of foot scores and behavioural data i.e.

evidence based substrate selection. This resolving the current poor floor choice indoors on a temporary basis, allowing an informed choice in 2017. This research project must undergo ethical review at the next ethics meeting and the current report sent to the zoo inspectors to ascertain their thoughts on the proposal to meet this condition, albeit overdue on the original time lines, with substrates installed prior to the winter period when the birds are shut in.

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Appendix 1: Prevalence of flamingos affected by foot pathology at Safari Zoo compared to other published collection data

		Hyperkeratoses		Fissures		Nodular lesions		Papillomatous growths	
Location	n	Score 1+2	Score 2	Score 1+2	Score 2	Score 1+2	Score 2	Score 1+2	Score 2
Safari Zoo	55	100	56	96	42	9	0	2	0
European zoos									
Amersfoort zoo	63	98	25	87	21	2	0	13	0
Antwerp Zoo	15	100	100	100	87	47	27	93	67
Augsburg Zoo	20	100	100	100	100	15	5	5	0
Avifauna	16	100	75	100	44	6	0	25	0
Burgers Zoo	73	100	95	96	79	44	10	93	32
Copenhagen Zoo	45	100	51	87	60	0	0	67	27
Dublin Zoo	76	100	36	75	20	4	0	7	0
Durrell	50	100	34	66	8	4	0	8	0
Edinburgh Zoo	19	100	79	100	68	11	0	21	0
Givskud Zoo	19	100	53	84	32	37	26	37	5
Helsinki Zoo	17	94	18	76	29	0	0	18	0
Jerez Zoo	47	100	51	89	32	15	0	32	2
Kolmarden Zoo	30	97	70	87	70	0	0	47	3
Odense Zoo	58	100	88	97	69	2	0	93	34
Parken Zoo	42	100	62	95	24	5	0	90	5
Riga Zoo	43	100	91	79	40	44	2	19	5
Rotterdam Zoo	127	100	90	84	50	35	9	48	14
Twycross Zoo	34	100	82	94	62	15	3	71	6
Total	794	100	67	87	46	17	4	46	12
Texan Zoos									
Ellen Trout Zoo	17	100	47	35	0	47	35	6	0
Houston Zoo	43	100	67	72	0	42	26	7	0
Total	60	100	57	54	0	45	31	7	0

Publihsed data as per Nielsen, 2010.

Appendix 2: Percentage of area affected by foot pathology among flamingos at Safari Zoo

Safari Zoo	Hyperkeratoses		Fissures		Nodular lesions		Papillomatous growths	
Position on foot	Score 1+2	Score 2	Score 1+2	Score 2	Score 1+2	Score 2	Score 1+2	Score 2
Base	28	1	2	0	2	0	0	0
Proximal D2	94	35	66	22	3	0	1	0
Proximal D3	71	5	26	2	0	0	0	0
Proximal D4	80	11	32	8	0	0	0	0
Distal D2	15	1	7	0	0	0	0	0
Distal D3	72	6	38	1	0	0	0	0
Distal D4	62	3	55	7	0	0	0	0

Nielsen 2010	Hyperkeratoses		Fissures		Nodular lesions		Papillomatous growths	
Position on foot	Score 1+2	Score 2	Score 1+2	Score 2	Score 1+2	Score 2	Score 1+2	Score 2
Base	38	6	9.1	1.8	3.8	0.9	11	2
Proximal D2	95	45	39	14	6.3	0.9	30	4.6
Proximal D3	81	13	22	7.1	1.6	0.9	11	1.3
Proximal D4	87	29	32	12	6	1	25	5.5
Distal D2	17	1.1	17	2	0.3	0	9.3	0.3
Distal D3	51	6	40	12	0.5	0.4	22	2
Distal D4	44	6.3	50	14	0.4	0.1	12	0.7

Appendix 3: Age distribution of foot pathology in flamingos at Safari Zoo

		Worst affected number				Total Both	Left	Right
		H	F	NL	PG			
<1 year		NA	NA	NA	NA			
1-3 years		NA	NA	NA	NA			
4-9 years	Number 1 or 2	100%	100%	12%	0%	13.65	7.06	6.59
	Number 2 only	47%	35%	0%	0%			
10-19 years	Number 1 or 2	100%	100%	13%	0%	14.91	7.22	7.70
	Number 2 only	57%	39%	0%	0%			
20-29 years	Number 1 or 2	100%	91%	0%	9%	17.73	8.91	8.82
	Number 2 only	73%	55%	0%	0%			
>30 years		NA	NA	NA	NA			

Appendix 4: Relationship between foot pathology and birth place of flamingos received by Safari Zoo

Birth	No of birds	Average age of bird	Average duration at ZPB	Worst affected number				Total Both	Left	Right
				H	F	NL	PG			
Les Geants du Ciel	1	9y11m	8y0m	2	2	1	0	20	9	11
Parc Zoologique de la Palmyre	13	13y6m	9y6m	1.7	1.5	0.2	0.0	15.4	7.2	8.2
BioParc de Doue	10	22y1m	8y10m	1.7	1.4	0	0.1	17.4	9.2	8.2
UNK Purchased Jacana	2	15y8m	9y0m	1.5	1	0.5	0	20.5	9.5	11
Zoo Parc de Beauval	25	7y7m	7y7m	1.4	1.4	0.0	0.0	13.4	6.8	6.6
N/A	4	NA	NA	NA	NA1	NA	NA	NA	NA	NA
Total	54									

Birth	No of birds	Average age of bird	Average duration at ZPB	Worst affected number				Total Both	Left	Right
				H	F	NL	PG			
UNK Purchased Jacana	2	15y8m	9y0m	1.5	1	0.5	0	20.5	9.5	11
Les Geants du Ciel	1	9y11m	8y0m	2	2	1	0	20	9	11
BioParc de Doue	10	22y1m	8y10m	1.7	1.4	0	0.1	17.4	9.2	8.2
Parc Zoologique de la Palmyre	13	13y6m	9y6m	1.7	1.5	0.2	0.0	15.4	7.2	8.2
Zoo Parc de Beauval	25	7y7m	7y7m	1.4	1.4	0.0	0.0	13.4	6.8	6.6
N/A	4	NA	NA	NA	NA1	NA	NA	NA	NA	NA
Total	4									

Appendix 5: Flamingo post-mortem summary Safari Zoo 2014-2016

No.	Date of death	Date of PM	Taxa	Species	Species	ID	Sex	Age	Weight (kg)	Microchip	Location	Hx	Gross findings	Diagnosis	Category	Histology	Microbiology	Author
111	24/08/16	24/08/16	Avian other	Chilean flamingo	*Phoenicopterus chilensis*	FC0016	F	NR	2.19	Red FCN	Flamingo	Quiet last night and away from the group, checked first thing this morning and found dead. Presented and underwent PM immediately. No microchip and left tissue Red FCN	Massive SC oedema and free fluid, right pectoral pale tan with haemorrhage overlying the infraspinatus muscle, left normal. NAD on coelomic examination.	Trauma and subsequent ischaemia of the right pectoral	RTA / Trauma	Sent to IZVG	NA	JC / IZVG
30	14/02/16	14/02/16	Avian other	Chilean flamingo	*Phoenicopterus chilensis*	PCC019	M		1.8	Blue AXT	NR	Broken wing, [illegible] exposed bones. Sudden death with no previous signs of illness or injury.	Bird looked thin, with little body muscle. Observed open fracture of the right radius bone, fracture looked at least a week old, the wing was swollen in the area and had formed a scab around the wound. The area around the open fracture was infected. The bird did not show any signs of pain and was isolated with the group until found dead in the morning. No need for further investigation - [illegible] on the [illegible].	Old open fracture of the right radius/ulna and the carpus, cause of death not suspected [illegible] related	RTA / Trauma	NA	NA	FB / FRS
51	29/05/15	29/05/15	Avian other	Chilean flamingo	*Phoenicopterus chilensis*	PCC055	F	9y1m	1.45	250279600024873	NR	Standing alone on some occasions but would join back up with the group throughout the day. The bird is quite thin, found dead by side of the flamingo pool.	No PM report	Open	Open	NA	NA	CKS
27	12/04/15	12/04/15	Avian other	Chilean flamingo	*Phoenicopterus chilensis*	PCC003	F	9y	1.9	250229600018469	NR	Bad left leg, swollen knee joint, very weak and thin. Had enrofloxacin, meloxicam and CCF. Got weak, couldn't stand up, lost weight and died.	Swelling of TMT joint, swelling of tibiotarsal joint, swelling of tibiotarsal region. Deep wound on top of tibiotarsal zone, with tendon and bone exposure. Infection and necrotic fibrin observed on tibiofemoral joint, with necrotic femoral muscles.	Cause of death due to severe leg infection and necrosis, no need for further investigation.	RTA / Trauma	NA	NA	FRS
37	22/04/14	22/04/14	Avian other	Caribbean flamingo	*Phoenicopterus ruber*	FCR027	NR	NR	NR	958000001378309	Flamingo house	Found dead in the flamingo house, looked very thin, no signs of injury.	Thin BCS, very obvious pathology restricted to the kidneys, grossly swollen and mottled with many small white micro abscesses (IC - actually gout)	Kidney failure	Anatomical	IZVG: amyloidosis, renal gout	NA	FB / IZVG

Note: Chilean flamingos arrived March 2015

APPENDIX 6

BOROUGH OF BARROW IN FURNESS

ZOO LICENSING ACT 1981 – SECTION 16(A)2

Direction to comply with a condition attached to a licence to operate a zoo.

To: Mr. David Stanley Gill

At: South Lakes Safari Zoo Ltd,
Broughton Road,
Dalton-in-Furness,
Cumbria LA15 8JR

1. TAKE NOTICE that Barrow Borough Council having given you the opportunity to be heard, **is not satisfied** that in relation to South Lakes Safari Zoo Ltd a condition attached to your licence dated 11th December 2015 which required you to:

   Condition 17: Review of Veterinary Programme

   A review of the Veterinary programme must be undertaken in conjunction with the consulting veterinarian and a resulting written programme of care (to include parasite control, vaccination, p.m. routine etc) be agreed, recorded and maintained accordingly.

is met.

The above licence condition is not met in relation to the whole Zoo.

Barrow Borough Council hereby requires you to take the following steps to ensure that the licence condition is met,

2. WHAT YOU ARE REQUIRED TO DO

- A review of the Veterinary programme must be undertaken in conjunction with the consulting veterinarian; and
- A resulting written programme of care (to include parasite control, vaccination, p.m. routine etc) be agreed, recorded and maintained accordingly

3. TIME FOR COMPLIANCE

These steps are to be complied with by **22nd May 2016.**

4. WHEN THIS NOTICE TAKES EFFECT

This notice takes effect on the date of service (4th March 2016).

5. ORDER UNDER s.16A

The Zoo specified above need not be closed to the public during the period specified for compliance with this direction.

6. NON-COMPLIANCE

Failure to comply with the direction may (if appropriate) lead either to the closure of the zoo by a Zoo Closure Direction (under section 16B) or to alteration of your licence under section 16(B) so as to require that a section of it is closed permanently to the public.

7. RIGHT OF APPEAL

Your attention is drawn to the notes overleaf which include details about appeal against the direction.

This Direction Order does not require the undertaking of work that the Zoo would not ordinarily be required to undertake therefore this Direction Order shall have immediate effect unless an appeal is brought during the period within which you are entitled to appeal against it. If you do appeal, the Order shall not take effect, during the subsequent period before the appeal is either determined or abandoned. Therefore the effective date for this Order is 4th March 2016.

Signed ..[redacted]..... Date 4th March 2016

Name: Phil Huck
Designation: Executive Director

Barrow Borough Council,
Environmental Health Department,
Town Hall, Duke Street,
Barrow-in-Furness,
Cumbria LA14 2LD
Tel: (01229) 876543 Fax: (01229) 87641
email: envhealth@barrowbc.gov.uk

Notes

Direction under section 16A(2) of the Zoo Licensing Act 1981 to meet a licence condition

1. This Direction is made under section 16A(2) of the Zoo Licensing Act 1981.

2. The local authority may, after giving the licence holder an opportunity to be heard, make a direction varying this direction (section 16A(4)).

3. A variation to a direction may increase the period specified to carry out the work required provided this does not exceed 2 years from the date of the original direction (section 16A(5)).

4. A direction to comply with a licence condition may be revoked by a further direction of the local authority (section 16A(6)).

5. You may appeal against the direction or any varied direction to a Magistrates' Court within 28 days of receipt of the direction or any varied direction. The court may confirm, vary or reverse the local authority's decision and generally give such directions as it thinks proper, having regard to the provisions of the Act (section 18).

   Where this direction either requires the holder of the licence to close the zoo, or a section of it, or to carry out works he would not otherwise be required to carry out, (or both), then that direction shall not have effect during the period within which the licence holder is entitled to appeal against it, nor, where such an appeal is brought within that period, during the subsequent period before the appeal is determined or abandoned (section 18(8) and (9)).

   The address of the local Magistrates' Court is:

   Furness Magistrates Court
   Abbey Road,
   Barrow in Furness,
   Cumbria,
   LA14 5QX.

   Telephone - 01229 820161 Fax - 01229 870287.
   Email - cumbria.south.magistrates@hmcourts-service.gsi.gov.uk

6. If the local authority is satisfied that the licence holder has failed to comply with this direction to meet a licence condition which requires any conservation measure referred to in section 1A of the Act to be implemented at the zoo, the local authority shall either (as appropriate), after giving the licence holder an opportunity to be heard, and after the period for compliance has expired, make a Zoo Closure Direction (section 16B(1)) or, after the period for compliance has expired, make such alterations to the licence as it considers to be necessary or desirable to ensure that the section of the zoo in relation to which it is satisfied that the condition is not met is closed permanently to the public (section 16(1B)).

7. If the local authority is satisfied that the licence holder has failed to comply with this direction to meet a licence condition, other than one which requires any conservation measure referred to in section 1A of the Act to be implemented at the zoo, the local authority may, after giving the licence holder an opportunity to be heard, and after the period of compliance has expired, make a Zoo Closure Direction (section 16B(4)).

8. Section 19 of the Act sets out offences and penalties. Section 19(3B) describes an offence by a holder of a licence of failing, without reasonable excuse, to comply with a requirement in a direction under section 16A(2)(d) to close the zoo or a section of it to the public in accordance with the direction, for which the penalty on summary conviction is a fine not exceeding level 4 on the standard scale (section 19(4)). It is in any event an offence for an operator of a zoo to fail, without reasonable excuse, to comply with any condition for the time being attached to this licence for the zoo under the Act (section 19(2)).

APPENDIX 6

BOROUGH OF BARROW IN FURNESS

ZOO LICENSING ACT 1981 – SECTION 16(A)2

Direction to comply with a condition attached to a licence to operate a zoo.

To: Mr. David Stanley Gill

At: South Lakes Safari Zoo Ltd,
Broughton Road,
Dalton-in-Furness,
Cumbria LA15 8JR

1. TAKE NOTICE that Barrow Borough Council having given you the opportunity to be heard, **is not satisfied** that in relation to South Lakes Safari Zoo Ltd a condition attached to your licence dated 11th December 2015 which required you to:

   Condition 18. Delivery of Veterinary Services

   The delivery of veterinary services to and in the zoo, is still unclear and in some areas appears uncoordinated.

   The operator must, in conjunction with the Zoo's veterinary advisor and/or other such professional advice as deemed necessary, develop to the modern standards of good zoo practice and implement, an improved and clearly defined programme, for the delivery of veterinary services to the collection. (This must include the additional and extended collection). This programme must detail: the frequency of routine visits, duties expected of the Vet, routine prophyllaxis (vaccination etc), agreed surveillance policy – to include screening, post mortem protocols, transmission & recording of p.m. records & pathological results. All relevant information must be integrated into the animal records system, such that, information on any individual animal is quickly and easily retrieved. Agreed protocols for relevant veterinary cover when the principal vet is unavailable, must be clear. A written copy of the final procedures must be lodged with the licensing authority within 3 months & clear evidence of implementation provided within 6 months.

   is met.

The above licence condition is not met in relation to the whole Zoo.

Barrow Borough Council hereby requires you to take the following steps to ensure that the licence condition is met,

2. WHAT YOU ARE REQUIRED TO DO

- The operator must, in conjunction with the Zoo's veterinary advisor and/or other such professional advice as deemed necessary, develop to the modern standards of good zoo practice and implement, an improved and clearly defined programme, for the delivery of veterinary services to the collection. (This must include the additional and extended collection).

- This programme must detail: the frequency of routine visits, duties expected of the Vet, routine prophyllaxis (vaccination etc), agreed surveillance policy – to include screening, post mortem protocols, transmission & recording of p.m. records & pathological results.

- All relevant information must be integrated into the animal records system, such that, information on any individual animal is quickly and easily retrieved.

- Agreed protocols for relevant veterinary cover when the principal vet is unavailable, must be clear.

- A written copy of the final procedures must be lodged with the licensing authority and clear evidence of implementation provided.

3. TIME FOR COMPLIANCE

These steps are to be complied with by **22nd May 2016**.

4. WHEN THIS NOTICE TAKES EFFECT

This notice takes effect on the date of service (4th March 2016).

5. ORDER UNDER s.16A

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6. NON-COMPLIANCE

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7. RIGHT OF APPEAL

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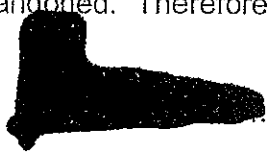
This Direction Order does not require the undertaking of work that the Zoo would not ordinarily be required to undertake therefore this Direction Order shall have immediate effect unless an appeal is brought during the period within which you

are entitled to appeal against it. If you do appeal, the Order shall not take effect, during the subsequent period before the appeal is either determined or abandoned. Therefore the effective date for this Order is 4th March 2016.

Signed  ..... Date 4th March 2016

Name: Phil Huck
Designation: Executive Director

Barrow Borough Council,
Environmental Health Department,
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6. If the local authority is satisfied that the licence holder has failed to comply with this direction to meet a licence condition which requires any conservation measure referred to in section 1A of the Act to be implemented at the zoo, the local authority shall either (as appropriate), after giving the licence holder an opportunity to be heard, and after the period for compliance has expired, make a Zoo Closure Direction (section 16B(1)) or, after the period for compliance has expired, make such alterations to the licence as it considers to be necessary or desirable to ensure that the section of the zoo in relation to which it is satisfied that the condition is not met is closed permanently to the public (section 16(1B)).

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Condition 17 Review of Veterinary Programme

A review of the Veterinary programme must be undertaken in conjunction with the consulting veterinarian and a resulting written programme of care (to include parasite control, vaccination, p.m. routine etc) be agreed, recorded and maintained accordingly.
Elevated to Direction Order 4th March 2016
Compliance Date 22nd May 2016

The Inspectors' Comments

In report 1, the Inspectors noted the following:

"The veterinary programme has been reviewed and improved. Veterinary visits are now more regular (2-3 times a week, total 3-4 hrs on average/week by Rick Browne; once a month by Andrew Greenwood) and documentation and record-keeping greatly improved and kept up to date. But also additional comments below re implementation and interventions for improvement of welfare." (Question 3.9, page 5).

In report 2 the inspectors have stated that this condition is complied with.

Zoo Comments

- *A full review of the programme was undertaken and presented to inspectors during inspection. Part of that review was to instigate a monthly review of vet "cases" the results of which would form the basis of a biannual review carried out by the Vet teams (Rick Browne, Andrew Greenwood, Frieda Rivera Schreiber). 4 months were presented to the inspection, those 4 months of discoveries outlined by our veterinary coordinator Frieda Rivera Schreiber have formed the basis of the claims in pages 4,5,6, of the inspectors report. Analysis as discussed by the inspectors is for veterinary review and a meeting of the veterinary team to review the veterinary situation of Safari Zoo for the period 1.1.16-30.4.16 has taken place.*
- *The conclusion of that review resulted in 5 action points which the team thought essential to provide proper useful analysis of the zoos situation rather than rely on a snapshot of information.*

AP 1. It was decided the period under observation was too narrow, just a snapshot, that further investigation was essential to provide a clearer picture as to what was occurring and so a review of the annual inventories over a 5 year period (2011-2015) must take place. By 30th September for a special Veterinary meeting arranged to discuss the findings.

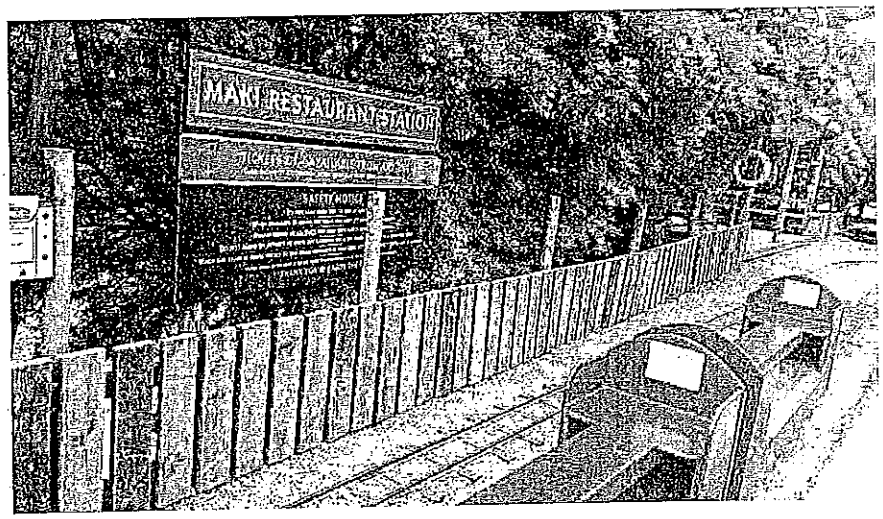
AP2. Contact Marsupial TAG/ vet advisor to the tag for further information/ help re wallaby mortality rates. Safari Zoo is the ESB coordinator for all Macropods except Parma and Bennetts Wallabies as they do not have programmes. It is therefor unlikely that information is collated. However, Parma Wallaby mortality rates at Safari Zoo have been very low over many years until the very wet difficult winter of 2015/6. It is suggested this could be the precursor of the deaths in this period as the

animals' free range and are not locked within dry housing. (suggestion of bringing them inside next winter with all the other macropods. The group was from wild caught stock ex New Zealand islands. It is apparent from the 15 years of managing the Macropd studbooks that we have now lost 3 species from Europe due to the necrobacillus infections taking more lives than births and we only have two self supporting species in Red Kangaroo that is stable and Western Grey Kangaroo that is now stable. Al other species are in decline due to the same issue of non treatable infection as the main overriding cause.

AP 3: Squirrel Monkeys contact Colchester zoo or Edinburgh who keep large troops of squirrel monkeys for their experience of multi male multi female groups.

AP4: Lemurs - promotion of a research project to arrange students to come and study the groups year round. How they interact and what their ranges are, where the issues occur. AG IZVG have employed a new co-ordinator of research therefore they will write brief and coordinate to find students.
We funded a study on wild Ring Tailed Lemurs in Madagascar in 2002. Find this thesis and re appraise the conclusions in relation to our groups.

AP5: Ducks. Fencing has been installed separating duck from vehicles. Speed limits reinforced and training of drivers that anything in the road has right of way



Duck Fencing

Officer Comments

The Inspectors concluded after the May 2016 inspection that the work undertaken by the Zoo's Veterinary department provides compliance with the Direction Order and Condition 17

Officer Recommendation

- Members note this information only

Reason for recommendation

The Zoo have appealed the direction order dated 4th March 2016 and a hearing is scheduled to take place on 14th July 2016 in Barrow Magistrates' Court. As a result this matter cannot be considered further at this time. However it will be brought back to Committee after the appeal has been determined.

Condition 18 Delivery of Veterinary Services

The delivery of veterinary services to and in the zoo, is still unclear and in some areas appears uncoordinated.

The operator must, in conjunction with the Zoo's veterinary advisor and/or other such professional advice as deemed necessary, develop to the modern standards of good zoo practice and implement, an improved and clearly defined programme, for the delivery of veterinary services to the collection. (This must include the additional and extended collection). This programme must detail: the frequency of routine visits, duties expected of the Vet, routine prophylaxis (vaccination etc.), agreed surveillance policy – to include screening, post mortem protocols, transmission & recording of p.m. records & pathological results. All relevant information must be integrated into the animal records system, such that, information on any individual animal is quickly and easily retrieved. Agreed protocols for relevant veterinary cover when the principal vet is unavailable, must be clear. A written copy of the final procedures must be lodged with the licensing authority within 3 months & clear evidence of implementation provided within 6 months.
Elevated to Direction Order 4th March 2016
Compliance Date 22nd May 2016

Officer/Inspector Comments

The Veterinary System at any Zoo is a synergy of the procedures and paperwork married against the 'hands on' treatment of the animals, in either reactive or proactive scenarios. The Zoo Vet has further involvement on all aspects of animal care from enclosure design through to dietary review and should be instrumental in progressing the Zoo's Collection Plan.

In report 1 the Inspectors noted:

"New system: Monthly summary signed by all vets and veterinary summary produced Jan-April 2016 for review at vet meeting in June 2016." (Q 3.10).

Regarding veterinary records – "Improved since last inspection, but notes by consultant vet very brief, e.g. do not give anaesthetic drug dosages used." (Q3.11).

Regarding medicines – "Room is too hot and, although locked away, antibiotics etc not
kept in refrigerator." (Q3.12).

Regarding controlled drugs – "Pentobarbitone kept in locked gun cupboard." (Q3.13).

In their ancillary report (report 2) inspectors noted:

"Complied with. However, the inspectors have ongoing concerns that the veterinary programme, although much improved recently in terms of process and regularity, still deals largely with preventive (non-infectious) morbidity, especially traumatic injuries due to fighting in primates, and foot and dental disease in macropods. At the admission of the vet (RB) this is essentially unchanged over the last 20 years. In

addition there are ongoing deaths due to exposure/hypothermia and emaciation. This is fundamentally due to management structure and practices."

The inspectors provided more detail in Report 3 stating:

A. "Veterinary Records

More comprehensive veterinary records are now maintained for the animals. There is a monthly summary sheet of animals that have died, or been treated, and a four month summary had been prepared for the inspectors.

Mortality and causes of mortality

1. *From examining the previous year's stock list, the inspectors noted that the mortality rate is still high. Over the period of time January 2015 to December 2015 there have been 146 deaths. This is made up of approximately half mammals, half birds and some reptiles.*
2. *During the first four months of 2016, i.e. from Jan 1st to April 31st, a further sixty one animals have died (50) or had to be euthanased (11).*

More detailed veterinary records are now being maintained and the causes of death during this period, for these animals were available.

From the records the inspectors noted that there were a significant number of deaths (19) from preventable causes.

The veterinary team had recorded that;

1. *Two animals died from rat poison*
2. *Five Inca terns died from exposure undetermined*
3. *One Alpaca died from hypothermia*
4. *Thirteen animals died from trauma*
5. *One bird euthanased after having a beak broken by a Macaw*
6. *Three from emaciation*
7. *One lemur had drowned*
8. *Three Ducks had been run over.*

A significant proportion of these are due to fighting amongst animals. At interview the vet for the collection RB agreed that there was a large number of injuries from fights but did not see how he could resolve this. He agreed that that a major cause of deaths was from injuries and trauma.

Furthermore, whilst there have been seventeen animal deaths from trauma related causes, during the period between 1 January and 30 April 2016, a further fifteen animals have been treated for traumatic injuries and wounds. (Other animals have been treated for other medical problems).

(The actual figure is likely to be higher, as not included in this figure are other animals that might have received injuries and not received treatment, and other animals that are listed for having received treatment but not stated as having received treatment for trauma, e.g. a hand infection).

The inspectors noted that there is now an obvious increase in the number of visits and the veterinary involvement in the zoo, and this is to be commended. There is also a significantly improved recording system of veterinary matters, and it is partially because of that, that the inspectors now have the written evidence of the welfare issues that they are concerned about.

The veterinary department (FS and RB), were interviewed regarding this at length and accepted that the level of injuries and death were unacceptably high. However they did not have a plan as to how it could be reduced. FS was of the opinion that injury due to fighting is what would happen in the wild, and the risk of this should be balanced against their 6 freedom to range freely. They did inform us that they had planned a meeting in June, with the consulting vet Andrew Greenwood, to discuss the first four months of data.

The veterinary department, despite attending more regularly, seem to be largely reactive and 'firefighting'. Qu RB 'I spend most of my time stitching animals up' the management in preventing these problems.

The inspectors do acknowledge that they have implemented a program of vaccinations, contraception and worming in many areas, which is to be commended.

The inspectors would like to stress that their concern over the high level of trauma and mortality is not a criticism of the keepers themselves, of whom the inspectors were impressed with their keenness, and obvious passion about looking after the animals to the best of their ability. It is also acknowledged that a programme of training and CPD for keepers is now place that was not evident in November 2015.

There are likely to be many complex reasons for the high level of trauma and mortality, however it is the inspectors' belief that, to a large part, it is fundamentally the way the animals are kept; i.e. in large groups, in a large space, where it is difficult to manage the animals and to detect injuries or body condition, with uncontrolled breeding in some instances, (e.g. ring-tailed lemurs).

During interview, DA commented that he thought the collection was overstocked, and had too many animals, however DG informed the inspectors that the lemurs were allowed to breed as they liked. However there is a collection plan which does contain some more detail.

For example in the collection plan; for ring tailed Lemurs it states: 'Monitor breeding and surplus as numbers increase. Possible to stop breeding next year'.

It is a requirement under the Section 1A (vii) of the ZLA that a zoo must;

> 'accommodate their animals under conditions which aim to satisfy the biological and conservation requirements of the species to which they belong, including providing each animal with an environment well adapted to meet the physical, psychological and social needs of the species to which it belongs; and providing a high standard of animal husbandry with a developed program of preventative and curative veterinary care and nutrition.'

In the inspectors' opinion the mortality rate is high and sadly, from the information supplied, the cause of many of these deaths are preventable. Whilst the inspectors accept that deaths from trauma can, and do, occur, and that other preventable accidents can occur, it is the consistently high number, plus the lack of any written or verbally produced action plan to remedy this, that is of concern.

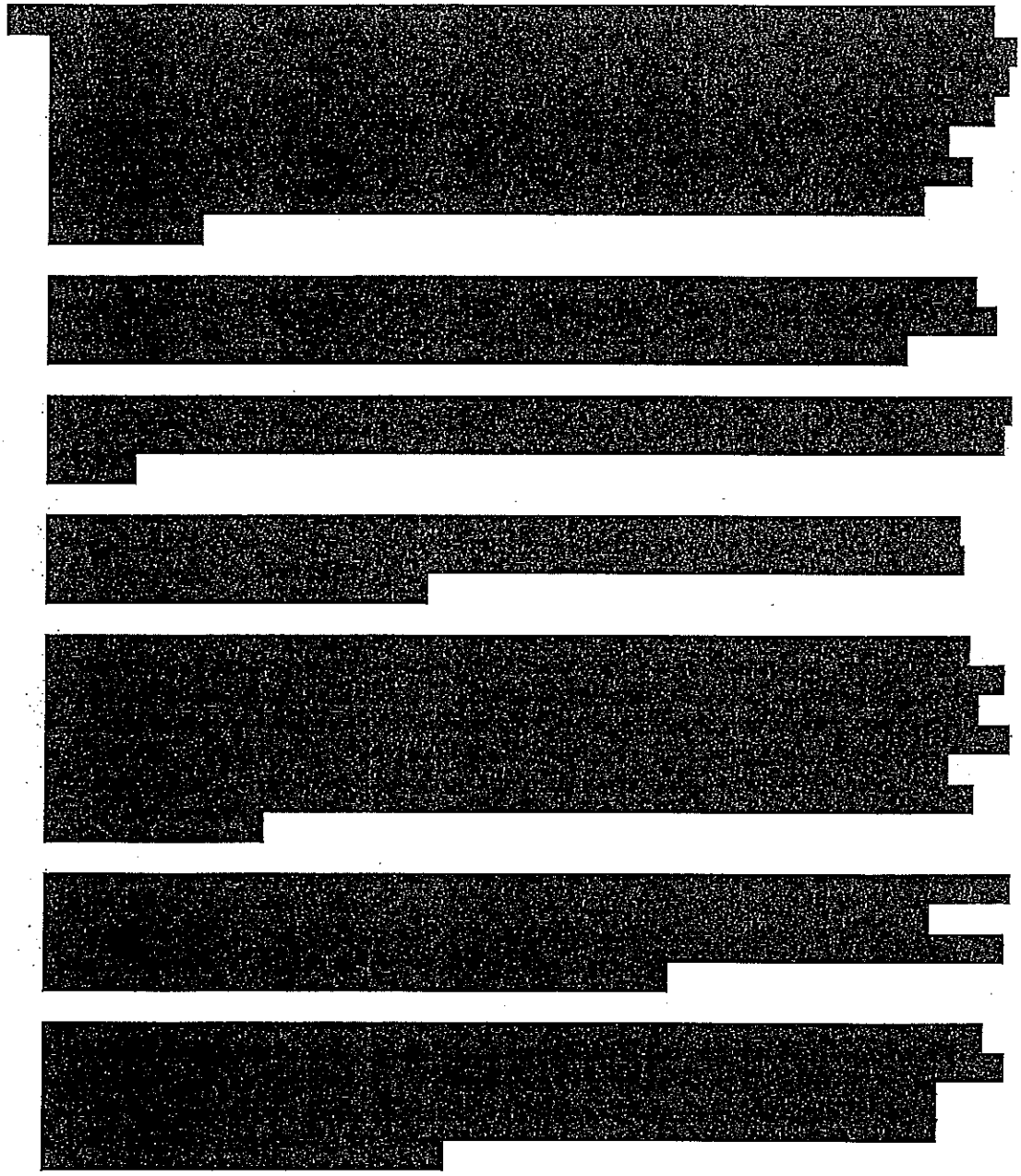
These are problems that are preventable provided a suitable environment for the animals to live in has been provided, whilst demonstrating most normal behaviour, but not undergoing fear and distress.

There is little evidence that the present management team, with DG acting as a hands on manager, have made any significant attempts to reduce this problem. In fact there is no evidence that the management team have made any efforts to reduce this problem by putting together and implementing a plan to improve the current welfare of these animals. However, DA stated that, were he allowed to, he would implement such changes."

Zoo's Comments

- *We have consulted widely and had assistance with research into this issue and taken advice from numerous sources. It would seem from this exercise there is a wide variation in the way DEFRA Inspectors apply and set standards within the ZLA and SSSMZP. There is no defined standard or indeed is there legal obligation to comply to very specific criteria that some Inspectors may set as their personal standard. The SSSMZP gives broad parameters for compliance and this Zoo should not be subjected to the application of a standard that is not universally applied to the wider Zoo community under the ZLA in the UK.*
- *We have concerns over the way the Veterinary situation at the zoo was described and reported in the November Inspection report, our complaints and observations do not seem to have been considered valid however we should point out that numerous documents and procedural activities were not considered, inspected or acknowledged by the inspection team at that inspection in November 2015 and then the zoo was accused of major failings because the team did not see or acknowledge those issues that were totally available to them at the inspection or beforehand in submissions.*
- *Further the zoo questions the scientific factual basis that the inspectors have made their negative comments and opinions regarding management. We ask that the inspectors quantify and qualify their comments and opinions sticking to facts and not personal views and opinions. If a specific person is to be isolated and criticised it is essential that factual evidence is gained rather than personal comments or hearsay.*
- *In the inspectors' opinion the mortality rate is high and sadly, from the information supplied, the cause of many of these deaths are preventable. Whilst the inspectors accept that deaths from trauma can, and do, occur, and that other preventable accidents can occur, it is the consistently high number, plus the lack of any written or verbally produced action plan to remedy this, that is of concern.*

We question this opinion based on facts.
The International Species Identification System or ISIS is a worldwide data base of each zoo that subscribes to the programme. It is generally seen as requirement of zoos to be members. This data base holds the detailed records of a huge number of zoos from around the world and in this instance from the UK under the ZLA and DEFRA inspection standards.
We have undertaken a limited but ongoing study into mortality rates in other UK zoos that are fully licenced and seen as "model" or established well managed zoos. We do not intend to name all the Zoos involved in this publicly available document but have all of the information available for any further appeals that may be needed.



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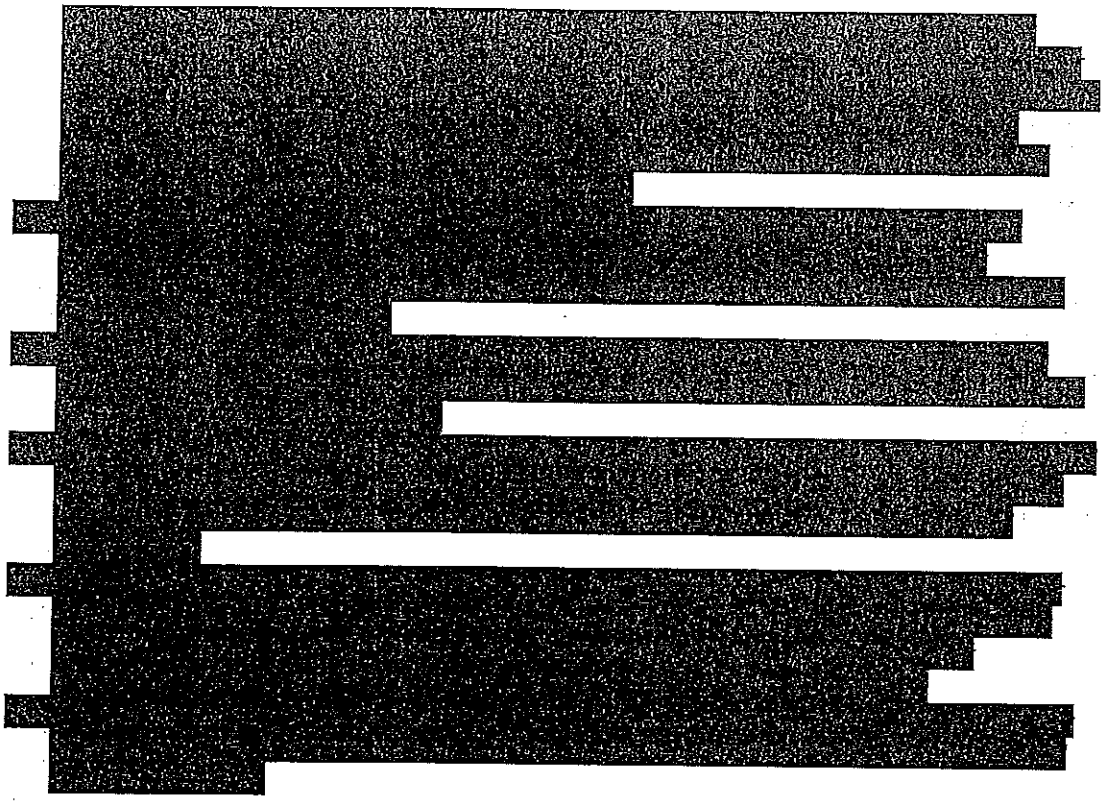
Our Veterinary care programme and recording of such is at least equal to if not better than many zoos licenced under the Act. We have data from the largest zoo in the UK that shows that we compare extremely well and indeed few zoos of comparative size or collection have better mortality or trauma records.

It is our intention to prove that the standard and criteria demanded from this Zoo by inspectors in the last two years is not the standard actually maintained by others. At our DEFRA Balai Veterinary inspection that concentrated on Veterinary records, practices and procedures, we were inspected in great detail (far deeper and longer than the Special Inspection) and this gave us an excellent report and we passed the strict test with no issues . Whilst the DEFRA Zoo inspectors made verbal comment that the DEFRA officially employed Veterinary inspector was "not experienced in zoos or qualified" she did in fact spend far more time and went into far deeper detail about our practices and recording and health and welfare record and is directly employed by the government to uphold the strictest standards for animal health and welfare in Zoos under the European Directive.

The Veterinary review does identify some preventable deaths but once again all zoos looked at had similar numbers of preventable deaths. This has to be seen as the "learning curve" of working with exotic species. However some are down to practices that need to be changed or reviewed in all collections and this must be recognised and actioned.

We have identified issues that need addressing and we believe we have done this via re training and more responsive action orientated Animal Management . Instances of Rat poison being identified in a number of deaths has been reduced to zero by training and specialist courses on the subject.



It seems from the information on other holders of large groups of squirrel monkeys that they have exactly the same breakdown trauma deaths and injuries. It is impossible to predict when a breakdown will occur in a group of 5, 10 or 50.

- *In 2016 a list of causes of death has been raised. There was specifically criticism made of a Night heron death where it is noted the Vet stated or suggested a possible attack from a Macaw. This cause is disputed greatly and was not the thoughts of the staff. It is far more likely that this injury causing death was caused by flying into the mesh at high speed during high winds. With regards to management causes, it is not tenable to suggest that a bird flying into mesh in high winds is management related or indeed if a Macaw indeed did bite the Heron how can this be prevented when this is such an abnormal occurrence? Macaws and Herons have been mixed for many years with great success and numerous breeding successes not least once again this spring when Night Herons have successfully reared outside in the aviary.*
- *The Alpaca was and still is undetermined as the cause of its loss of condition as it was in the same group as 3 others and all the others had good condition. The PM simply described the physical condition at death and could not isolate a cause. Alpacas have extremely thick woolly coats and it was impossible to see this loss of condition in comparison to the others. It is not possible to simply feel their backs very easily without excessive stress in capture thus increasing trauma related injury, illness or death. This cannot be blamed on management as the illness did not reveal itself until it was dead.*
- *The Inca terns was a one off freak event caused by the severe wet weather in January /February . We received a large new group of birds from Emmen in Holland . they were winter hardy and we kept them in for a few weeks before releasing them into the Illescas Aviary. We suffered serious rain storms and*

continued wet conditions that was unprecedented. Sadly 5 Inca Terns succumbed to the wet and wind outside when they refused to come inside the housing shelters. We have not lost any since that day and indeed they are breeding. We do not accept that this was a bad management decision but rather a freak weather situation and unavoidable if the birds chose to stay outside the shelter.

- *Re emaciation this refers to Parma Wallabies that all were investigated fully. The conclusion was that possible toxoplasmosis was the cause. However further investigation revealed keeper failure to feed concentrated food everyday and check health status to prevent such issues, the specific keeper involved in the shortcutting of duty has now left the zoos employment due to continued failure to comply with duty of care. Resolved.*
- *With reference to the Ducks being run over, prior to these events we had no record of this issue in the past. In response to the sudden change in incidents management placed a fence between the ponds and the road to prevent this occurrence again. Resolved.*

We would argue that using the facts recorded in ZIMS our style of management has advantages over more traditional approaches in welfare and death rates and the concerns voiced by inspectors are unfounded in fact. We acknowledge that preventable deaths are exactly that and more work has to be done to address this aspect and improve just as all zoos need to do the same.

We do not accept the criticism of management that has been submitted without any factual evidence as to comparative standards being submitted to qualify or prove the accusations made in the opinions.

The criticisms of the management are serious and make clear comment that the zoo is badly managed or "not to modern Zoo practice" and this has been used very widely in national press and the web domain doing great damage to the whole management and keeping staff credibility without any scientific evidence to back up the accusations aimed at DG alone and no evidence whatsoever to support this criticism in the factual statistical evidence available. It is simply a personal view based on no comparative evidence and we would request this accusation be immediately publicly removed from the record on the basis of the factual evidence that compares other zoos mortality and trauma records.

We do not intend to bring other zoos names or credibility into this situation if the report is to be in the public domain. However the full details and examples of other zoos failures to reach the standard demanded tor Safari Zoo will be available for any litigation or appeal if it was found necessary in the future to clear this zoos name and reputation.

- *The comments or criticisms are not balanced in reality or based on knowledge of historic interactions and behaviours and experience. 2106 so far is by far the best breeding season ever for birds in the Zoo. with tremendous success with exceptionally difficult species such as Roseate Spoonbills where 6 are now fully fledged.*

This Condition in our view is now Complied with in full and continuing development will take place

Officer Recommendation
That Members:

- **Note this information only**

Reason for recommendation
The Zoo have appealed the direction order and a hearing is scheduled to take place on 14th July 2016 in Barrow Magistrates' Court. Therefore this matter cannot be considered further at this time. However it will be brought back to Committee after the appeal has been determined.