

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**ASIA PACIFIC GUIDANCE FOR ESTABLISHMENT OF NATIONAL PROCEDURE FOR
RECORDING AND REPORTING WILDLIFE STRIKES TO AIRCRAFT**

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and approved by the AOP/SG/5 Meeting and published by
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ACRONYMS AND ABBREVIATIONS

ANSP	Air Navigation Service Providers
APAC	Asia and Pacific
ATC	Air Traffic Controllers
IBIS	ICAO Bird Strike Information System
DNA	Deoxyribonucleic Acid
PANS	Procedures for Air Navigations
WHM	Wildlife Hazard Management
WHMP	Wildlife Hazard Management Programme

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1. INTRODUCTION

- 1.1 The presence of wildlife on, or in the vicinity of an aerodrome poses a serious threat to aircraft operational safety.
- 1.2 In accordance with 9.4.1 of the ICAO Annex 14 Aerodromes, Volume I (Note, 9.4.1 and 9.4.2) Aerodrome Design and Operations, the wildlife strike hazard on, or in the vicinity of, an aerodrome shall be assessed through:
 - a) the establishment of a national procedure for recording and reporting wildlife strikes to aircraft;
 - b) the collection of information from aircraft operators, aerodrome personnel and other sources on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations; and
 - c) an ongoing evaluation of the wildlife hazard by competent personnel.
- 1.3 Furthermore, the wildlife strike reports shall be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database (9.4.2 of ICAO Annex 14 Aerodromes, Volume I Aerodrome Design and Operations refers).
- 1.4 PANS –Aerodrome 6.3.1 (page II-6-2) states an effective Wildlife Hazard Management Programme (WHMP) depends on accurate and reliable data. Reviewing and analysing wildlife strikes and wildlife observations will help quantify avian hazards at the aerodrome and its vicinity and indicate the effectiveness of current wildlife strike prevention methods.
- 1.5 Generally, the more information that is recorded about a wildlife strike incident the better. As a minimum, the data required on the ICAO wildlife strike reporting form should be collected as fully as possible. If some data items are not available (e.g. altitude of strike) then as much information as possible should be collected and due account taken of the missing data during subsequent analyses. All wildlife hazard management programs need to be monitored to see if they are working effectively and whether they need to be modified, extended or improved. The only effective way to do this is by collecting data on the strikes including at the aerodrome concerned. Other measures, for example counting the wildlife on the airside, provide useful additional information, but are not a direct measure of the strike risk at the aerodrome.
- 1.6 All strikes should be reported, whether or not they cause damage to the aircraft and report whatever wildlife species was involved. It is important that airport managers do not penalise staff for reporting wildlife strikes. Even though strikes to large jet airliners from small species such as swallows or sparrow-sized birds are unlikely to cause significant damage to an aircraft, staff should report them.
- 1.7 Similarly, the total number of strikes at an aerodrome should never be used as a measure of strike risk or of the performance of the wildlife controllers. Staff must be encouraged to report all sightings and strikes of wildlife. Collection of information on wildlife around the 13 km range refer to (6.3.5.2 of PANS Aerodromes (page II – 6-4) from the aerodrome reference point is of utmost importance and relevance to wildlife hazard management. The main risk arises from strikes with large species, especially birds that form flocks. A risk assessment process that combines potential strike frequency with likely severity needs to be adopted to properly assess the risk. Such a process cannot work effectively unless all strikes are reported.
- 1.8 A properly trained and equipped wildlife controller should be present on the airfield for at least 15 minutes prior to any aircraft departure or arrival. Thus, if aircraft are landing or taking off at intervals of less than 15 minutes there should be a continuous presence on the airfield throughout daylight hours. The controller should not be required to undertake any duties other than wildlife control during this time. Note that for aerodromes with infrequent aircraft

movements, 15 minutes may not be long enough to disperse all hazardous wildlife from the vicinity of the runway. In this case the controller should be deployed sufficiently in advance of the aircraft movement to allow full dispersal to be achieved.

- 1.9 At night, active runways and taxiways should be checked for the presence of wildlife at regular intervals and the dispersal action taken as needed.

2. SCOPE AND PURPOSE OF THE DOCUMENT

2.1 Purpose of the Document

- 2.1.1 The purpose of this document is to provide guidance to regulators, aerodrome operators, aircraft operators and Air Navigation Service Providers (Air Traffic Controllers) to fulfil the requirements stipulated by ICAO Annex 14 Volume I as described in paragraphs 1.2 and 1.3 above including the materials that are not provided in PANS-Aerodromes (Doc 9981) and Airport Services Manual (Doc 9137), Part 3 – Wildlife Hazard Management and Annex 19 Safety Management.

3. RECORDING WILDLIFE STRIKES

3.1 Record all suspected and confirmed strikes

- 3.1.1 As time progresses and traffic numbers increase, aircraft manufacturers use quieter aircraft that are larger in size and while wildlife populations increase. Accordingly, greater effort is required to control and monitor wildlife activities on and in the vicinity of aerodromes. Every strike must be reported to the relevant authorities, actions taken and communicated to all relevant stakeholders (Annex 14, Volume I 9.4.1 b) & 9.4.2 refer).

3.2 Record all strikes reported by Pilot and ATC irrespective of ground confirmation

- 3.2.1 Aerodrome operators should ensure all strikes reported by airlines/pilots and ATC are logged. In this sense, aerodromes should consider the adoption of smart devices to collate data onto a robust system capable of easy data access and ability to draw speedy conclusions with the help of analytical tools.
- 3.2.2 The cost of downtime for inspection and repair of aircraft following wildlife damage or suspected wildlife damage is significant. The additional costs and disruption as a result of aborted flights, rescheduling of aircraft passengers and air cargo, transfer of passengers to alternative means of transport, overnight accommodation at the expense of the aircraft operator and the deleterious effects on connecting flight schedules that can be significant and damaging to airline operating budgets and the passenger experience which are also major factors in the cost of a bird strike. Therefore, suspected strikes must be treated with greater significance.

3.3 Report all carcass on the runway as suspected strikes

- 3.3.1 Trained and competent staff who should be able to detect and record the presence of wildlife and assess the wildlife hazard and expel hazardous wildlife by using active/passive measures or interventions. It is recommended that the training syllabus for aerodrome staff engaged in wildlife control activities include an element of ecology and biology knowledge, to enable them to make reliable and accurate identifications of wildlife both from observations and post-strike during the collection and analysis of wildlife remains. The management of unidentifiable remains/carcass (including blood smears on aircraft components) should also be addressed in the management program and sent to relevant organizations for deoxyribonucleic acid (DNA) analysis.

4. STANDARD SPECIES NOMENCLATURE ACROSS SPECTRUM FOR REPORTING PURPOSES

- 4.1 Wildlife species vary greatly across the Asia and Pacific (APAC) Region. Even within a given area, there can at times be several ‘common’ names for a particular species and so it's important to set up a wildlife library of standard names for all wildlife species.

5. STANDARD FORM FOR MONITORING AND RECORDING OF WILDLIFE ACTIVITY

- 5.1 Ideally, aerodrome wildlife controllers should record the following at least every 30 minutes (if air traffic is sufficiently infrequent that wildlife patrols are more than 30 minutes apart, an entry should be made for each patrol carried out): however patrols will depend and vary on the number of movements, and surrounding habitat. For example, if there has been frequency of rain which might significantly increase presence of insects in the airfield which will lead to more wildlife activity. In such instance's patrols must be customized accordingly.

- i) Areas of the aerodrome patrolled,
- ii) Numbers, location and species of wildlife seen,
- iii) Action taken to disperse the wildlife, and
- iv) Results of the action.

- 5.2 More general information such as the name of the wildlife controller on duty, time on and off duty, weather conditions etc. should be recorded at the start of a duty period. Refer to the standard form below with recommended fields.

- 5.3 A standard form for monitoring and recording of wildlife activity should be developed. A suggested set of fields should include the below Additional fields which are relevant to aerodromes can be added.

i) **General Information:**

- 1. Date of Recording
- 2. Time of Activity
- 3. Zone on aerodrome where activity was spotted
- 4. Sky Condition when Activity is noted
- 5. Wind Direction at time of activity
- 6. Weather Condition at time of activity
- 7. Grid number (if aerodrome grid map is Available)
- 8. Previous 24 hrs. weather conditions (like rain, or hail)

ii) **Wildlife Related**

- 1. Name of Wildlife Species
- 2. Number of the Species Observed
- 3. Activity Species is doing at time of observation
- 4. Altitude at which species was observed
- 5. Direction of flight of species (if relevant)
- 6. Start Time of Activity

-
7. End Time of Activity
 8. Dispersal required
 9. Type of method used for dispersal
 10. Action due to dispersal

iii) **Supplemental Information**

1. Runway in Use
2. Scaring Device used (Type)
3. Time of Scaring device used
4. Number of Pyrotechnics used if used
5. Number of wildlife monitoring personnel on shift at time of Activity
6. Proof of Activity – Photographs

6. AERODROME WILDLIFE SAFETY RISK ASSESSMENT

Note: Please refer to Airport Services Manual (Doc 9137), Part 3 – Wildlife Hazard Management, Chapter 3

7. DATA MODELLING AND ANALYSIS

- 7.1 Aerodrome operators should adopt data modelling and analysis to derive useful information and conclusions from the collected data. Some sample reports from a wildlife data modelling and analysis application is available in **Attachment 1**.

8. CONTINUAL MONITORING: RECORDING AND REPORTING OF WILDLIFE STRIKE

8.1 Continual Monitoring Program for Wildlife Hazards

- 8.1.1 When an aerodrome completes an assessment of wildlife strike hazards, it should consider implementing a continual monitoring program. A continual monitoring program is a best management practice. Recurrent wildlife monitoring to be outlined in the programme.
- 8.1.2 The goal of systematic, long-term wildlife hazard monitoring in an airport environment is to identify changes to wildlife composition, numbers, attractants, travel corridors and the general airport environment in a timely manner that can affect the presence or behavior of wildlife.
- 8.1.3 Continual monitoring allows the aerodrome operator to regularly determine trends in wildlife, and target mitigation practices to reduce the possibility of strikes, thus positively effecting safety. The aerodrome can use this information to quickly and efficiently implement mitigation techniques and evaluate the efficacy of its mitigation program. Ultimately, the frequent hazard identification and adaptable mitigation will reduce the likelihood of wildlife strikes. Additionally, continual monitoring will help decrease the time, effort, personnel hours, and money spent on mitigation because hazards will be identified before they pose a high risk.

8.2 Continual Monitoring Report:

8.2.1 As part of a continual monitoring program, an aerodrome should consider preparing periodic (an annual/half annual) report to summarise the efficacy of its wildlife mitigation program, including:

- i) Identification of the wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences.
- ii) Identification and location of features on and near the aerodrome that attract wildlife.
- iii) Description of wildlife hazards to aircraft operators.
- iv) Description of wildlife strikes during the year.
- v) Discussion of any significant modifications on or near the aerodrome property.
- vi) Summary/Analysis of ATC and aerodrome “event logs” or wildlife management, patrol, monitoring data logs.
- vii) Periodic report can be compared with the airlines monitoring report for any gaps.

8.3 Reporting wildlife sighting – Process for Aerodrome/Airline Personnel (on-ground)

8.3.1 Process for reporting of wildlife sighting by aerodrome/airline personnel is shown in **Figure 1**.

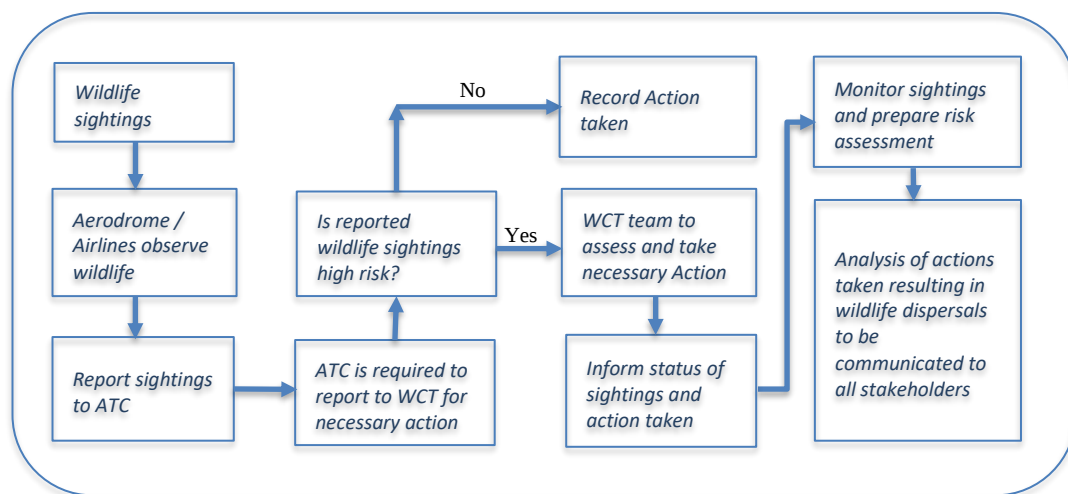


Figure 1: Reporting wildlife sighting – Process for Aerodrome/Airline Personnel

8.3.2 It is recommended that:

- Use of technology smart application to enable users to just click on location to record species and number for effective wildlife hazard management.
- In addition, the recording system should reflect standard global names of wildlife species and information of the standard reporting form (refer to 5.3)

8.4 Reporting wildlife sightings – Process for Aircrew in-flight

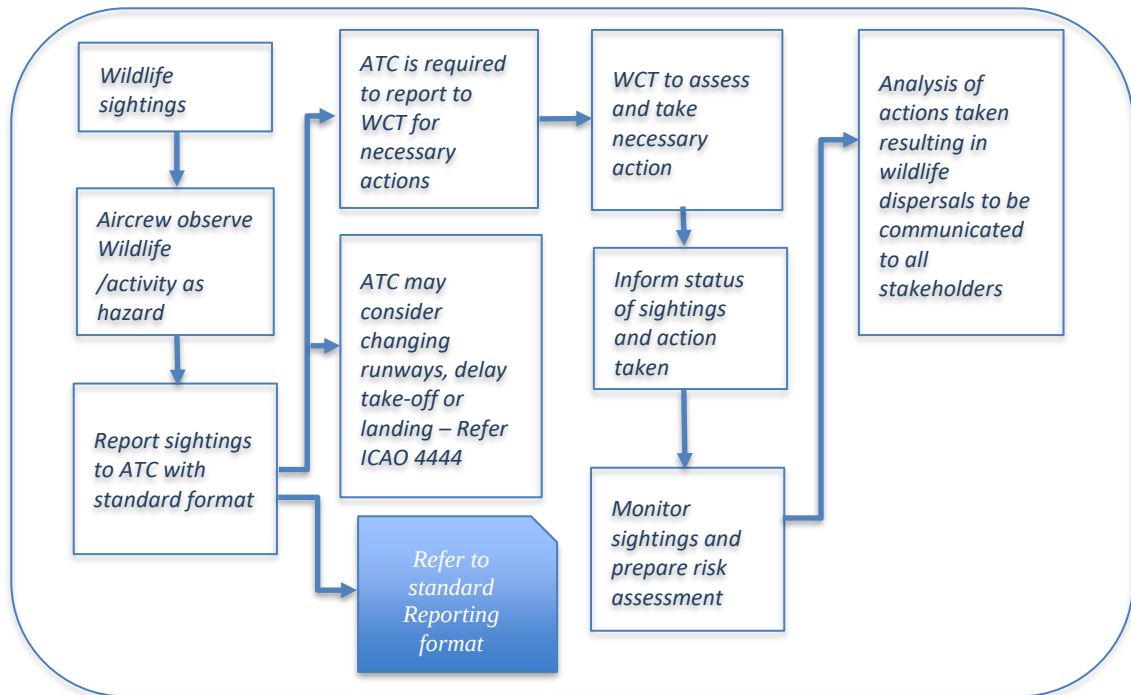


Figure 2: Reporting wildlife sightings – Process for Aircrew in-flight

8.5 Reporting of Confirmed and Suspected Strike Process

Confirmed Strikes

- 8.5.1 Any reported collision between a bird or other wildlife and an aircraft for which evidence in the form of a carcass, remains or damage to the aircraft is found (including blood smears or feathers or may include in-flight ‘smell’ through air-conditioning). Any bird/wildlife found dead on an airfield where there is no other obvious cause of death (e.g. struck by a car, flew into a window etc.).

Unconfirmed strikes or Suspected Strikes

- 8.5.2 Any reported collision between a bird or other wildlife and an aircraft for which no physical evidence is found.

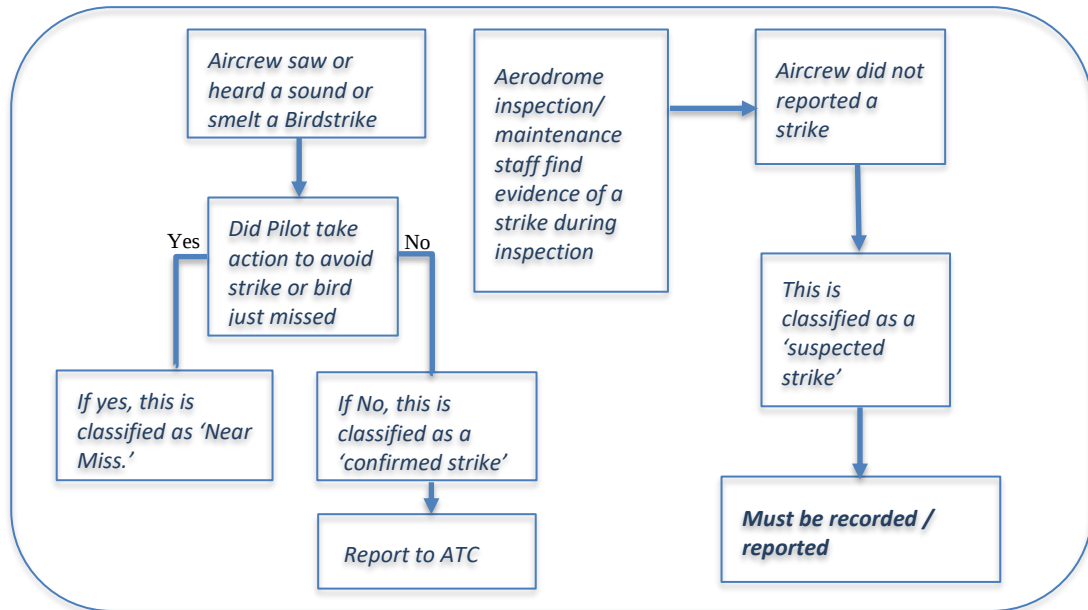


Figure 3: Reporting of Unconfirmed or Suspected Strike Process

8.6 Wildlife Location Determination Process

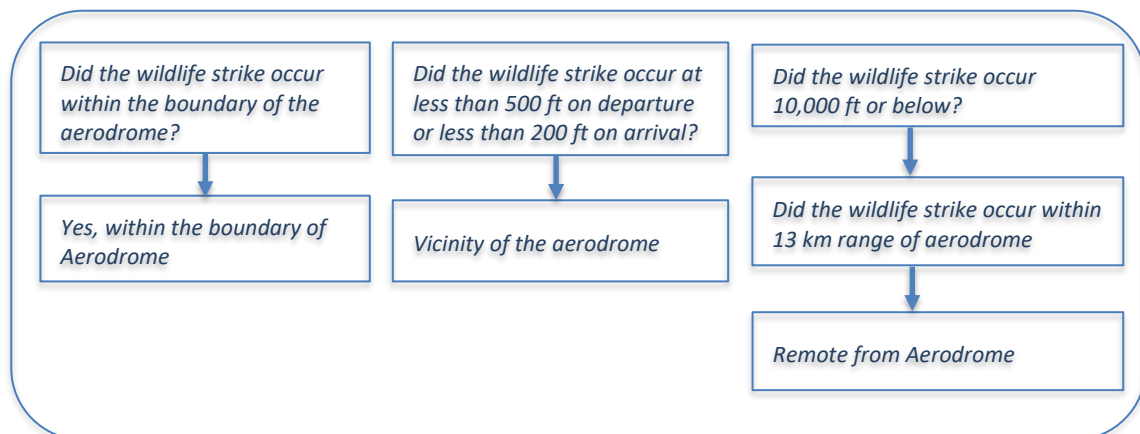


Figure 4: Wildlife Location Determination Process

8.7 Wildlife Incident Reporting Criteria

- 8.7.1 The reporting forms (paper or electronic format) used by the aerodrome operator or other stakeholders at the aerodrome for reporting wildlife strikes, should contain at least the information provided in *Appendix 2 (Wildlife Incident Reporting Criteria)* to Chapter 6 of Part II of the PANS-Aerodromes. It is recommended that Paper forms should be avoided.

8.8 Common Understanding of Terms

- 8.8.1 It is crucial to standardise the use of various terms and ensure a common understanding among stakeholders, including pilots, air traffic controllers, airport wildlife hazard controllers and other parties. These terms include description of bird size (large/medium/small), number of birds, etc. These parameters must be determined and understood by all relevant stakeholders.

8.9 Risk Assessment

- 8.9.1 In the report, it would also be useful to include the wildlife actions or type of activities, e.g. flying, standing on ground, roosting, hovering, etc if observed, at the time of the report. The information will be useful for risk level analysis, which is related to the type of activities, size, number, whether in flocks, etc.
- 8.9.2 Please refer to *Airport Services Manual (Doc 9137), Part 3 – Wildlife Hazard Management, Chapter 3*, for carrying out the risk assessment of the wildlife strike hazards.

8.10 Real-time Reporting Format

- 8.10.1 Aviation frontline personnel including pilots, ATC and aerodrome wildlife management staff constantly face time pressure in their jobs. They are required to make decisions based on the available information in a timely manner. Therefore, it is crucial to standardise the format of real-time wildlife reporting to minimise the time for transmitting the information and subsequent clarifications.
- 8.10.2 In Doc 4444 PANS-ATM Para. 7.5.2, temporary hazards including birds on the ground or in the air are regarded as essential information on aerodrome conditions. PANS-ATM Para. 7.5.3 has the following procedure:

Essential information on aerodrome conditions shall be given to every aircraft, except when it is known that the aircraft already has received all or part of the information from other sources. The information shall be given in sufficient time for the aircraft to make proper use of it, and the hazards shall be identified as distinctly as possible.

- 8.10.3 As a minimum, the following items could be considered when formulating the real-time reporting format:

- i) Date and UTC Time;
- ii) Altitude of aircraft (for pilot reports only);
- iii) Location of sight/strike;
 - a) With reference to prominent features on ground or in the air;
 - b) Aerodrome zoning to be applied for ATC and aerodrome personnel.
- iv) Movement and altitude of birds;
- v) Number of wildlife – with a standardized categorization; and
- vi) Size of wildlife – with a standardized categorization.

- 8.10.4 It is recognised that the frontline personnel may face various workload at the time of wildlife sighting and strike. Therefore, flexibility for fewer items may be allowed during the first reporting, but the personnel involved should supplement missing information at the earliest opportunity and submit as much information as they can including attaching photos, if required. Below is a detailed Sample Reporting Format of a wildlife Strike Form.

- 8.10.5 Standardized wildlife strike reporting forms are available in Manual on the ICAO Bird Strike Information System (Doc 9332-AN/909) for use by States/Administrations.

9. WILDLIFE STRIKE REPORTS TO ICAO

- 9.1 Effective analysis of wildlife strike data is particularly important. For example, separating strikes that occur on the aerodrome (under 200 feet on approach and 500 feet on climb out using the ICAO definition) from those that occur further out in the approaches helps to define those strikes that are likely to be influenced by the aerodrome bird management programme. Similarly, separating strikes with species that are over 100g in weight (i.e. those more likely to cause damage), and giving greater emphasis to strikes with flocks all help to identify trends in the real wildlife strike risk at the aerodrome. So, for example, an aerodrome with an increasing rate of wildlife strikes is not necessarily becoming a more risky place to fly. If the increase in strikes is due to an increase in incidents with small species, whilst the rate of strikes with large species and flocks is falling, then this is indicative of both better wildlife control and better reporting of strikes.
- 9.2 The wildlife strike reports shall be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database (9.4.2 of ICAO Annex 14 Aerodromes, Volume I (Note, (.4.1 & 9.4.2) Aerodrome Design and Operations refers).
- 9.3 Ideally, States should submit wildlife strike reports to ICAO in the format of either ECCAIRS.e5f files or the standard ICAO ECCAIRS Excel-based form available at <http://www.icao.int/ibis>. –(IBIS is currently under review)
- 9.4 The reports should be sent to the following email addresses:
wildlife@icao.int, icaohq@icao.int, aoi@icao.int, and iaa@icao.int

10. DETAILS OF REPORTING

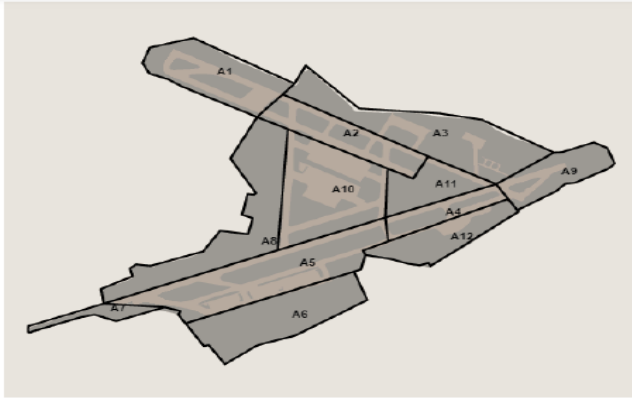
- 10.1 Aerodrome operations staff may conduct numerous wildlife activity monitoring inspections throughout the day, to build up a more complete understanding of wildlife patterns around the Airport. Extensive reporting functionality in compliance with ICAO and regional civil aviation authorities, allows wildlife data to be drilled down, so that aerodromes can better understand their most prevalent species, locate high wildlife traffic areas, wildlife attractants, seasonal distributions and patterns. Adopt adequate hazard management plans to mitigate the risk by better understanding the environment.
- 10.2 Example of reports for Activity and Strike is provided in **Attachment 1**.

Attachment 1

Analysis of Activity and Strike

Sample Reports

1. Daily Activity Reports



DATE VISIBILITY

RUNWAY IN USE

STARTING POINT/TIME

☐ DAWN
 ☐ MORNING
 ☒ AFTERNOON

☐ DUSK
 ☐ NIGHT

NO OF BIRD SCARER PRESENT

NO OF DOG CATCHERS PRESENT

SCARING DEVICES USED

☒ PYROTECHNICS GUNS & CARTRIDGES
☒ FIRE CRACKERS & MATCH BOXES
☐ ELECTRONIC DEVICES

BIRD SPECIES BIRD ACTIVITY GRID REF

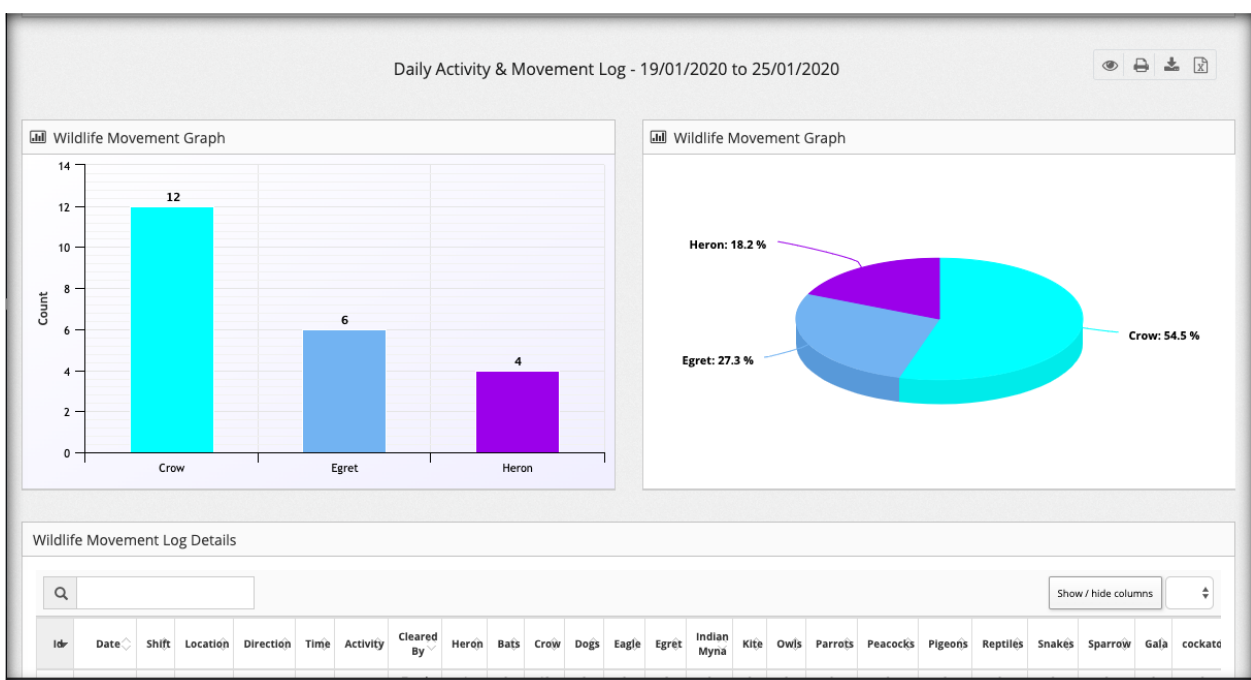
BIRD SPECIES BIRD ACTIVITY GRID REF

BIRD SPECIES BIRD ACTIVITY GRID REF

BIRD SPECIES BIRD ACTIVITY GRID REF

INSPECTION REPORT

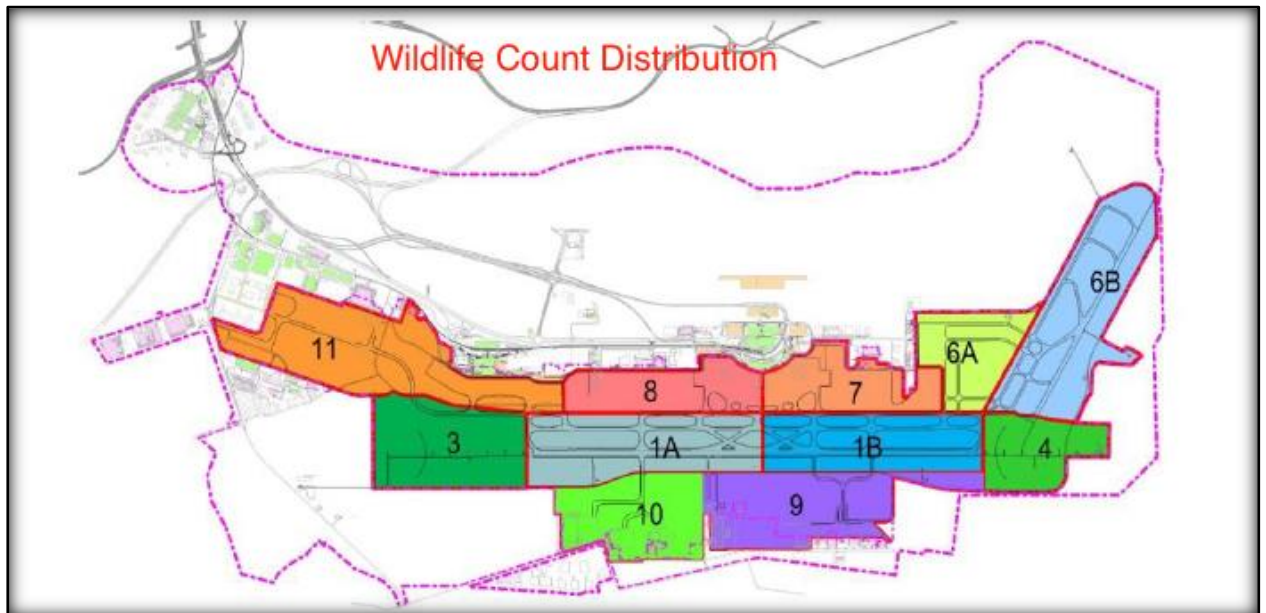
NAME&SIGN



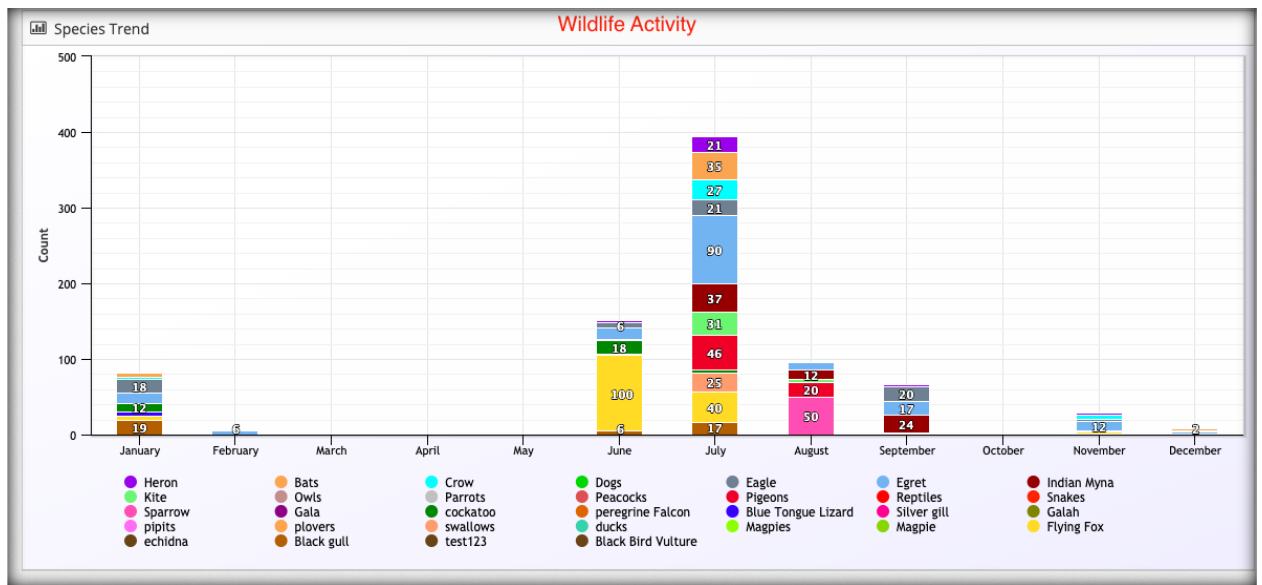
2. Monthly Activity Report (Weekly can be seen as well)



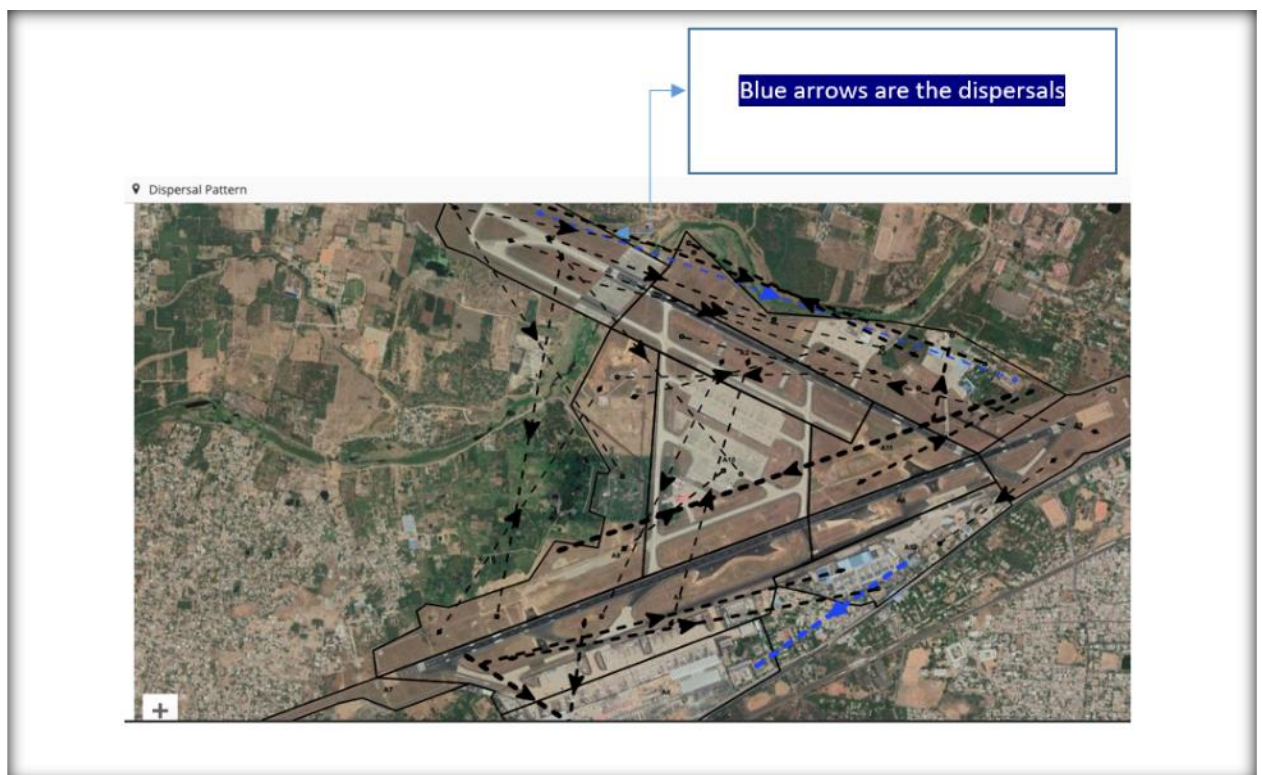
3. Wildlife Count Distribution



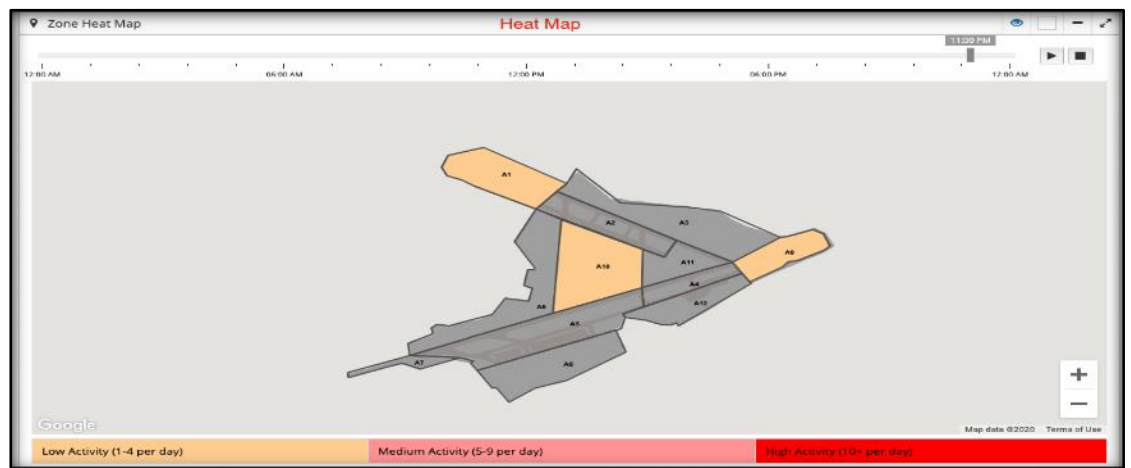
4. Species Trend



- Activity Maps
- Dispersal Maps
- Dispersal Patterns

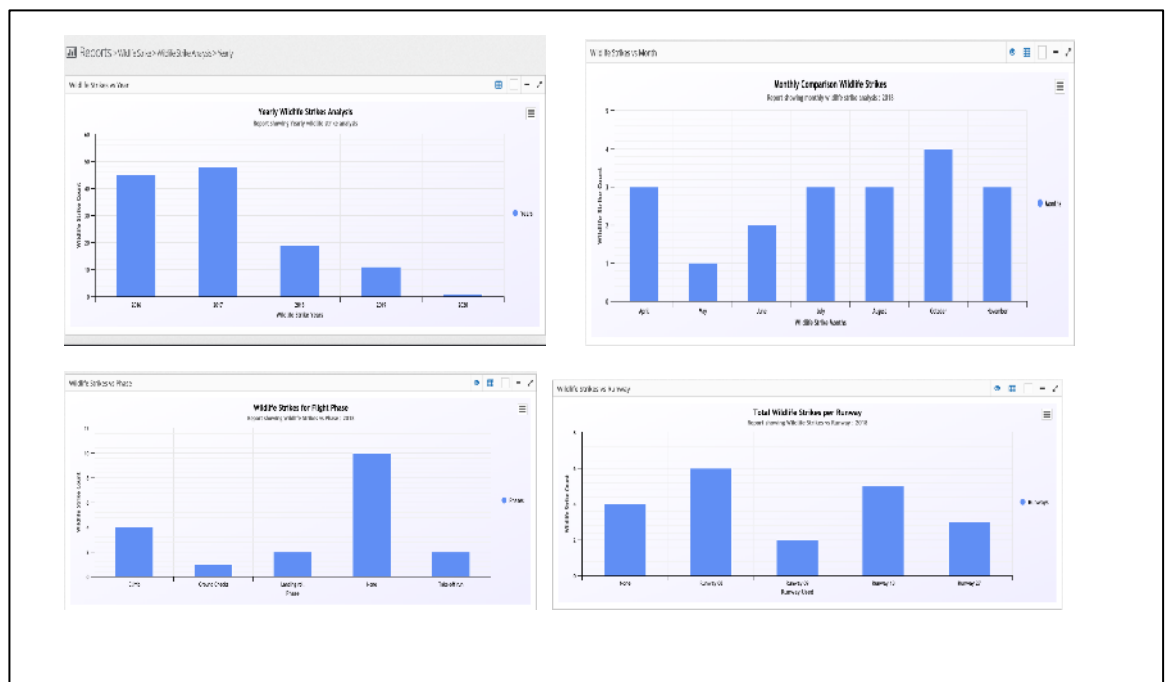


5. Zone Heat Maps

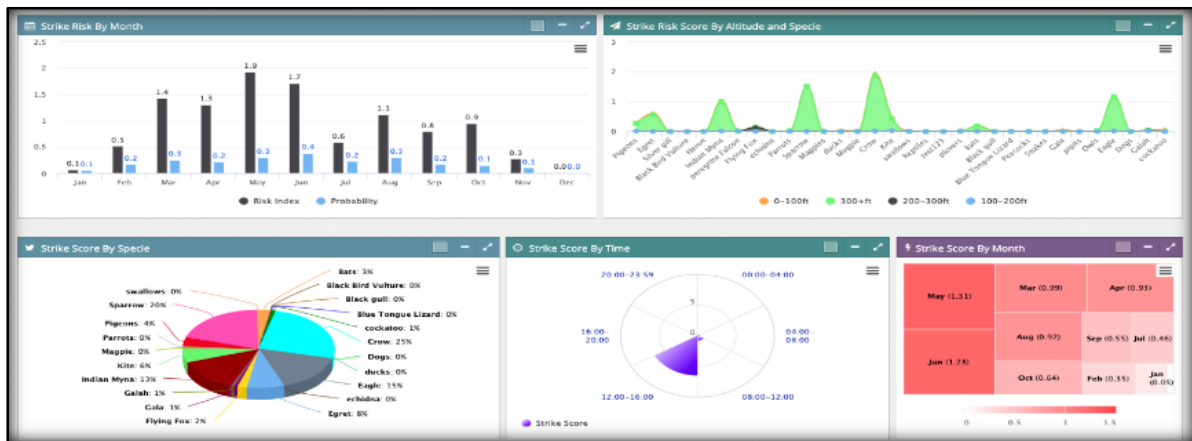


6. Wildlife Strike Data

- Year to Year Analysis
- Strikes Per Month
- Wildlife Strike vs Phase of Flight
- Wildlife Strike Vs Runways Used
- Wildlife Strikes per Light Conditions
- Designated Wildlife Strikes Per Runway Used
- Wildlife Strikes at Flight Altitudes
- Wildlife Strike per Species (High Risk Species)



7. Wildlife Probability Report



REFERENCES

1. ICAO Annex 14 Aerodromes, Volume I – Aerodrome Design and Operations
2. Procedures for Air Navigation Services - Aerodromes (Doc 9981)
3. ICAO Airport Services Manual (Doc 9137), Part 3 – Wildlife Hazard Management
4. World Birdstrike Association – Recommended Practices No1. Standards for Aerodrome Bird/wildlife Control, Standard 4 Logging Wildlife Management Activities
5. Australian Airports Association – Wildlife Hazard Management at Airports
6. Advisory Circular – Protocol for the conduct and Review of Wildlife Hazard Assessments and Wildlife Hazard Management Plans