WILDLIFE HAZARD MANAGEMENT PROGRAMME (WHMP)

STATE ACTION PLAN FOR DEVELOPMENT AND IMPLEMENTATION OF WHMP

GENERIC TEMPLATE

_____ [Insert name of State]

This generic template provides a recommended action plan for States to implement WHMP. Certain action(s) and/or order of actions recommended here may be not applicable in all States. States may adapt this action plan to suit their national and local conditions as appropriate.

ID	ACTION	ENTITY RESPONSIBLE	TARGETED IMPLEMENTATION DATE	ACTUAL IMPLEMENTATION DATE	REMARKS
WHMP 1	Designate a WHM National Coordinator to coordinate activities for the development and implementation of WHMP at the national level	State Aviation Authority[1] responsible for aviation safety (hereafter referred to as CAA)			
WHMP 2	Identify/designate WHM Focal Points in all stakeholders, e.g. aerodrome operators, ANSPs, aircraft operators, and pilots. *Note.– Stakeholders may be represented by their national, regional or international associations, e.g. ACI, CANSO and IFALPA.*	CAA, Aerodrome Operators, ANSPs, Aircraft Operators.			
WHMP 3	Review ICAO provisions and guidance issued by other relevant aviation organisations.	CAA, Aerodrome Operators, ANSPs, Aircraft Operators			

ID	ACTION	ENTITY RESPONSIBLE	TARGETED IMPLEMENTATION DATE	ACTUAL IMPLEMENTATION DATE	REMARKS
WHMP 4	Establish National WHM Committee (NWHMC) with defined terms of reference. *Note.– See list of publications in suggested references below.*	CAA or industry representative appointed by CAA			
WHMP 5	Facilitate WHM initial training in basic WHM concepts for NWHMC members.	CAA			
WHMP 6	Organize initial and recurrent technical WHM training and seminars for Focal Points and relevant staff members of all stakeholders. *Note.– Regular seminars, e.g. annual, are important for maintaining recency and promoting sharing of knowledge and best practices in WHM.*	Other stakeholders, e.g. ANSP, aerodrome operators			
WHMP 7	Identify, if non-existing, develop, and if need be, amend regulations, standards and guidance materials, e.g. SSP, reference to WHMP in aerodrome manual and SMS manual. *Note.– States may reverse order of WHMP7 and WHMP9 as they see fit. See Note 2 below the Table.*	CAA, National WHM Coordinator and all relevant Focal Points for all stakeholders			

ID	ACTION	ENTITY RESPONSIBLE	TARGETED IMPLEMENTATION DATE	ACTUAL IMPLEMENTATION DATE	REMARKS
WHMP 8	Establish regulations and/or guidelines that consider WHM aviation safety impacts related to land and infrastructural developments outside the aerodrome boundary. *Note.– Examples of land and infrastructural developments that may have safety impacts are theme parks, restaurants, solar panel installations.*	State, e.g. Ministry responsible for Civil Aviation in coordination with other concerned Ministries.			
WHMP 9	Establish airport WHM committees with defined terms of reference and representation from all relevant stakeholders. *Note.1 – States may reverse order of WHMP7 and WHMP9 as they see fit. See Note 2 below the Table.* *Note 2.– Examples of relevant stakeholders to be represented on the WHM committees are airport runway safety team, urban planning and land administration authorities.*	Aerodrome operators			

ID	ACTION	ENTITY RESPONSIBLE	TARGETED IMPLEMENTATION DATE	ACTUAL IMPLEMENTATION DATE	REMARKS
WHMP 10	Develop airport WHM Plan covering on and off airport activities, facilities and infrastructure and any changes thereof, contingencies and crises so that any impact of such elements shall be included in the WHM plan. Consistency with other plans shall also be duly considered. *Note.1 – Refer to Part 3 of Doc 9137 for guidance on the establishment of airport WHM plan.* *Note 2.– An example of "other plans" is waste management plan.* *Note 3.– WHMP should be drafted with achievable actions, define clear list of roles & responsibilities.*	Aerodrome operators			
WHMP 11	Include the review of effectiveness of airport-level WHM Plan(s) in State safety oversight program. *Note. – The review of the effectiveness of airport WHM Plan could be included in the aerodrome SMS.*	CAA			
WHMP 12	Establish methodology and procedures to review regularly, e.g., annually, the effectiveness of national WHM program. *Note. – This could be part of SSP.*	CAA			

ID	ACTION	ENTITY RESPONSIBLE	TARGETED IMPLEMENTATION DATE	ACTUAL IMPLEMENTATION DATE	REMARKS
WHMP 13	Coordinate airport WHM Plan with air operators and other airport users in the identification of wildlife hazards, e.g. locations and probabilities of wildlife presence, to improve effectiveness of mitigation measures, e.g. by providing a mechanism to share in a timely manner wildlife hazard intelligence with other stakeholders, in particular, pilots, such as alert bulletins, NOTAMs and wildlife detection technologies. *Note. – "timely manner" in this context means "as close to real time as possible".*	CAA and all relevant Focal Points for all stakeholders			
WHMP 14	Identify the necessary means and resources for the implementation of national WHMP (human, financial and material resources)	National Coordinator and NWHMC			
WHMP 15	Promote safety and reporting culture as per safety management principles	CAA and all relevant stakeholders			
WHMP 16	Establish wildlife hazard database as part of SDCPS[3] under SMS and SSP and report electronically wildlife strikes in the standard ICAO format. *Note. – Information technologies should be adopted to facilitate the recording, sharing and reporting of wildlife activities and strikes.*	CAA and aerodrome operators			

Notes:

1. Examples of State Aviation Authority are CAA, DGCA and DCA.
2. State may change order of action items as they see fit.
3. SDCPS stands for Safety Data Collection and Processing Systems

References

Publications / Websites

1. PANS Aerodromes (Doc 9981)
2. Airport Services Manual (Doc 9137), Part 3 - Wildlife Hazard Management
3. ICAO Asia Pacific Guidance for Evaluation of Aerodrome Wildlife Hazard Management Programm
4. ICAO Asia Pacific Guidance for Establishment of National Procedure for Recording and Reporting Wildlife Strikes to Aircraft
5. ICAO Asia Pacific Guidelines on the drafting of Terms of References of National Wildlife Hazard Management Committee
6. IBIS Manual (under revision as at 2021). See https://www.icao.int/safety/Pages/IBIS.aspx.
7. ACI Wildlife Hazard Management Handbook

Training

1. ACI Wildlife Hazard Management Professional Certificate Course (classroom interactive)
2. ACI Wildlife Hazard Management Training Couse (online self-learning)

Activities

1. ICAO AP-WHM/WG

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC GUIDANCE ON DEVELOPMENT AND IMPLEMENTATION OF AERODROME WILDLIFE HAZARD MANAGEMNT PROGRAMME

[DRAFT]

First Edition 2022

This Guidance Material was developed by AP-WHM/WG and approved by the AOP/SG/# Meeting and published by ICAO Asia and Pacific Office, Bangkok

RECORD OF AMENDMENTS

AMENDMENTS				AMENDMENTS			
No.	Date applicable	Date entered	Entered by	No.	Date applicable	Date entered	Entered by

Contents

FOREWORD

Annex 14, Volume I, Aerodrome Design and Operations requires to collect, record, analyse and report wildlife activities at or in the vicinity of aerodromes.

PANS-Aerodromes (Doc 9981) requires that an aerodrome operator shall develop, implement and demonstrate an effective wildlife hazard management programme at the aerodrome, and this should be tailored to and commensurate with the size and level of complexity of the aerodrome, and the number of aircraft movements and their type, taking into account the potential wildlife hazards identified and the risk assessment of those hazards.

This Regional Guidance Material has been developed to fulfil the requirements of *ICAO Annex 14, Volume I, Aerodrome Design and Operations* and *PANS-Aerodromes (Doc 9981)* using material sourced from the latest *ICAO Doc 9137, Aerodrome Services Manual, Part 3 — Wildlife Hazard Management*, the *Airport Council International Wildlife Hazard Management Handbook* and other CAA/Aerodrome Operator documents available online, in an attempt to put together, in one document, best practices in this area. Having this best practice information in one document will assist the aerodrome operator to effectively develop and implement a suitable wildlife hazard management programme for the aerodrome to meet the national and international requirements on wildlife hazard management on and in the vicinity of the aerodrome and also to assist the responsible authorities (CAAs) to assess the standards through periodic audits.

1. INTRODUCTION

1.1 The most common aviation safety concerns reported across the globe is the wildlife strikes. There has been an increasing trend which cause concern among aerodrome operators. The constant and continuous improvement in strike reporting by aerodrome operators allows the aviation industry to better understand the true strike rate. In response to this ever-present wildlife hazard, aerodromes will need to develop a wildlife hazard management programme. This will include the completion of a mandatory wildlife hazard assessment and the development and implementation of a wildlife hazard management plan (WHMP) which will be based on relevant accurate data, providing more efficient and effective wildlife hazard management. The Aerodrome's WHMP should provide details on the actions and procedures necessary to manage habitat and wildlife given the country and region specific conditions. Habitat Management is an on-going long-term issue and will involve capital and operational investment to deal with various habitat management activities. There will be short term activities which include upkeep and maintenance of vegetation at regular intervals.

2. WHAT IS WILDLIFE HAZARD MANAGEMENT?

2.1 Wildlife hazard management involves manipulating an animal's behaviour on or its habitat in order to achieve a specific goal with regards to altering animal's behaviour, population, or geographic distribution. At aerodromes, the goal of wildlife management is to change the behaviour of animals so that they do not occupy critical safety zones where aircraft operate. The key to managing wildlife at aerodromes is to understand the animals' basic requirements and how their behaviour can lead to an aviation safety hazard. Essentially, it is imperative to know why animals behave the way they do and take necessary actions to prevent a wildlife strike, this ongoing process is wildlife hazard management.

3. WILDLIFE INSTINCTS ON AERODROME HABITATS

3.1 All wildlife has basic instincts for survival and reproduction and these instincts dictate how they will behave in an ecosystem. They need energy and nutrients, including water, to survive and thrive. They must maintain the core temperature of their bodies, they must avoid being eaten by other animals, and they must reproduce. All of their behaviour can be traced to these basic needs. Different species have different behaviours and some of these can lead to high risk situations at aerodromes. Once the aerodrome operator understands these instincts of the wildlife that lead to its high risk behaviour, they can begin to take steps to change that behaviour or alter the habitat.

3.2 Wildlife meets its basic instincts by utilizing various habitats. A habitat is any kind of distinguishable feature within the aerodrome ecosystem, such as an open meadow, a stand of trees or a water body. Different animals use different habitats to meet their instincts, and some vary the types of habitats they use at different times of the year, depending on the specific instinct they are fulfilling.

4. MANIPULATING HABITATS

4.1 With an understanding of how wildlife behave and use different habitats to meet their instincts, the aerodrome operator should begin to manage them without impacting to operations. This is a continuous process where immediate results are seldom possible. Around the aerodrome, this usually means manipulating habitats, especially around the critical safety zones, so that wildlife is not able to fulfil their instincts there. This kind of manipulation varies depending on the wildlife involved and the instincts they need to fulfil. For example, a drainage ditch full of water will provide ducks with a safe place to bathe and feed. If the ditch is directly adjacent to a runway, there may be a risk of ducks being struck by aircraft as they move to and from the ditch habitat. When the drainage ditch is enclosed with a box culvert, the habitat that the duck requires is gone. The duck is no longer able to fulfil its instincts in that location and will have to find another suitable habitat. As a result, there will be fewer ducks in a critical safety zone for aircraft, and, therefore, a reduced risk to aviation safety.

4.2 Manipulation of Habitats on and in the vicinity of aerodrome is an ongoing process, it might require several techniques and approaches to manage the Habitat to reduce the risk of wildlife strikes.

5. NATIONAL LEGISLATION AND GUIDELINES

5.1 Management of wildlife on and in the vicinity of aerodrome is regulated under State's Civil Aviation and territory legislation. These requirements may relate to the use of firearms, lasers, pyro techniques, legal humane killing and safe control and disturbance of wildlife. The clearing of vegetation or other habitat management must be under the guidelines of legislative requirements of individual State.

6. WILDLIFE HAZARD MANAGEMENT PLAN

6.1 A wildlife hazard management plan (WHMP) documents an aerodromes wildlife hazard management programme within a framework of documents. Refer to details of WHMP in Doc 9137 – Chapter 9.

ID	Document	Custodian	Edition/Version	Comments
1	Aerodrome Manual			
2	Safety Management System			
3	Wildlife hazard management Plan			
4	Standard Operating Procedures (SOP's)			
5	Aerodrome Environment Management plan			

6.2 Developing an aerodrome wildlife hazard management plan (WHMP) is the most appropriate means of mitigating wildlife risk at aerodromes.

6.3 Aerodrome WHMP Contents:

Ecological and Wildlife hazard survey

- Study and assessment on aerodrome topography
- Survey and assessment on flora and fauna
- Survey and assessment on ecosystem
- Survey and assessment of potential wildlife habitat around aerodrome area up to 13 kms
- Survey and assessment on aerodrome habitat
- Daily inspection and assessment on critical ~~area~~ safety zones
- Collect flora and fauna of aerodrome and its surrounding area
- Get an overview of wildlife activity and make a list of species impacting airspace

Data Analysis

- Collect wildlife activity data within aerodrome critical area with standard sampling model
- Collect wildlife strike data
- Analyse wildlife data to identify potential hazardous species for aerodrome operations
- Summary of dispersal data

Habitat Management

- Prepare a vegetation management plan for aerodrome
- Prepare grass height management chart
- Set up calendar events to manage habitat on a regular basis
- Track the actions taken to manage habitat
- Determine Potential areas of wildlife activity
- Determine seasonality patterns

Risk Assessment

- Aerodrome areas may be categorised by distinguishing the level of threat posed by the activities of the potential hazardous species, such as:
- PHZ – Primary Hazard Zone (area where the aerodrome has active control)
- SHZ – Secondary Hazard Zone (immediate vicinity of the aerodrome including approach/take off funnel)
- THZ – Tertiary Hazard zone (area beyond the Secondary Hazard Zone and up to 13 Km radius from aerodrome reference point (ARP)

- Determine a suggested value of probability of strike on past wildlife activity, dispersal data, strike data flight movement patterns *(Note:– New species may require a different risk assessment)*.
- Determine a suggested risk index value.
- Determine peak activity periods and location patterns
- Categorise the potential hazardous and least hazardous wildlife species
- Prepare a management plan for mitigating potential hazardous species visiting aerodrome areas

Set Goals and Targets

- Set goals and targets based on the data analysis, risk assessment of the probability of strike.
- Follow ICAO/State's reporting and recording guidance
- Encourage accountability on set goals and targets.
- States and aerodrome operators to follow-up corrective actions, to completion, through status reports

Set Standard Operating Procedures

- Set an on-going strategy for wildlife hazard reduction based on habitat on and in the vicinity of the aerodrome
- Follow set ICAO/State procedures on operational notifications by all stakeholders (refer to Asia Pacific Guidance for Establishment of National Procedure for Recording and Reporting Wildlife Strikes to Aircraft https://www.icao.int/APAC/Documents/APAC%20Guidance%20on%20National%20Procedures%20for%20Recording%20and%20Reporting.docx.pdf
- Set suitable dispersal methods and removal of food chains in aerodrome surrounding areas to reduce wildlife activity.
- Comply with ICAO/States procedures

Roles and Responsibilities

- Clearly define roles within WHM (including regular inspection and real time reporting)
- Define training and staff resources are competent in the functions required for WHM
- Ensure relevant stakeholder engagement and involvement for reduction of wildlife hazards and enhance Aviation Safety (for example, through a WHM committee).

Roles and Responsibilities of Aerodrome WHMP Stakeholders

Role	Responsibility
Airport Manager/Chief Operations Officer/Aerodrome Safety Manager	• Oversee the implementation of and continuous review and improvements of the WHMP. • Review of wildlife strike rate • Review and allot appropriate budget for WHM • Review and set WHM targets (safety performance indicators (SPI)/ safety performance targets (SPT) related to WHM) • Encourage and provide opportunities to attend knowledge sharing events and appropriate WHM conferences to keep abreast with State regulations, technology, procedures and best practices • Organise Aerodrome WHM Committee meetings.
Aerodrome wildlife hazard manager	• Development of WHM for aerodrome • Review and implementation of WHM • Conduct competent assessment and engage staff for WHM • Ensure operations staff are trained and competent in the functions required for WHM • Knowledge share and keep updated with new technologies and methodologies relevant to WHM • Frequent liaisons with airline operators, governments, councils and other stakeholders to engage integrated wildlife hazard management for aerodrome • Prepare a training syllabus and topic for WHM staff • Train the trainer to conduct training among WHM staff • Ensure stake holder awareness workshop/meeting
Aerodrome Ground safety officers	• Ensure waste management plan and awareness of waste management plan and hazardous situation to airport stakeholders.
WHM ~~Safety Control~~ Duty Manager	• Ensure day to day implementation of WHMP deployment • Ensure WHM control officers are trained and competent in all functions of WHM • Ensure real time reporting and recording of WHM is followed appropriately.

Role	Responsibility
	• Ensure proper metrics and indicators are being followed in reporting and recording Wildlife activities and strikes. • Conduct field patrol to identify the potential hazardous site within aerodrome area and initiate treatment measure • Conduct daily patrol during wildlife warning period at aerodrome • Ensure WHM procedures are carried out adhering the SOPs • Prepare a work flow for WHM reporting
Wildlife Safety Control Officers	• Prepare the training material and conduct awareness training to WHM staff • Ensure all training is complete • Attend knowledge sharing awareness sessions to ground level staff and community surrounding aerodrome • Ensure circulation of daily WHM reports to Operations team
Aerodrome maintenance team	• Take prior approval from WHM manager for soil excavation/building construction at aerodrome area • Ensure periodical vegetation/slit clearance from open/storm water drains • Ensure drain outlets are properly cordoned off to prevent animal entry • Ensure boundary fence/walls are with appropriate height with attached barbed mesh to prevent animal entry • Ensure pre monsoon/post monsoon checks are carried out for potential wildlife attractant within airside
Airport Planner	• Ensure airport land is allotted for major projects are well away from critical area
Airport Projects Taeam	• Ensure adequate wildlife control measures are engaged to prevent bird/wildlife attraction to site. • Ensure WHM manager is consulted about the bird hazard mitigation measures adopted at project site and get his approval • Ensure all projects are informed to WHM manager
Air Traffic Control	• Ensure compliance with air traffic manuals and procedures

Role	Responsibility
	• Accurate notification of wildlife hazards and reporting strikes and near misses to relevant authorities. • Timely notification of updated hazard information to airborne aircraft • Understand wildlife species risk • Be informed of WHM
Airline Operators	• Ensure airline operations staff and maintenance engineers to report all wildlife strikes, activity or hazardous conditions to operations/relevant WHM staff. Preserve remains and/or request a DNA sample. • Provide/ inform aerodrome operations evidences of strikes, damage, carcasses, feathers and any other traces of wildlife strikes to Aerodrome WHM officers • Provide copies of strike records to aerodrome WHM officers for cross reference and data validations • Provide information to pilots operating to/from the aerodrome.
Airport Tenants	• Comply with airport waste management policies • Regular monitoring and maintenance • Report of wildlife nesting and roosting within buildings and hangars to relevant WHM staff.
Local town planners and government authority officers	• To consider potential wildlife attraction with new land developments
Civil Aviation Authority	• Ensure CAAs WHM Inspectors are competent in WHM • Ensure audit checklists reflect WHM reports • Encourage use of technology and smart applications instead of manual forms • Ensure all regulatory changes are appropriately communicated to relevant stakeholders in aviation. • Report Wildlife strikes to ICAO using ECCAIRS, no PDF.

Note:– Please refer to Asia/Pacific Regional Guidance on Aerodrome Operations Personnel Competency Requirement Framework at
https://www.icao.int/APAC/Documents/APAC%20Regional%20Guidance%20on%20AOPC.pdf

6.4 Review of the WHMP

6.4.1 It is recommended to maintain and update wildlife hazards, risks, and monitor the progress against the WHMP actions and targets.

6.4.2 Periodic reviews (e.g. annual review) of the WHMP should be based on data and assessment findings. Continuous improvements actions must be recommended to the management to keep the WHMP framework to work at the airports.

- Ensure all procedures, roles and responsibilities are current to the WHMP.
- Regular reviews of internal WHM reports can assist airports to evaluate the efficacy of WHMP.
- Reviews of reports can help identify gaps and highlight required changes.

7 WILDLIFE HAZARD ASSESSMENT

7.1 The strike risk is different at every aerodrome and is influenced by the specific hazards present. Climate, biodiversity and extent of wildlife attractants on and off aerodrome, seasonal changes, aircraft operations and the efficacy of the WHMP all will determine the risk. Addressing the risk that are common to most aerodromes will provides a beginning point for an aerodrome to establish the hazards. Hazards are commonly present in habitats with activities that attract wildlife species.

7.2 Habitats and Activities: Aerodromes are attractive to wildlife as they satisfy all their instincts, such as, food, water and shelter. Features common to many aerodromes are:

- Grass insects, reptiles, and ground mammals
- Tranquillity – safe area for few species to burgeon and breed
- Thermals for gaming, mating and grooming of juveniles
- Drains
- Runway and taxiway strips
- Airside/Landside landscaping
- Vegetation and densely forested areas
- Waste management
- Airport infrastructure projects excavation (exposes ground insects also disturbs underground mammals to look for safer areas, generally they move to safety critical areas)
- Wetlands, natural and artificial
- Grass
- Buildings development infrastructure

7.3 For details on monitoring and managing these hazards refer to Wildlife Risk Assessment and Monitoring and Detecting Wildlife Hazards in sections 8 and 9 respectively.

8 WILDLIFE RISK ASSESSMENT

8.1 Risk assessments determine the wildlife species risks. Understanding these risks are the key elements which streamline action plans. Prioritising and targeting potential hazardous to least hazardous species, locations and times, aerodromes should allocate resources to manage wildlife hazards as required.

8.2 To quantify the risk presented at any given aerodrome, it is necessary to perform periodic risk assessment of wildlife species at the aerodrome annually or when the bird activity or strike rates goes beyond the set target.

8.3 Wildlife species risk assessment at aerodromes are to be ranked according to the risk posed to aircraft by some factors below

- Bird movement log on aerodrome area data
- Numbers and size of species
- Activity on categorised aerodrome areas
- Flocking behaviour
- Size of the wildlife and movement patterns
- Strike history

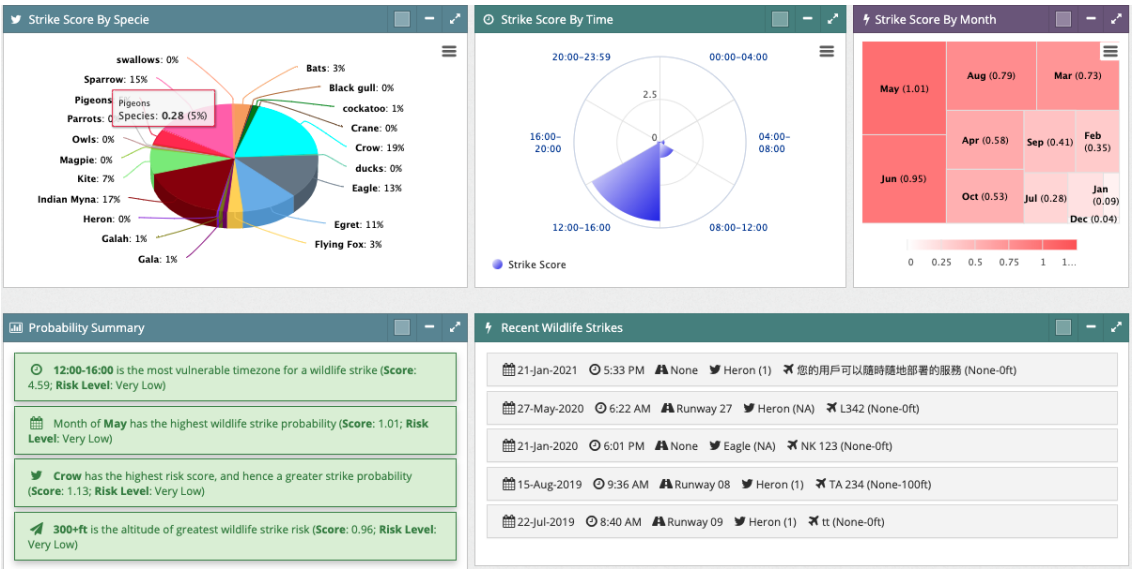
8.4 Reporting and recording of data are a fundamental requirement to understand wildlife strike risk assessment. An important step in managing wildlife hazard is to assess the level of risk that each species of animal presents to aircraft operations at the aerodrome. This risk assessment is more than simply surveying the species found in and around the aerodrome; it involves assessing the extent of damage that may result (the *consequence*) and the associated likelihood of that risk occurring with the given species and the operator/operation in consideration. This allows the aerodrome operator to prioritize its actions to target the highest risks. The risk assessment should whenever possible, identify all relevant factors that cause different wildlife species to present a risk to aviation safety; this may include physical environmental attractants, species specific behavioural traits, food sources or other attractants. Identification of these factors will greatly aid in the formulation of an effective Wildlife Hazard Management Programme.

8.5 Part of the risk assessment is to evaluate the expected severity of the impact or damage resulting from a strike event. This ranking will depend on the size/mass of the animal and its tendency to flock or congregate. Heavier animals have a greater capacity to damage an aircraft and impact its flight performance. As a guide, birds that tend to flock and weigh more than 1.8 kg can cause the most severe damage to aircraft. Birds (or bats) that are solitary and weigh less than 50 g might be expected to cause the least severe damage. Flocking behaviour might mean that a strike event could include multiple impacts, or it could increase the likelihood or the consequence of a given strike.

8.6 From an aerodrome perspective, risk assessments are mostly informed by understanding the likelihood that species will be involved in a strike. This is because the effect of the strike, while dependant on the attributes of a specific species (mass of individual and abundance/numbers) is also a factor of which aircraft is involved and how it is being operated; these are considerations generally beyond the ability of an aerodrome to assess and rightly sits with the aircraft operator/airline to assess and manage. The examples below use a scale with 5 levels but fewer or more levels could be used. The likelihood can be assessed qualitatively on a scale, for example, from Very Low to Very High. Species that are distracted

by aircraft noise or that learn to avoid aircraft could be rated as Low or Very Low. Birds that flock in large numbers to certain habitats in the flight path could be rated a High or Very High. Solitary animals might be rated as Medium but other behavioural factors might have to be considered. This likelihood might also vary with the season or other conditions such as grass height or presence of standing water or rain and weather conditions.

8.7 Wildlife Strike Evaluation Dashboard Sample Reports (Example only)



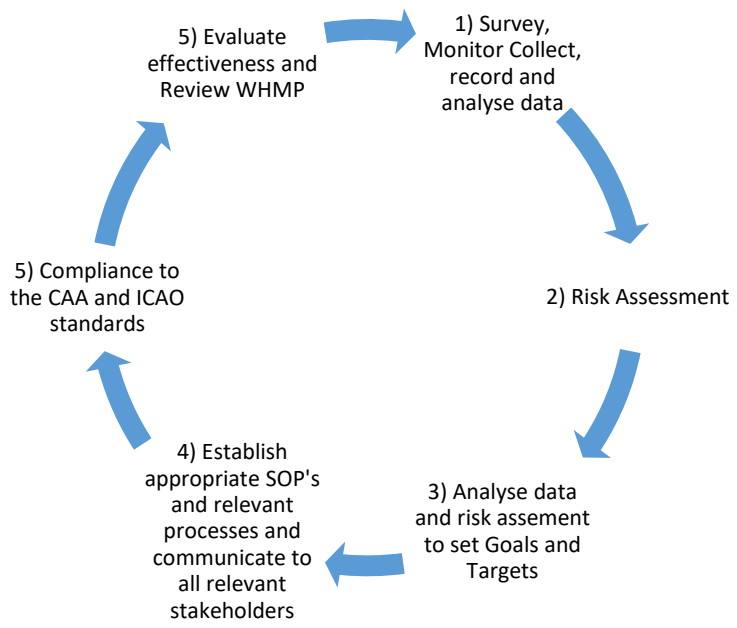
Notes:–

1) *The likelihood is based on the average of flight movements, recorded and reported wildlife activity and wildlife strike.*

2) *A more thorough discussion of the assessment of risk can be found in ICAO's Safety Management Manual (SMM) (Doc 9859).*

9 MONITORING AND DETECTING WILDLIFE HAZARDS

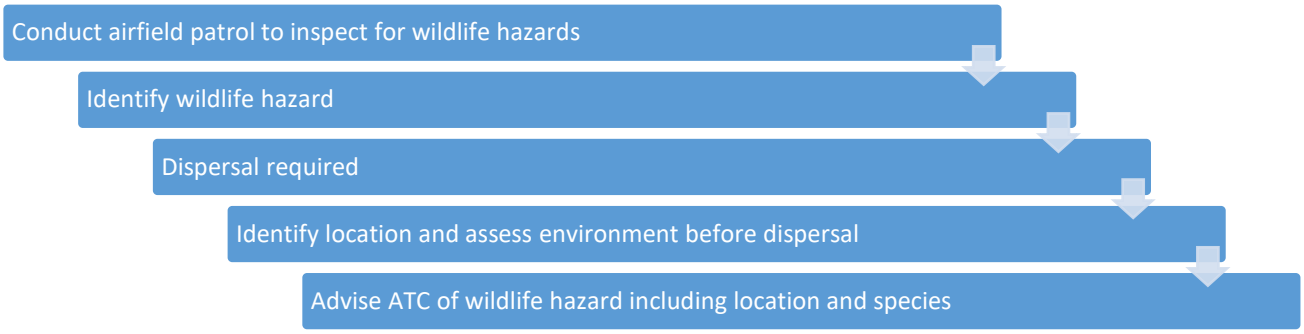
9.1 Recommended approach to developing a Wildlife Hazard Management Programme



9.2 Key to managing wildlife hazards at aerodromes are the Standard Operating Procedures (SOPs) included in the Aerodrome WHMP. The SOPs provide aerodrome WHM personnel with a systematic and replicable approach to identify, manage and monitor potential hazards and to engage active control management.

9.3 Recommended documents of SOPs

9.3.1 Procedure to monitor and record wildlife/bird movement data through the day with standard sampling method should be established.



9.4 Pilot Notification

9.4.1 Procedures for pilot notification in response to any significant wildlife concentration or activity both on and in the vicinity of the aerodrome should be established. Refer to *ICAO Asia Pacific Guidance for Establishment of National Procedure for Recording and Reporting Wildlife Strikes to Aircraft*

(https://www.icao.int/APAC/Documents/APAC%20Regional%20Guidance%20on%20AOPC.pdf). Notification must include:

ID	Activity	Action Taken	Responsible team
1	Species Activity		
2	Location (Area)		
3	Size of the species(Big/Medium/Small)		
4	Flocking behaviour (Single/Multiple/Numerous)		
5	Duration (Time)		
6	Resolution		
7	Escalation		

9.5 Research Priorities

9.5.1 Research projects should be designed to assess the efficacy of novel management practices and control actions on reducing wildlife hazards. Proper experimental design is critical to the successful evaluation of novel practices, and aerodrome operators should whenever possible consult with local biologists when considering their research priorities.

9.6 Identifying Root Causes of Wildlife Hazard

9.6.1 It is critical to understand the behaviour and basic requirements of each hazardous species of wildlife. Remember, each animal has a basic requirement for energy and nutrients, including water. They must maintain their bodies core temperature, they must breed and reproduce, and they must avoid being predated by another animal. When identifying root causes of wildlife hazards, consider each species and its basic requirements including the food chain. Then, observe the aerodrome and surrounding areas to determine how the different habitats may aid the species in fulfilling its requirements.

9.6.2 This stage of the risk assessment should, wherever possible, involve a trained wildlife professional who is familiar with ecology and animal behaviour. Ideal habitats for hazardous wildlife may not be readily apparent, and the attractiveness of aerodrome habitats may vary seasonally. Consider all stages of an animal's requirements throughout the annual cycle. Breeding seasons, annual migrations, seasonal weather patterns, and food availability are all factors that can contribute to temporal changes in wildlife hazard.

9.7 Sample WHMP Activity Table

WHMP ID	Activity	Action	Responsible team	Targeted Implementation date	Actual implementation date	Comments
1	Vegetation. Composition of grass management, pesticides for insect management					
2	Water bodies management					

3	Agriculture fields around aerodrome vicinity management					
4	Buildings provide sites for nesting, roosting and perching.					
5	Open water access to water, breeding and roosting sites					
6	Food waste disposals					
7	Water retention, drainage					
8	Structures/Shelters					
9	Landfill/Garbage disposal sites					
10	Sewage Treatment and Wastewater Plants					
11	Reservoirs, lakes, Ponds, Rivers and Salt Marshes					
12	Gravel Pits and Quarries					
13	Nature Reserves					
14	Possible Future Hazards in the Vicinity of the Aerodrome Safeguarding					
15	Landscaping at Aerodromes					
16	Perimeter Fence/Drain outlets					
17	Airport projects/Excavation sites					

9.8 Routine Patrolling

9.8.1 Routine patrolling is the core of the WHMP and should include site tours or inspections, observations, interventions and record keeping. Regular surveillance of the aerodrome is necessary to spot hazardous wildlife. The use of binoculars, spotting scopes and possibly night vision equipment by trained staff allows for optimum observation. The wildlife control operators should determine high-risk areas and spend disproportionately more time in those areas. The frequency of patrols will be highly dependent on local conditions and the behaviour of wildlife. In some locations or during some seasons, daily patrols may suffice. Under certain situations patrols may be required every 30 minutes or even more frequently. Runway safety inspections may be incorporated or performed in parallel with wildlife hazard management patrols. Patrols should be carried out in a random pattern rather than a regular route so that wildlife do not 'learn' or become accustomed to the timing of patrols.

9.9 Summary of routine patrolling activities

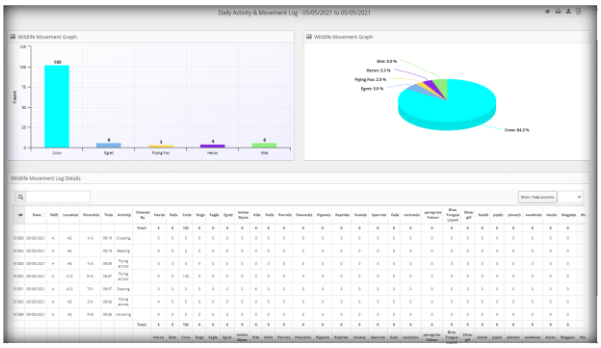
ID	Activity	Action	Responsible team	Targeted Implementation date	Actual implementation date	Comments
1	Monitoring Wildlife					
2	Continuous Recording and Reporting wildlife Activity					

ID	Activity	Action	Responsible team	Targeted Implementation date	Actual implementation date	Comments
3	Determine number of patrols					
4	Recording Daily Activities					
5	Daily Activity Report					
6	Equipment Maintenance					

9.9.1 Wildlife control officers are responsible for the collecting of data for wildlife counts, activity, strikes and dispersals. Standardised data collection is essential for data analysis. To ensure consistent data collection it is highly recommended the use of technology and smart applications. This data visibility will provide adoption of effective procedures and maturity level assessments towards training and knowledge while provide a 360-degree visibility of wildlife patterns within aerodromes.

9.10 Data Analysis Sample Reports

9.10.1 Daily Activity Report



9.10.2 Monthly Activity Report

10. MANAGING POTENTIAL WILDLIFE HAZARDS

10.1 Habitat management is probably the most important method of preventing or reducing wildlife strikes on and around an aerodrome. The airfield habitat should be less attractive to the animals than the surrounding areas. If there are off-aerodrome sites that attract birds these may need dealing with as these can create flight paths of birds moving from one area to another (e.g. from an overnight roost to a feeding location). In such circumstances the aerodrome should, in conjunction with local regulator(s) seek to reduce the attractiveness of these off aerodrome sites also. Habitat management can be the most effective method to reduce wildlife hazard at an aerodrome. This section outlines some general concepts and considerations. The management of habitats on the aerodrome will be quite different from that on land adjacent and near to the aerodrome. Some considerations are part of the long-term development of the aerodrome and should be included in the Aerodrome Master plan. Other issues are more related to regular maintenance and upkeep of aerodrome landsite key to habitat management is avoiding conditions that attract wildlife such as food, water, shelter, and resting and breeding are to be conducted on a regular basis. Modifications to the aerodrome's habitat/environment to eliminate or exclude food, water and shelter can limit the attractiveness of an aerodrome to birds and other wildlife. Habitat management provides the foundation for an aerodrome's wildlife hazard management programme because it offers ecologically based, long-term measures for reducing the number of hazardous wildlife at the aerodrome. If direct action against wildlife is chronically necessary, it is usually because habitat management has not yet been fully implemented or further measures are not cost-effective.

10.2 Passive and Active Management

10.2.1 Passive and Active Management is a continuous management, modifying of habitats to indirectly remove or reduce wildlife.

10.3 Passive Management

10.3.1 Wildlife is attracted to the aerodrome environment for food, shelter and water. Passive management is habitat management. This reduces the wildlife population by making the environment less attractive to wildlife providing longer term risk reduction. All aerodromes must adhere to passive management.

10.4 Types of Passive Management

Grass Management	Grass height management
Drains and Drainage	Removing water, or excluding access to water is recommended
Built Environment	Remove disused buildings, aircrafts and other building materials. Avoid posts, signs and poles that wildlife may perch on. Manage apron lighting enclosures to discourage nesting and manage runway lighting to reduce insect attraction. Ensure perimeter fences are regularly monitored for damage. Regularly monitor buildings and other infrastructure for nests and roosts.

Landscaping	Identify suitability of flora species used in the aerodrome's landscaping. Do not include plants bearing fruits or flowers attractive to wildlife. Regular pruning must be done to get rid of dense growth. If sprinklers are to be used ensure they are monitored and do not leave them unattended as water will be a source of attractant for wildlife.
Waste Management	Poor waste management will be a major significant risk to an aerodrome and vicinity. All bin lids must always be closed to restrict wildlife attraction and access, avoid waste overflow and ensure frequent waste removal. Provide guidance and training to all food and storage operations.
Vector management	Grass land in critical area to be monitored for pests and insects and appropriate management action to be initiated to control their presence
Termite/Ant hill/Rodent	Appropriate management measures to be adopted to control the ant hills and rodents in critical area

10.5 Active Management

10.5.1 Sometimes nothing can be done to change a habitat on an aerodrome. To reduce attractiveness of the aerodrome, active management techniques are to be deployed to manipulate wildlife behaviours. For examples, Black Kites are attracted to the thermals of the runways, so an intervention must be used to keep the Black Kites away from the runways. Aerodromes can consider a wide range of acoustic, pyro techniques or air-sirens to provide enough stimulus to make the birds fear for safety and leave the runways.

Continuous Monitoring	Frequent patrols
Dispersals	Aerodromes to consider a wide range of methods and not bank on one option as wildlife are very smart and often desensitise themselves to these methods

10.6 Types of Dispersal Tools:

- Acoustic devices with distress and alarm calls.
- Raptor kites and balloons
- Reflecting tape
- Predator models
- Pyrotechnics
- Trapping and remote release

- Stock Whip
- Physical deterrence

Note:– Trapping and release of wildlife must be conducted following State's and local body's rules and regulations in a humane manner.

10.7 Removal

10.7.1 When efforts to manipulate wildlife behaviour from returning to the area have failed, the risk they pose is too great for safe aircraft operations, then further intervention techniques will need to be deployed. Removal techniques will vary based upon the risk the wildlife poses to aerodrome safety and staff as well as species behaviour. Removal of wildlife or a group of wildlife may be the only option. This can involve trapping and releasing them in a new location. Aerodrome operators must ensure that they are compliant with all regulations regarding the wildlife species in question, and that they carry out removals in a manner as humane as possible. In some cases, wildlife establishes breeding and nesting sites which can create a strike hazard. Wildlife defending their nests and young ones can become oblivious to aircraft traffic. The young hatchlings and juvenile wildlife are inexperienced and lack awareness of the environment, making them prone to strikes. Removing nests will deter and limit the establishment of breeding. Permits from environment authorities are required for native and endangered wildlife species.

10.8 Ethical Responsibility

10.8.1 Wildlife management at aerodromes is a critical part of safe aircraft operations. Furthermore, aerodrome operators have an ethical responsibility to contribute to the conservation of wildlife and biodiversity. Some of the species that present a high risk to aviation safety might be critically endangered or threatened. It is the responsibility of the aerodrome operator to deliver solutions that maintain aviation safety whilst conserving the species in question. Culling wildlife is not an option as often the empty space of the culled wildlife is replaced by another.

11. TRAINING

11.1 The significance of wildlife and habitat management plans/programmes must be recognized as a major safety priority of all aerodromes regardless of size, aircraft movements or the lack of a perceived threat.

11.2 Aerodromes should have specific comprehensive wildlife and habitat management training programs. Staff tasked for wildlife and habitat management should be trained and assessed as fully competent to perform their duties. It is important that the role is comprehensively explained to staff and that they fully understand their roles and responsibilities.

11.3 Aerodromes with fully qualified and trained staff are better prepared and positioned to deal with wildlife threats.

11.4 Standardisation of training: training should be conducted professionally by appropriately qualified personnel using approved material drawn from appropriate standards and guidance material. Training content and programmes should be approved by a wildlife manager with guidance from a subject matter expert to ensure that the program content is enough, and all mandatory safety and operational requirements are met.

11.5 Blended learning approach: Aerodromes should have a targeted WHMP that supports the roles of each person responsible for managing or implementing the programme. Training should be delivered from a theoretical, practical, and procedural aspect and include a familiarisation programme by an organisation recognised by the CAA.

11.6 Liaison plan: the wildlife team will require training on the importance and significance of coordination in respect of all wildlife stakeholders.

11.7 Objectives of the training programme: It is important for aerodromes to outline the objectives of a tailored wildlife and habitat management plan/programs. It is not sufficient for staff to undertake any role within the aerodrome wildlife team without appropriate wildlife and habitat training.

11.8 Summary of Training Programmes

Airside Training	All employees operating airside at aerodromes will have received appropriate airside training to ensure that they can perform their airside duties in a safe and efficient manner. Airside training will include radio telephony procedures and practical assessments
Environmental Training	Awareness of environmental factors is very important for aerodromes and are an ever-increasing influence on aerodrome procedures. Wildlife teams must be fully aware of all environmental issues and how they can contribute to the sustainability policy at aerodromes. The following guidelines should apply at aerodromes. • Understanding of environmental sustainability. • Environmental evaluation and analysis of wildlife plan. • Use of best practice environmental techniques
Practical/on the Job Training	It is not enough to provide theoretical training for this role as much knowledge will be gained from carrying out the task under a proficient and competent person. The programme should be sufficiently enough to ensure effective delivery and should have a sign off process on the proficiency of the person across all the practical, procedural and skills required to manage and implement the plan/programme. It is critical that each aspect of the procedures required for wildlife habitat and management are well practiced and understood by the wildlife team.
Wildlife Management Control Measures	It is critical that the wildlife team receives comprehensive training on the different techniques that can be used in the wildlife management programme. This must include all procedures and practices that are at the disposal of the aerodrome. Each team member must receive full training on all aspects of the programme to include familiarization with all equipment that is available to the team.
Runway Incursion Prevention Training	Due to the nature of the role and the requirement to operate close to runways (never inside the runway strip unless with

	ATC permission) staff must have completed runway incursion prevention training.
Post Incident Training	Where a wildlife management person is involved and found to have failed to follow procedures, the option to re- train may exist. It is important that the area of weakness is identified, and remedial action taken. All incidents on the airfield are investigated by aerodrome authorities, sometimes in cooperation with ATC.
Research Plan	it is very important that aerodromes employ the best possible practices available to them when developing wildlife plans. Detailed accurate information based on proven research is an important element in ensuring that best practice principles apply. Where possible, aerodromes should have a dedicated resource that will ensure that advances in the field of wildlife management and habitat management, (whether that be scientific, procedural or proven improved control techniques) are reflected in the aerodrome's wildlife and habitat management plan/programme.
Refresher Training	Each aerodrome should have an effective refresher training programme that the wildlife team will complete on a regular basis. The training must include a dedicated wildlife management and habitat module which will reflect on statistical information, procedural reviews, staff feedback and a central piece by a subject matter expert at the aerodrome (internal or external) and by a senior manager responsible for the aerodrome management and habitat plan.

Note:– All training programmes should be reviewed prior to delivery to ensure that the programme is reflective of current best practice of wildlife management techniques.

11.9 Training awareness programme should be made available to the following groups:

- Air Traffic Services
- Airlines pilots and Engineers
- Ground handlers
- Food catering companies
- Waste removal companies
- Contractor's construction projects
- Other entities as deemed necessity

12. EVALUATION OF THE WHMP

12.1 Aerodromes should have a process to review and evaluate the wildlife habitat and wildlife management plan/programme to provide safety assurance that the plan/programme is fully effective and correctly implemented. The review should be completed on an annual basis but also must include an on-going review process to ensure that the plans/programmes are always current and fully functional. A review should consider the general workings of the plans/programmes with a view to efficiency and effectiveness. Reference to statistics from previous years (five) should form part of the review. Trend analysis of statistics is a key to ensuring there is an informed view as to the success and effectiveness of wildlife management plans/programmes.

12.2 Evaluation Process Overview

ID	Activity	Responsible team	Targeted Implementation date	Actual implementation date	Comments
1	Evaluation of the Aerodrome Wildlife & Habitat Management Plan/programme				
2	Are roles clearly defined and understood by all?				
3	Do aerodrome personnel understand their roles and responsibilities?				
4	Do programmes meet required standards in ALL respects?				
5	Is the programme effectively resources managed? Are procedures efficient and effective?				
6	Are programess current with all regulations and best practices?				
7	Is there an effective review process in place?				

12.3 Summary of Evaluation Plan

ID	Activity	Action
1	Evaluation Plan Report	This comprehensive annual report should be prepared and compiled by an appropriately qualified person who has full knowledge of the plan/programme and the standards required for effective delivery. The completed report along with all recommendations must be forwarded to the aerodrome wildlife hazard management committee and the senior management responsible for the delivery of the plans/programmes.
2	Evaluation Inputs	The wildlife manager (or appropriate professional) tasked with performing the annual evaluation should undertake de-briefing from staff on general effectiveness and observations on all aspects of the plan/programme. The evaluation seeks non-performance or areas for improvement. Staff are often best positioned to provide valuable feedback on the plans/programmes.
3	Aerodrome Survey	A wildlife survey is a valuable tool for aerodromes to ensure their wildlife management and habitat plans/programmes are effective, meet all regulations and standards. The survey will be completed formally on an annual basis by a qualified professional. Evaluation of all operational, practical, procedural and technical aspects of wildlife and habitat management will form part of this survey. A comparison with previous year's findings and recommendations to ensure the survey delivers on the purpose of the survey.
4	Statistical Comparisons Year on Year	It's extremely important that accurate statistics are gathered and interpreted by a competent person to ensure that aerodromes can have effective control measures in a timely fashion. Reference should be made to previous statistical data over the last five years and recommendations and action points raised accordingly. Particular attention should be placed on the quality and accuracy of aerodrome wildlife statistics and how these statistics are interpreted so that trends are measured, and mitigation measures immediately put into place.
5	Review of Procedures	A full comprehensive review of all control procedures and practices to ensure that effective control measures are in place and are correctly followed and documented. A review of seasonal migration patterns is essential. Particular attention to identification of new species and control measures are required to deal with the species.
6	Equipment Serviceability	A full equipment audit shall be undertaken annually to establish serviceability and effectiveness of all equipment used to support wildlife management.
7	Research Review	Where possible, aerodromes should have a dedicated resource that will ensure that advances in the field of wildlife management and habitat management, whether that be scientific, procedural or proven improved control techniques are reflected in the aerodrome's wildlife and habitat management plan/programme.

ID	Activity	Action
8	Intelligence Gathering	The importance of gathering intelligence locally at the aerodrome and surrounding areas can contribute greatly to ensuring that control measures are effective. A plan for sharing information with local aerodromes or aerodromes with similar wildlife and habitat issues is a useful process of mutual benefit where control measures are compared and evaluated.
9	Wildlife Documentation Audit	An evaluation of all reports and records to ensure they meet appropriate standards as they must provide accurate information that can be understood and that will be of value in the evaluation process.

Note:– Emphasis should be placed on quality of all records, daily logs to ensure the best practice reporting is gathered so that this information can be fed back into the action in a timely fashion.

13. INTEGRATED APPROACH TO WILDLIFE MANAGEMENT

13.1 Managing wildlife strikes is on-going and complex problematic situation. Wildlife operate in their environments and collision between wildlife and aircrafts are dynamic and unpredictable events. A balanced and adaptive approach to wildlife hazard management in aviation can be achieved with integrating all direct and in-direct stakeholders. This implies that all operational sectors and industries should extend responsibility to positively engage in strike mitigation.

14. REFERENCE & SOURCES

ICAO, Annex 14, Volume I, Aerodrome Design and Operations

ICAO PANS-Aerodromes (Doc 9981)

ICAO Airport Service Manual (Doc 9137), Part 3- Wildlife Hazard Management

ICAO, Manual on Bird Strike Information System (IBIS) (Doc 9332)

ICAO, Airport Planning Manual (Doc 9184), Part 1, Master Planning

ICAO, Airport Planning Manual (Doc 9184), Part 2, Land Use and Environmental Control

Airport Council International (ACI), Wildlife Hazard Management Handbook

Civil Aviation Authority of Fiji, Guidance Material on Wildlife Hazard Management (GM – WHM)

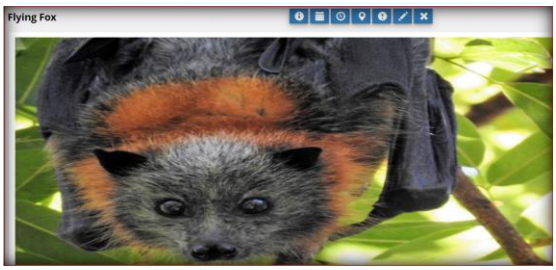
World Birdstrike Association Recommended Practices No.1 Standards for Aerodrome

Australian Airports Association, Managing Bird Strike Risk, Species Information Sheets, Airport Practice Note 6

Australian Airports Association, Wildlife Hazard Management at Airports, Airport Practice Note 9

APPENDIX 1

Overview of Species and Wildlife Hazard Management Plan (Example only)



Basic Information

Flying Fox (Pteropus) is one of the active species in XYZ airport. Typically, in XYZ airport, around >300 Flying Fox are spotted and observed per day. They have a life span of 1-1 years and a weight of 1.1 kg, typically their average clutch size is 1.

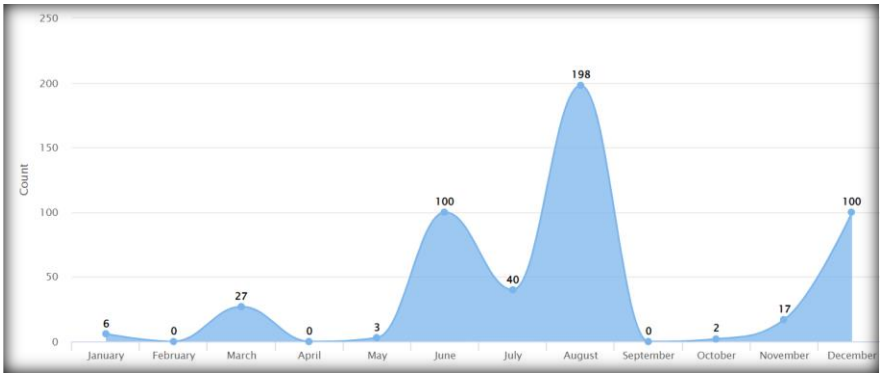
Attributes

Default Altitude: 300 m AMSL
Species Activity Time: XXXX
Wildlife Species ID : XXXXXX

Seasonality

Breeding season is typically around the months of Jan-Jan. During the breeding season, the average count of Flying Fox spotted per day is around 0, whereas in the other seasons, the frequency dips to 0 spotting per day.

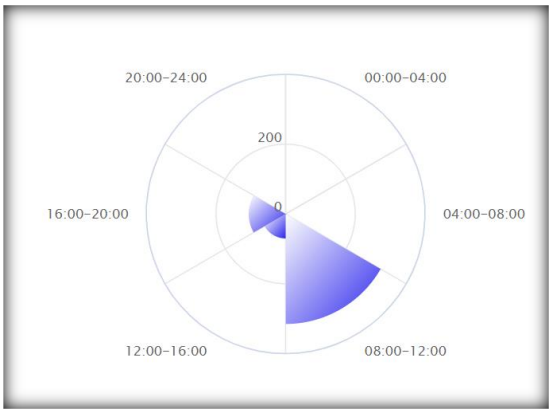
Below graph depicts the seasonality information over months:



Peak Activity Info

Species is typically very active at All Day and specifically around the time frames of 00-00 hrs. During peak activity time, average spotting is around 0 wildlife species per hr. whereas during other times, the frequency reduces to 11 wildlife species per hr.

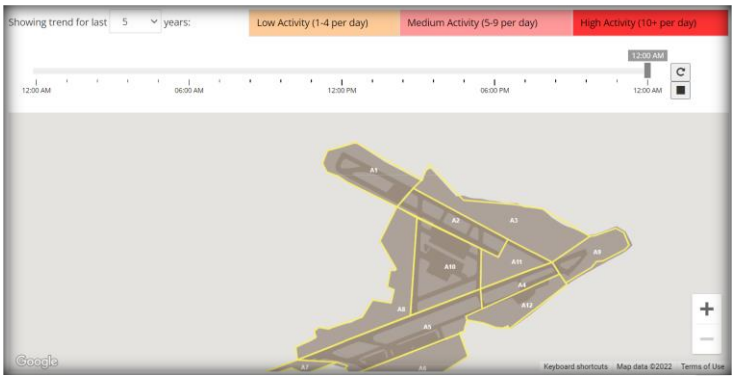
Showing trend for last [ ] years:



Area of Activity

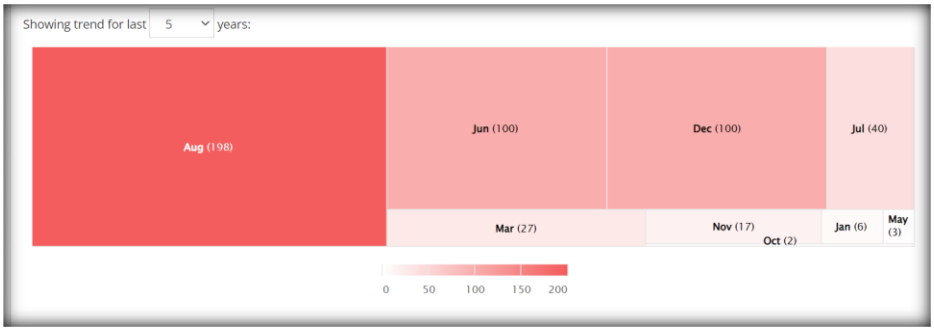
Flying Fox activity frequently occurs around the following areas of XYZ airport:
A2
A3
A4

On an average, there are 6 (29%) wildlife species activities per day spotted in these hot zones, and the remaining zones only account for 15 (71%) wildlife species activities. Below is a heat map of wildlife activity observed.



Hazard Info

Flying Fox has been categorized as Hazardous, with a risk index value of 1.



Typically, Bird Whistle and Bird Bomb have been used at XYZ airport. As scaring mechanisms most of the time to drive away the Flying Fox.

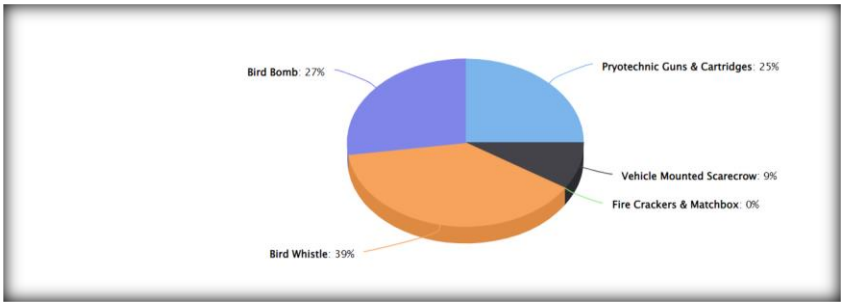
Pyrotechnic Guns & Cartridges: 25%

Vehicle Mounted Scarecrow: 9%

Firecrackers & Matchbox: 0%

Bird Whistle: 39%

Bird Bomb: 27%



Species Name: Flying fox
Scientific Name: Pteropus
Common Name: Flying fox
Species Size: Large

Hazard

Their large body mass and flocking behaviour present a considerable strike risk which is exacerbated by their nocturnal behaviour, making detection difficult. Airports themselves are rarely a source of attraction, however flocks of flying-foxes transiting through airport air space and aircraft flight paths, particularly during the nightly exodus from their daytime camps, are a serious hazard.

Flying foxes, also known as fruit bats, present a significant strike risk to aircraft because they:

- Can transit over airports in groups of hundreds or thousands of individuals.
- Have a relatively high body mass for their size;
- Are nocturnal, making visual detection by aircrew and aerodrome safety personnel difficult; and
- Are generally unresponsive to conventional active dispersal tools.

Attractants

Primarily fruits and nectar of native trees and shrubs, particularly eucalypts and fig species.
Repellents - no info available
Habitat: Rainforest, mangroves, paperbark swamps, open forests. Departs roost site (camp) at dusk to forage. Returning at any time prior to dawn.

Active Hazard Management

1) Monitor flight strips for individuals or flocks and report hazard to aircraft operators.
2) Remove trees and shrubs from airside and landside areas whose fruits and flowers attract flying-foxes.
3) Develop a landscaping policy that provides guidance on appropriate plant species use.
4) During high-risk periods encourage delayed take-offs and landings.
5) Monitor flying-fox camps in the vicinity of the aerodrome to identify local population trends.
6) Where possible, schedule flight operations to avoid peak activity. Successful flying-fox management requires a focus on detecting the hazard and communicating the details to all stakeholders.
7) Daily risk periods for flying-foxes are often concentrated around dusk during their regular camp fly-out. Knowing the time of acute risks can be used to avoid strikes by, e.g.:
    - Scheduling flights outside of known risk periods;
    - Delaying take-off and landing until the acute risk period has passed; and
    - Executing short or full length departures, where appropriate, based on the known height and location of the flying-foxes.

Passive Hazard Management

Because flying-fox strike risk tends to be primarily from over-flights, flying-fox management strategies should focus on detecting the hazard, communicating the details to all stakeholders, and monitoring the hazard. An assessment of the flying-fox hazard should be completed by a qualified and experienced person who can recommend aerodrome specific modifications.

Anticipate potential periods of increased flying-fox activity by:

- Establishing ongoing and long-term monitoring of flying-fox transit activity over the aerodrome to determine any predictable and repeatable trends in terms of time, height and expected hazard longevity; and
- Establishing ongoing and long-term monitoring of flying-fox roost population dynamics to predict periods of high and low activity. Roost populations often swell and subside throughout the year in response to season and food availability, and in some instances, roosts can be temporarily abandoned altogether. Therefore, understanding roost trends can better equip an aerodrome to predict periods of possible high or low risk.

Identify and remove all potential fruiting and flowering trees and shrubs from airside and landside landscaping that may be used by flying foxes. Plant species to exclude and avoid, include (but are not restricted to):

- Paperbarks and bottle-brushes;
- Grevilleas;
- Hakeas;
- Figs;
- Lillipillies and various other rainforest trees;
- Palms; and
- Fruit trees such as mango, pawpaw and various stone-fruit trees.

AP-WHM/WG TASK LIST
[Status Update – ~~21 May 2021~~ 27 April 2022]

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
1/1	Develop a Generic Composition of National Wildlife Hazard Management Committee	AP-WHM/WG/1	AP-WHM/WG/1	Completed	AP-WHM/WG/1-WP/06
1/2	Develop a Generic Terms of Reference of National Wildlife Hazard Management Committee	AP-WHM/WG/1	AP-WHM/WG/1	Completed	AP-WHM/WG/1-WP/06
1/3	Develop survey questionnaire to analyze the State's problem/issues/deficiencies on wildlife hazards management including ICAO USOAP CMA WHM PQs	Sri Lanka, India, WBA	By the end of June 2019	Completed	
1/4	Send survey questionnaire to States/Member Administrations	Secretariat	By the end of July 2019 (giving 4 months of time for the completion of the Survey Questionnaires by States)	Completed	State Letter T 11/5.6 – AP069/19 (AGA) dated 18 July 2019
1/5	Analyze the State's problem/issues on wildlife hazards management based on completed survey questionnaires and present the report to AP-WHM/WG/2	Sri Lanka, India, WBA	AP-WHM/WG/2	Completed	AP-WHM WG/2-WP/11 Continued in Task 2/5
1/6	Present a case study on airport wildlife strike hazard assessment and implementation of mitigation measures	Thailand, India	AP-WHM/WG/2	Completed	AP-WHM WG/2 – WP/05 from Thailand

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
1/7	Request papers from ACI, CANSO, IFALPA, IFATCA and IATA to present their views on wildlife strike hazards at the Second Meeting of AP-WHM/WG	Secretariat	AP-WHM/WG/2	Completed	AP-WHM WG/2 – WP/03 from ACI and WP/04 from IFALPA
1/8	Develop a Generic Composition of Airport Wildlife Hazard Management Committee and its TOR	Nepal, Bhutan, Lao PDR	By the end of July 2019	Completed	Decision AOP/SG/3-6 Posted in ICAO APAC Website under e-Documents
1/9	Develop a Regional Guidance on Development and Implementation of Airport Wildlife Hazard Management Programme	Australia, Fiji, India, WBA, AAPA	December 2020 (Initial Draft) (Final Draft) AP-WHM/WG/4 (Final document)	~~In progress~~ Completed	AP-WHM WG/2 – WP/07 from Fiji AP-WHM WG/3 – WP/08 (WBA, Australia, Fiji, India and AAPA) AP-WHM WG/4 – WP/04 (Australia, Fiji, India, AAPA, ACI, IFALPA and WBA)
1/10	Encourage States to use IBIS electronic format or ECCAIRS to submit wildlife strike reports to ICAO	Bangladesh, Bhutan, Cambodia, Fiji, India, Lao PDR, Maldives, Nepal, Philippines, Sri Lanka, Thailand Secretariat	From 1st June 2019	Completed	State Letter T 11/5.6 – AP043/20 (AGA) dated 2 March 2020 AP-WHM WG/2-WP/02

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
1/11	Develop guidance for establishment of national procedure for recording and reporting wildlife strikes to aircraft	Philippines, Sri Lanka, Nepal, WBA, IFALPA USA, Secretariat	Initial Draft by the end of December 2019 Final Draft by AP-WHM/WG/2 Review by December 2020	Completed Completed Completed	AP-WHM WG/2 – WP/08 from WBA AP-WHM WG/3 – WP/05 (WBA, Nepal, Philippines, Sri Lanka and IFALPA)
1/12	Develop procedures for 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	Philippines, Sri Lanka, Nepal, WBA, IFALPA Secretariat	Initial Draft by the end of December 2019 Final Draft by AP-WHM/WG/2 Review by December 2020	Completed Completed Completed	AP-WHM WG/2 – WP/10 from WBA Continued in Task 2/6 for remaining work AP-WHM WG/3 – WP/05 (WBA, Nepal, Philippines, Sri Lanka and IFALPA)
1/13	Develop performance measurement indicators/metrics to evaluate the effectiveness of the implementation of Airport Wildlife Hazard Management Programme	Bangladesh, India, Thailand, WBA	Initial draft by the end of December 2019 and final draft by AP-WHM/WG/2	Completed	AP-WHM WG/2 – WP/06 from India Continued in Task 2/7

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
2/1	Monitor the establishment of a National Wildlife Hazard Management Committee by the States [Scope of work – 2 as per ToR]	Secretariat – Issue State Letter based on AOP/SG/3 Conclusion.	July 2020	Ongoing	State Letter Ref.: A 3/3 – AP-104/19 (AGA) dated 17 September 2019 Report of the Survey analysis (AP-WHM WG/3 – WP/04 from WBA) 11 among 23 respondent States established NWHMC.
2/2	Assist in conducting workshop/seminar on Global and Regional Guidance on WHM [Scope of work – 3 as per ToR]	Australia, ACI ICAO/ACI Regional Workshop on WHM – ACI to take the lead	TBC in 2021 AWHMP – 18 May 2021 Reporting and recording data on wildlife strikes and observed wildlife – July 2021 Wildlife safety risk assessment – 14 Sep. 2021	Ongoing Completed ~~Planned~~ Completed ~~Planned~~ Completed	Possible timing: Australian Aviation Wildlife Hazard Group (AAWHG) Forum in September 2021 in Adelaide, Australia ICAO/AAWHG WHM Webinar on 18 May 20 Conducted: Reporting and Recording Data on Wildlife Strikes on 20 July 2021 Wildlife Safety Risk Assessment on 14 September 2021 21 (WHMP)

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
2/3	Share the best practices on the measures adopted by member States/Administrations to prevent wildlife strike hazards at or in the vicinity of aerodromes a) Submission of best practices to Secretariat/ICAO APAC Office b) Review and select/consolidate the best practices for posting in ICAO APAC Website c) Publish the best practices in ICAO APAC Website	All States/Administrations Expert Group composed of the Chairman, Australia, Fiji, New Zealand, USA and WBA Secretariat	By December ~~2021~~ 2022 Before ~~AP-WHM/WG/4~~ AP-WHM/WG/5 July ~~2022~~ 2023	Ongoing	Upload on ICAO APAC eDocuments: 1) Australian Airports Association, ~~Wildlife Hazard Management at Airports~~ **Practice Note 6** – Managing Bird Strike Risk – Species Information and **Practice Note 9** – Wildlife Hazard Management at Airports.

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
2/4	Re-send survey questionnaire to States/Administrations that did not provide responses in Task 1/4	Secretariat COSCAPs and PASO to assist in collection of responses	June 2020 (2 months for States/ Administrations to respond)	Completed	Mark questions for responses by CAA and aerodromes State Letter Ref.: T 11 /5.6 – AP122/20 (AGA) dated 4 June 2020
2/5	Based on the survey questionnaire responses: a) Compile the results of the survey questionnaire and the problems / issues faced by States b) Conduct needs analysis and present the recommendations on the prioritized actions to provide assistance to States as required, including future tasks for the WHM WG	WBA Australia, China, Fiji, Indonesia, Malaysia, Nepal [Lead], New Zealand, Pakistan, Thailand, WBA	October 2020 ~~AP-WHM/WG/4~~ AP-WHM/WG/5	Completed	Report of the Survey analysis (AP-WHM WG/3 – WP/04 from WBA) AP-WHM/WG/4-Flimsy 1 presented by WBA
2/6	Develop a standardised real-time reporting format for aircrew in flight for transmitting the sighting of wildlife presence.	Australia, Philippines, Sri Lanka, Nepal, WBA, IFALPA [WBA to take the lead]	AP-WHM/WG/3 AP-WHM/WG/4 (Draft format)	~~Partially~~ completed	AP-WHM WG/3 – WP/05 (WBA, Nepal, Philippines, Sri Lanka and IFALPA)

	ACTION ITEM/PLANNED ACTIVITIES	RESPONSIBLE PARTY	TIME FRAME	STATUS	REMARKS
2/7	Review performance measurement indicators/metrics presented in WP/06 (AP-WHM/WG/2)	Australia, USA, ACI, WBA	September 2020	Completed	AP-WHM WG/3 – WP/08 (WBA, Australia, Bangladesh, India, Thailand and ACI)
3/1	Draft a template on State's action plan for establishment and implementation of WHMP	WBA, Australia, IFALPA, ACI, Thailand	December 2021	Completed	AP-WHM WG/4 – WP/03
3/2	IBIS Webinar/Workshop (Tentative) in conjunction with AP-WHM/WG Meeting (as summary update on IBIS)	ICAO WHM Expert Group Members	~~AP-WHM/WG/4~~ In conjunction with AP-WHM/WG/5		
4/1	Presentation/WP by Australia on planning consideration in safeguarding framework in the vicinity of aerodromes	Australia	AP-WHM/WG/5		
4/2	Summary presentation on assistance provided to States	Secretariat	AP-WHM/WG/5		