Fifth Meeting of the Asia/Pacific Wildlife Hazard Management Working Group (AP–WHM/WG/5)

*Bangkok, Thailand, 3 to 5 May 2023*

**Agenda Item 3: Global, Regional and National Guidance/Best Practices on Wildlife Hazard Management**

# DRAFT KNOWLEDGE ARTICLE ON BEST PRACTICES BY WBA

(Presented by Worldbirdstrike Association)

**SUMMARY**

This paper presents an overview of an effective wildlife hazard management with a multi-faceted approach that involves regular surveys, effective control programs, personnel training, use of technology.

## 1. INTRODUCTION

1.1 Wildlife hazard management is an important aspect of airport safety.

Regular assessments of potential wildlife hazards should be conducted in and around the aerodromes. These assessments should include an evaluation of habitat, food sources, and potential nesting areas for birds and other wildlife.

## 2. STANDARD 1

2.1 Regular wildlife surveys help to identify the presence and behaviour of wildlife in the aerodrome environment. This information can be used to design effective wildlife control measures.

2.2 A named member of the senior management team at the aerodrome should be responsible for the implementation of the wildlife control program, including both habitat management and active wildlife control. Based on the assessment of habitat and wildlife behaviour all aerodromes must develop a comprehensive wildlife management plan that outlines specific strategies and procedures to prevent and mitigate wildlife hazards.

**Notes:**
The WHMP should be managed at the airport by competent, properly trained personnel, according to ICAO Doc 9137 Part 3 and other international (e.g., EASA) and state regulations.

Wildlife Hazard depends specifically on bird/wildlife species ecology e.g., behaviour, food and habitats preferences. Therefore, it is fundamental for WHMP personnel, especially for Wildlife Hazard department staff to have proper knowledge about bird/wildlife identification and their ecology, even more specifically on their local prevalent species.

Not all bird/wildlife species create risk to aviation. However, there are several species that should be treated as hazardous to aviation based on their size and behaviour. The WHMP should be focused on state and aerodrome specific hazardous species, that include passive, pro - and reactive measures.

Commitment to the process from Senior managers is essential and they must take responsibility to ensure proper WHM plans / programs are implemented.

The Wildlife Strike Risk (WSR) considers aerodromes as well as the rest of the airspace according to Wildlife Hazard (WH) presents of various bird/wildlife species. The WSR to aircraft cannot not be eliminated however it could be mitigated in a cost-effective way via Wildlife Hazard Management Programs (WHMP) with continuous monitoring and interventions.

It is important to know the international and state nature protection regulations which should be included in WHMP activities as they may impact the use of particular dispersal measures. The IUCN (International Union for Conservation of Nature) regional red list of threatened species should be considered before taking any lethal action.

There are additional cultural and/or religious realities that may impact some WHMP activities. There are many regions where shooting or culling wildlife is prohibited and all WHM programs must ensure they follow the States and country specific measures.

## 3. STANDARD 2

3.1 An aerodrome should undertake a review of the features on its property that attract hazardous birds/wildlife. The precise nature of the resource that they are attracted to should be identified and a management plan developed to eliminate or reduce the quantity of that resource, or to deny wildlife's access to it as far as is practicable.

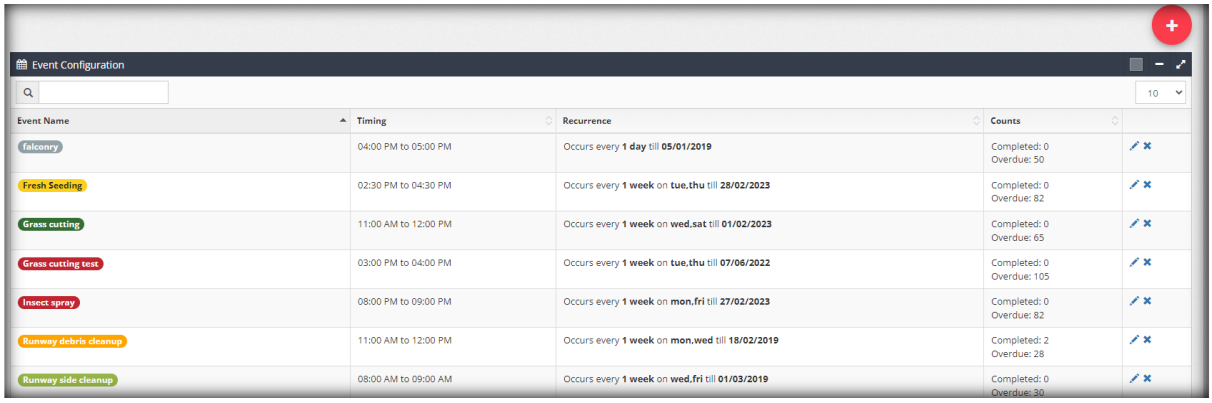
3.2 Where necessary, support from professional bird/wildlife strike prevention specialists or experts should be sought. Implementing a wildlife control program involves various techniques to discourage wildlife from entering the aerodrome environment which include habitat modification, hazing techniques and removal of attractants.

**Notes:**
Habitat management is fundamental for WHMP and should be focused on limitation of access to food, water, breeding and shelter for hazardous bird/wildlife species. As such, an airport environmental assessment shall be conducted and regularly monitored and updated. Wildlife attractants should be listed, considering that natural and anthropogenic environments are attractive to wildlife.

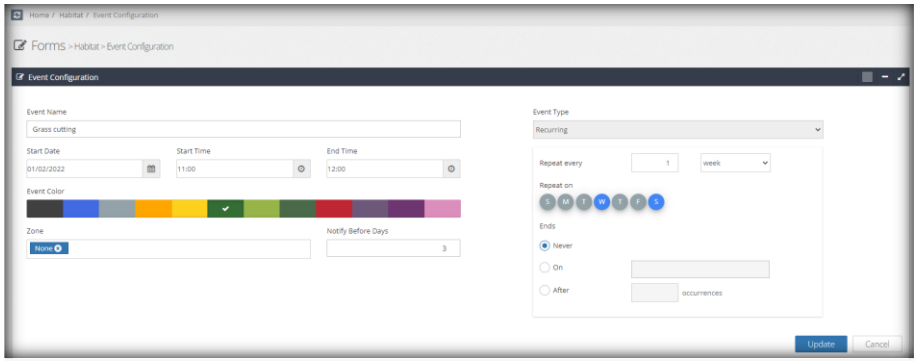
The reason why birds / wildlife frequent aerodromes is not always obvious Attractants could be food sources such as invertebrates, small mammals, seeds, water, nesting sites in grasslands, bushes, trees, or simple security offered by vast open spaces with easy sighting of predators. It is often best to obtain assistance of a professional bird/wildlife prevention specialist to help identify what the specific attractants are to the airfield.

Once attractants are identified management plans should be developed to reduce / remove / deny access to the attractants.

Overall, effective habitat management and wildlife repelling at airfields requires a multi-faceted approach that combines a range of different strategies. By taking proactive steps to manage habitats and minimise wildlife encroachment, airfields can help ensure the safety of aircraft, passengers, and wildlife alike. This effective management can be achieved by setting up events similar to below:




Habitat management can be monitored using technology tools to setup and monitor habitat events regularly instead of a one-off event similar to below.




All Habitat activities can be recorded and monitored using relevant application tools.

A survey of a 13 km radius must be undertaken, to identify the threat sources and suggest preventive measures. Activity monitoring must be conducted regularly depending on the number of flight movements, historical strikes and wildlife activity around the airfield.

Strike reporting must follow the States and ICAO format and submit the strikes to the State's authorities via IBIS reporting. Strike Incident Reporting by airport operators is highly recommended and should not be looked at as negative.

Airport Operators are further encouraged to report strikes based on

- Species
- Phase of flight
- Location of occurrence (on or off airfield)

A wildlife assessment survey in an airfield is a process of evaluating the presence and behaviour patterns of wildlife species. This assessment is vital to identify potential hazards to aircraft operations to ensure aviation safety.

The survey involves collecting data on the prevalent wildlife species, their habitat and movement and behaviour patterns. The survey data is then analysed to identify potential hazards and develop strategies to reduce the risk of wildlife strikes with aircraft.

Based on the results of the survey, appropriate measures may be taken to manage the wildlife population, such as habitat management, modification, relocation and removal. The ultimate goal of the wildlife assessment survey in an airfield is to reduce the risk of wildlife strikes, which can cause damage to an aircraft and endanger the lives of passengers and crew.

Wildlife hazard assessment surveys should be conducted based on the strikes and wildlife activity prevalent; the frequency of assessment is to be based on the habitat, activity and strikes specific to the airfield.

Climate changes impact on wildlife distribution and behaviour depends on wildlife species and areas, nevertheless it should be included in WHMP. Therefore, the WHMP should be regularly evaluated by a team of experts including professional biologists if available, or any other wildlife experienced experts.

## 4. STANDARD 3

4.1 A properly trained and equipped bird/wildlife controller who is knowledgeable about wildlife biology and wildlife behaviour 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 birds/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.

At night, active runways and taxiways should be checked for the presence of birds/wildlife at regular intervals and the dispersal action taken as needed. - Refer to Doc 9137

Wildlife control units shall consider commercial, general aviation, including helicopters (in other words all flights with passengers on board) and military flights as well in their prevention duties. All these movements shall also be considered in the strike analysis (e.g., ratio of damaging strikes and all strikes per 10,000 movements).

Communication between various stakeholders on an airfield is essential for achieving good wildlife control on airfields. Airport management shall ensure that a mechanism is available such as an airport wildlife strike prevention committee to enable these different stakeholders/organisations to understand and to participate in the wildlife management process.

All personnel including pilots, air traffic controllers and ground crews should be trained in identifying and responding to potential wildlife hazards. This training should also include procedures for reporting and documenting wildlife sightings and strikes.

Wildlife control staff should be equipped with wildlife deterrent devices or relevant methods appropriate to the wildlife species encountered, the numbers of wildlife present, and to the area that they need to control. Staff should have access to appropriate technologies and deterrents to detect and deter wildlife from entering aerodromes. These systems can also provide early warning of potential wildlife hazards. Other devices for removal of birds/wildlife, such as firearms or traps, or the means of calling on experts to support or supply these techniques which are at short at an aerodrome must be considered and taken into planned budgets.

All staff should receive proper training in the use of wildlife control devices. Experienced wildlife control personnel can monitor the airport and surrounding areas for wildlife hazards and take appropriate action when necessary. These personnel should be adequately trained in wildlife identification and control techniques. Periodic refresher training shall be conducted to keep the personnel abreast with latest developments in the field of WHM.

Wildlife Control team should use appropriate wildlife deterrent measures focused on local hazardous species. The lethal control measure should be used with great caution and should be carried out in sync with state regulations and cultural, religious circumstances.

**Recommendations:**

1. Use of technology smart application to enable users to record species and numbers by just a click on location for effective wildlife hazard management

2. Fully automatic system that records wildlife activities with ease

3. In addition, the recording system should reflect standard global names of wildlife birds, mammals, and reptiles.

4. Data patterns and projections contribute to better wildlife management and reduction

5. Knowledge sharing on wildlife hazard management, participation of wildlife staff in global, regional and state held webinars and conferences is highly recommended to enhance new techniques, technology and any other relevant information related to wildlife.

## 5. STANDARD 5

5.1 Airport bird/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).

- areas of the airport patrolled,
- numbers, location and species of birds/wildlife seen,
- action taken (if found necessary) to disperse the birds/wildlife,
- results of the dispersal actions to be recorded.

More general information such as the name of the wildlife controller on duty, time on and off duty, weather conditions should be recorded at the start of a duty period for accountability and responsibility. Aviation Security is everyone's responsibility.

Wildlife control agents should record their observations when patrolling. (See standard 3). Actions to disperse wildlife seen and the results of the action shall be recorded in accordance with ICAO Doc 9137 (Fifth edition - 2020) Chapter 5 Patrols and observations.

All Bird/wildlife incidents should be collected and recorded by wildlife strike form in the database and defined as:

Confirmed wildlife strike (CWS):

- any reported collision between wildlife and an aircraft for which evidence in the form of a carcass, feathers, any other remains, or damage to the aircraft is found.
- any reported collision between wildlife and an aircraft for which no physical evidence is found, but an indication of a collision exists (e.g., visual observation of the collision or acoustic perception of the impact).

Unconfirmed wildlife strike (UWS):

- any wildlife found dead on an aerodrome without any other obvious cause of death.
- any, recorded by aircrew, wildlife strike for which no physical evidence is found.

Wildlife incidents:

- incidents or observations where the presence of wildlife on or in the vicinity of the aerodrome could have an effect on a flight (e.g., missed approach, aborted take-off, etc.).

Near miss events:

- any events, recorded by aircrew, wildlife presents in close vicinity of the aircraft,

Bird/wildlife incidents should therefore be defined in 3 categories:

1. Confirmed strikes:

- Any reported collision between a wildlife or other wildlife and an aircraft for which evidence in the form of a carcass, remains or damage to the aircraft is found.
- 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.).

2. Unconfirmed strikes:

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

3. Serious incidents:

- Incidents where the presence of birds/wildlife on or around the airfield has any effect on a flight whether or not evidence of a strike can be found.

All Wildlife Strikes that occur on or in vicinity of the aerodrome at 500 ft or below, should be treated as a "local WS" and included in aerodrome WSR evaluation and monitoring.

Aerodromes should use standard methods for WSR monitoring. Therefore, it would be possible to compare and monitor aerodromes State WSH level. One of the measures should be Safety Performance Indicators based on aerodrome WS in reference to 10,000 air operations:

- Number of total Wildlife strikes (shows only dynamic of the Wildlife Strike incidents)
- Number of damaging wildlife (shows risk level)
- Number of BS that Effect on Flight (EOF) (show potential risk level, not every such a strike results in aircraft damage)
- Wildlife strikes reported by air crew in the vicinity of the airport (within the local CTR) during approach or after take-off should be recorded "near the aerodrome" for further analysis but not considered in the airport's BS statistics.

A risk assessment process that combines strike frequency with likely severity needs to be considered to properly assess the risk. Such a process cannot work effectively unless all strikes and activities are reported. Reporting and recording of wildlife activity is an integral part of the wildlife control team for further data analysis.

## 6. STANDARD 6

6.1 Forecast or Probability of wildlife strikes factor must be considered for continuous improvements on wildlife hazard management.

Aerodromes should establish a mechanism to ensure that they are informed of all bird/wildlife strikes reported on or near their vicinity.

The total number of wildlife strikes should never be used as a measure of risk or of the performance of the wildlife control measures at an airport.

Aerodromes should ensure that the identification of the species involved in wildlife strikes is as complete as possible.

Aerodromes should record all wildlife strikes and include, as far as they are able, the data required for the standard ICAO reporting form.

National Regulators should collate wildlife strike data and submit this to ICAO annually.

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.

Modern techniques are now available through computerisation and technology that make use of the frequency that each species is struck, combined with the probability of aircraft damage for that species, to calculate risk levels for a particular airport. These allow risk assessment matrices to be constructed and updated annually in order to evaluate how the risk level is changing in response to the wildlife management measures in place.

It is extremely vital that airport managers do not penalise staff for reporting wildlife strikes. Although strikes on large aircraft from smaller species such as swallows or sparrows are unlikely to cause significant damage, staff should be encouraged to report them.

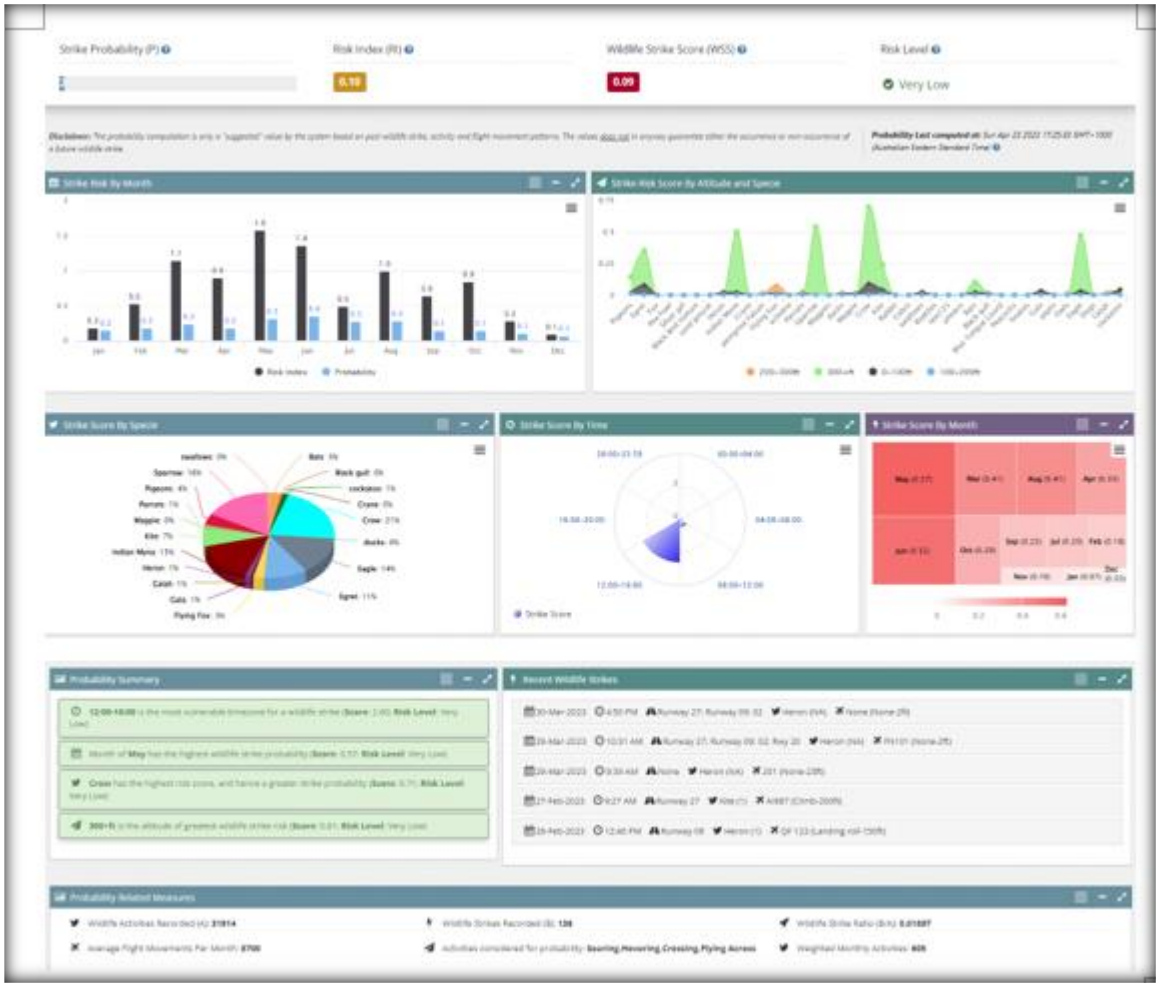
Similarly strikes at an airport should never be used as a performance measure of bird/wildlife controllers. The indicators should be based on the environment and management.

**Notes:** Effective risk management is crucial for minimising the likelihood and impact of wildlife strikes in aviation. Risk management involves identifying, assessing and prioritising risks and implementing measures to mitigate and prevent them.

In terms of wildlife strikes, risk management strategies include implementing wildlife control programs, using technology tools, radar systems, therefore adopting active and passive methodologies. Training of pilots and ground personnel to recognise and respond to potential wildlife hazards and designing structures to be more resistant to wildlife roosting is vital.

Probability modelling plays a key role in risk management for wildlife strikes. Analysing data on wildlife activities, flight patterns, previous wildlife strikes are factors that can establish some key indicators. Probabilistic models can estimate the likelihood of a wildlife strike occurring on a particular flight at a particular time at an airport. This information can be used to inform risk management strategies and prioritise resources for wildlife control measures. Overall effective risk management and probability modelling are important tools for minimising the risk of wildlife strikes in aviation and ensuring the safety of passengers, crew and aircraft.

Below are some examples of analysis of collected data




## 7. STANDARD 7

7.1 Aerodromes should conduct a formal risk assessment of their wildlife strike situation and use the results to help target their wildlife management measures and to monitor their effectiveness. Risk assessments should be updated at regular intervals, preferably annually.

According to AMC/GM TO ANNEX IV – PART-ADR-OPS
SUBPART B – AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS, GM2 ADR.OPS.B.020 Wildlife strike hazard reduction: The wildlife risk management program may cover an area of approximately 13 km (7 NM) from the aerodrome reference point.

WHMP should include monitoring of hazardous wildlife attractants and activities in a 13 km circle. Wildlife risk assessment for the 13 km zone should be repeated at least annually or as needed. Any measure toward mitigation of the risk in the aerodrome surroundings should be based on cooperation with stakeholders including landowners and State CAA. As a reminder the aerodrome operator has no responsibility in this area outside the platform. Their duty is to monitor this wide area and measure the incidence of the different environment surrounding the aerodrome. Should an area have a negative impact on the aerodrome's wildlife strike risk, measures should be recommended to stakeholders and authorities concerned. Methodologies for assessing the level of impact on the aerodrome's wildlife strike risk within a radius of 13 kilometers tools are available and should be adopted.

**Preparation of a WHMP Sample**

A WHMP is a document that outlines procedures and strategies for mitigating wildlife hazards at an airport.

1. Introduction
    - Purpose of the plan
    - Scope of the plan
    - Definition of terms
2. Background
    - Overview of wildlife hazards
    - Historical wildlife strikes and incidents analysis.
    - Current regulations and standards
3. Risk Assessment
    - Identification of wildlife species and their habitats near the airport
    - Analysis of the potential risk posed by wildlife to aircraft operations.
    - Assessment of the effectiveness of current wildlife management practices.
4. Wildlife Management Procedures
    - Identification of responsible personnel for wildlife management
    - Procedures for monitoring wildlife activity and identifying hazards
    - Procedures for implementing wildlife deterrents and mitigating hazards
    - Procedures for responding to wildlife strikes and incidents
5. Wildlife Deterrents and Technology applications for analysis
    - Overview of the different types of wildlife deterrents available
    - Selection of appropriate technology application tool which can automate and ease management of activity, strike, habitat and analysis
    - Selection of appropriate deterrents based on species and habitat
    - Procedures for installation and maintenance of wildlife deterrents
6. Training and Education
    - Training requirements for personnel involved in WHM'.
    - Education programs for airport stakeholders and the public regarding wildlife hazards and management practices.

7. Record Keeping and Reporting

    - Procedures for reporting wildlife strikes and incidents
    - Reports and Analysis to regulatory agencies
    - Ongoing reviews and update WHMP

8. Conclusion

    - Summary of the WHMP
    - Future ongoing continuous improvements, considerations and recommendations.

## 8. STANDARD 8

8.1 Collaboration with local authorities, wildlife management agencies and other stakeholders is essential for effective wildlife hazard management. Collaboration can help to share information and resources and coordinate efforts to mitigate wildlife hazards.

8.2 Aerodromes should conduct an inventory of wildlife attracting sites within the ICAO defined 13km wildlife circle, paying particular attention to sites close to the airfield and the approach and departure corridors. A basic risk assessment should be carried out to determine whether the movement patterns of birds/wildlife attracted to these sites means that they cause, or may cause, a risk to air traffic. If this is the case, options for wildlife management at the site(s) concerned should be developed and a more detailed risk assessment performed to determine if it is possible and/or cost effective to implement management processes at the site(s) concerned. This process should be repeated annually to identify new sites or changes in the risk levels produced by existing sites.

8.3 Where national laws permit, aerodromes, or airport authorities, should seek to have an input into planning decisions and land use practices within the 13km wildlife circle for any development that may attract significant numbers of hazardous birds/wildlife. Such developments should be subjected to a similar risk assessment process as described above and changes sought, or the proposal opposed, if a significant increase in wildlife strike risk is likely to result.

8.4 Managing the strike risk that originates from off the airfield is a more complex and difficult challenge. Firstly, the problematic sites need to be identified by means of a hazard assessment. This can pose problems because, for some species, such as gulls, the sites from which wildlife that cause a risk at the airport originate can be many miles from the airport itself. Having identified sites that support hazardous birds/wildlife it is then necessary to estimate the risk that they pose to the airport. Birds/wildlife on the airport itself can reasonably be assumed to pose some level of risk as their proximity to the aircraft means that they will eventually cross a runway to a taxiway and may thus be struck. Birds/wildlife at a site remote from the airport may pose no risk at all if they never cross the airfield or its approaches.

8.5 Part of the new ICAO standards concerning airport wildlife control states that: *"The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any such other source attracting wildlife activity on, or in the vicinity of, an aerodrome unless an appropriate aeronautical study indicates that they are unlikely to create conditions conducive to a wildlife hazard problem."*

8.6 Once sites that support birds/wildlife that are, or might, cause a flight safety problem are identified, management options can be developed. These can range from minor habitat modification, changing cropping or other agricultural practices, major drainage operations or large-scale removal of bird/wildlife populations. The choice of technique will depend on the particular situation encountered and expert advice should be sought if necessary. Larger scale off-aerodrome bird/wildlife management may also involve liaison with local conservation interests, especially if the sites that need to be managed are nature reserves. In some cases, it may be impossible to resolve the conflicting interests of flight safety and conservation, but in trying to do so the airport will be in a better position to show due diligence in the event of an accident or legal claim in the future.

8.7 Overall effective wildlife hazard management requires a multi-faceted approach that involves regular surveys, effective control programs, personnel training, use of technology, and collaboration with local authorities and stakeholders.

8.8 Education is also another key to preventing wildlife hazards. All airport personnel, including pilots, should receive adequate training on wildlife hazards and how to report sightings or incidents. Additionally, nearby communities should be informed about the importance of not feeding wildlife and the potential risks associated with wildlife near the aerodrome.

## 9. ACTION BY THE MEETING

9.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

—END—