



## **Guidelines for Wildlife Hazard Management at Aerodromes**

**2024**



## **Forward**

This Advisory Circular (AC) is provided as an additional information and guidance purposes. It may describe an example of an acceptable means, but not the only means of demonstrating compliance with Bhutan Air Navigation Regulations (BANRs) 2021 or Bhutan Aerodrome Standards (BAS) 2021.

Bhutan as a Contracting State to the Convention on International Civil Aviation has an obligation to the international community to ensure that civil aviation activities under its jurisdiction are carried out in strict compliance with the Standards and Recommended Practices contained in the Annexes to the Convention on International Civil Aviation in order to maintain the required aviation standards.

As per the Bhutan Air Navigation Regulations section 14.5.1.5 requires to have a Wildlife Hazard Management System in place through conduct of necessary study/assessment of presence of wildlife (birds and animals) on and in the aerodrome vicinity which can pose serious threat to aircraft operational safety including assessment, recording and reporting of wildlife strike on aircraft.

The guidance is designed for use across aviation industries including:

- Aerodrome operator
- Airlines
- Other operating agencies at PIA

It is expected that the aerodrome operator will be benefited by this guidance material as it provides an overall view of the Wildlife Hazard Management System.

**Kinley Wangchuk**  
Director



## REFERENCES

This Advisory Circular (AC) should be read in conjunction with:

- Bhutan Air Navigation Regulations(BARNs) – 2021
- Wildlife Hazard Management manual.

## 1. PURPOSE

The purpose of this AC is to provide general information and advice for the management of wildlife hazards at aerodromes.

## 2. ACRONYMS

➤ The following are acronyms used throughout this AC:

**AC** - Advisory Circular

**BARNs** - Bhutan Air Navigation Regulations

**ICAO**- International Civil Aviation Organization

**NOTAM** - Notice to Airmen

**SMS** - Safety Management System

**WHMP** - Wildlife Hazard Management Plan

## 3. DEFINITIONS

The following definitions explain various terms used throughout this AC:

- **Wildlife** - includes all birds, bats and terrestrial animals as a practical definition.
- **Wildlife strike** - when wildlife and a moving aircraft collide.
- **Confirmed wildlife strike** - A wildlife strike is confirmed in the following cases:
  - When physical evidence of a wildlife strike is found on the runway or runway strip used by the aircraft involved (unless another reason for the death of the wildlife can be found);
  - When physical evidence of the strike is found on the aircraft involved following an inspection
  - In any other instance where it can be reasonably proved from evidence that wildlife was struck as a direct result of a moving aircraft. For example, when aircrew report they definitely saw, heard or smelt a wildlife strike.

	<b>Bhutan Civil Aviation Authority</b>	<b>Advisory Circular No. BCAA/AGA/AC-GM/24</b>
--	--	--

- ***Suspected wildlife strike*** - An event where a wildlife strike has been suspected by aircrew or ground personnel but upon inspection:
  - no carcass from the wildlife is found; and
  - there is no physical evidence on the aircraft of the strike having occurred.
  
- ***Wildlife incident*** - An event where it is likely that a strike could have resulted from a wildlife hazard. A near miss event involving both wildlife and aircraft should be considered a form of wildlife incident.
  
- ***Wildlife Hazard Management Plan*** - A plan which identifies the wildlife hazard risk and details the measures used to treat that risk.
  
- ***Hazard*** - describes the source of potential harm to an aircraft caused by wildlife.
  
- ***Risk*** - describes the likelihood of a wildlife strike occurring and the resultant consequence to the aircraft.
  
- ***Risk treatment*** - describes the measures taken to reduce the likelihood of a wildlife strike occurring and/or the resultant consequence.
  
- ***Substantial damage*** - means damage or structural failure incurred by an aircraft by a wildlife strike that adversely affects the structural strength, performance or flight characteristics of the aircraft and that would normally require major repair or replacement of the affected component.
  
- ***Aerodrome vicinity*** - includes any facility, site or area which is identified as contributing to the risk at the aerodrome.

#### **4. GENERAL**

- Aviation safety statistics have demonstrated that wildlife can pose a significant hazard to the safe conduct of aircraft operations. According to recent worldwide data, the vast majority of wildlife strikes occur either on or within the immediate vicinity of an aerodrome.
  
- In many wildlife strike events, damage is sustained to the aircraft involved and/or the aircraft is delayed to allow for an inspection of possible damage. In more serious cases, the damage from a strike could result in the aircraft being unable to maintain safe operations.
  
- It is important that all reasonable action is taken by aerodrome operators to manage the wildlife



hazard at their aerodrome. The recommended approach is to:

- identify and monitor the wildlife hazard;
  - assess the hazard and rank wildlife species in their order of risk;
  - identify suitable risk treatment options;
  - develop a Wildlife Hazard Management Plan (WHMP) that is appropriate to address the hazard;
  - implement the WHMP and monitor its effectiveness; and
  - review and update the WHMP regularly.
- Operators of Certified Aerodromes are required to monitor and record the presence of wildlife on or in the vicinity of the aerodrome. Where this monitoring confirms the existence of a wildlife hazard, the aerodrome operator must develop a WHMP.
- Operators of Registered Aerodromes are required to monitor wildlife activity during their serviceability inspections. It is recommended that the operators of these aerodromes also consider the development of a WHMP, in the form of written procedures, where a wildlife hazard is found to exist.
- At certain other aerodromes, it is recommended that the wildlife hazard is assessed and that appropriate action is taken to manage the risk.
- The scope of the WHMP and the actions taken to manage the hazard should be commensurate with the responsibilities of the aerodrome operator.
- When assessing the wildlife hazard, individual species should be identified and prioritised in order of risk. The mass of the wildlife species and its behavioural characteristics (i.e. herding, flocking etc.) should be considered as this will affect the likelihood of a strike occurring and the resultant consequence. When assessing the wildlife hazard, the aerodrome operator should consider the number of confirmed and suspected strikes as well as any wildlife incidents that have occurred at the aerodrome. The practice of recording wildlife incidents is hence recommended as such events can indicate a situation with the potential to cause an actual wildlife strike.
- Where required, advice should be sought from a suitably qualified person when assessing and mitigating the wildlife risk.
- For wildlife hazards in the aerodrome vicinity which contribute to the risk but are outside the control of the aerodrome operator (i.e. on land located outside the aerodrome boundary), it is expected that the aerodrome operator will:
- advise the relevant land owner(s) or controlling authority of both the nature of the wildlife hazard and the resultant impact on the aerodrome; and

	<b>Bhutan Civil Aviation Authority</b>	<i>Advisory Circular No. BCAA/AGA/AC-GM/24</i>
--	--	--

- work with the relevant land owner(s) or controlling authority to manage the wildlife hazard.
- Wildlife strikes must be reported to the Bhutan Civil Aviation Authority (BCAA). More information on reporting requirements can be found in section 11.2 of this AC.
- Aerodrome operators are encouraged to actively engage with their aircraft operators and other relevant stakeholders including the sharing of wildlife hazard and strike information.

## 5. WILDLIFE HAZARD MANAGEMENT AT CERTIFIED AERODROMES

- ✓ The following section details the requirements, guidelines and recommendations for the operators of Certified Aerodromes with regard to wildlife hazard management.
- **Aerodrome serviceability inspections**
- ✓ Aerodrome serviceability inspections are visual checks used to assess the safety of the aerodrome at a particular point in time. Wildlife hazard identification forms an important part of these inspections and as a minimum, a check must be made of the following:
  1. the condition of aerodrome fencing (particularly in critical areas);
  2. climatic or seasonal considerations, such as the presence of:
    - a. wildlife at certain times of the year; and
    - b. the depth of water in drainage ponding areas etc.;
  3. possible shelter provided by aerodrome infrastructure (such as buildings, equipment and gable markers);
  4. wildlife hazard management procedures (as incorporated in the environmental management procedures for the aerodrome);
  5. off-airport attraction sources (such as animal sale centres, picnic areas, aeration facilities, waste disposal and landfill areas etc.);
  6. the use of harassment procedures where appropriate.

The aerodrome serviceability inspection should support wildlife monitoring at the aerodrome.

➤ **Wildlife Monitoring**

Operators of Certified Aerodromes are required to monitor and record on a regular basis the presence of wildlife on the aerodrome. This requirement also extends to the aerodrome vicinity where wildlife hazards outside the aerodrome boundary are found to impact on the safe operation of the aerodrome. The recommended practice for monitoring wildlife hazards can be found in section 9 of this AC.

Monitoring personnel should be suitably trained to be able to:

7. perform an initial identification of the wildlife species;
8. assess populations and describe their behaviour; and
9. demonstrate an understanding of the recording and reporting process.

To perform their roles properly, it is recommended that monitoring personnel have access to wildlife identification materials and equipment such as a field guide, identification books, binoculars etc.

Records of the results from wildlife monitoring must be maintained.

➤ **Wildlife Hazard Management Plan**

- ✓ Where monitoring confirms the existence of a wildlife hazard to aircraft operations, the operator of a Certified Aerodrome must produce a WHMP.
- ✓ The WHMP must be prepared by a suitably qualified person such as an ornithologist, biologist or someone with demonstrated expertise in the management of the wildlife hazard.
- ✓ The scope and complexity of the WHMP should be commensurate with the wildlife hazard at the aerodrome. The content of the plan must address the following as a minimum:
  10. hazard assessment (including monitoring action and analysis);
  11. pilot notification (reporting);
  12. liaison and working relationships with land use planning authorities;
  13. on-airport sources of wildlife attraction (i.e. food, water, shelter etc.);
  14. suitable harassment methods; and
  15. an ongoing strategy for wildlife hazard reduction (i.e. the provision of appropriate fencing).
- ✓ The responsibilities for wildlife hazard management and the roles of key personnel should be clearly defined in the WHMP.
- ✓ Once produced, the WHMP should be subject to continuous review and improvement to ensure it remains commensurate with the wildlife hazard at the aerodrome.
- ✓ The following events should trigger an immediate and urgent review of the WHMP:
  - ✓ when an aircraft experiences multiple wildlife strikes;
  - ✓ when an aircraft experiences substantial damage following a wildlife strike;



- ✓ when an aircraft experiences an engine ingestion of wildlife; and
- ✓ when wildlife is observed on the aerodrome in size or in numbers that are capable of causing the events described above.
- ✓ For aerodromes with a significant wildlife hazard, a Wildlife Hazard Management Committee can be formed to coordinate the efforts of the aerodrome operator, qualified persons and any key stakeholders.
- ✓ Integration with the Aerodrome Safety Management System
- ✓ To ensure a consistent approach to hazard identification and risk management is undertaken, the WHMP should be integrated with the Aerodrome Safety Management System (SMS).
- ✓ Both confirmed and suspected wildlife strikes as well as any wildlife incidents should all be considered when assessing the wildlife strike risk through the SMS.
- ✓ Any investigations into a wildlife strike, wildlife incident etc. should follow the relevant investigation procedures in the SMS.
- ✓ The WHMP should also be subject to the review and audit functions of the SMS.

## **6. WILDLIFE HAZARD MANAGEMENT AT REGISTERED AERODROMES**

- The following section details the requirements and recommendations for the operators of Registered Aerodromes with regard to wildlife hazard management.
- The serviceability inspection checklist used at a Registered Aerodrome must include a check for wildlife activity both on and in the vicinity of the aerodrome.
- If this assessment shows the existence of a wildlife hazard, operators of a Registered Aerodrome should be able to demonstrate that they are discharging their duty of care in providing a safe facility for aircraft operations. Registered Aerodromes should develop a simplified WHMP, in the form of written procedures, where a wildlife hazard is found to exist.
- Operators of a Registered Aerodrome are further required to issue Notice To Airmen (NOTAM) to the same standard as required for Certified Aerodromes. More information on reporting requirements can be found in section 11 of this AC.

## **7. WILDLIFE HAZARD MONITORING**

- Before the wildlife hazard can be effectively treated, it must first be identified through a monitoring process. The personnel selected to conduct monitoring should be suitably trained.

Wildlife monitoring must involve:

- wildlife presence and behaviour on the aerodrome; and
- wildlife activity in the vicinity of the aerodrome.
- Wildlife monitoring on the aerodrome



	<b>Bhutan Civil Aviation Authority</b>	<i>Advisory Circular No. BCAA/AGA/AC-GM/24</i>
--	--	--

The following is a suggested practice for monitoring wildlife on the aerodrome:

- ✓ The aerodrome environment should be divided into separate monitoring zones. It is reasonable to expect that the aerodrome operator will select these zones based on:
  - Geographical size;
  - Specific environmental factors within the zone such as terrain, soil type, flora, land use etc.; and
  - The operational use of the zone by aircraft such as takeoff, approach etc.
  - A trained person should monitor and record wildlife populations and behaviour within each zone; and
  - Any wildlife that transit across the zone, either by ground or by air, should be included.
- Wildlife monitoring should be conducted regularly and the frequency should correlate to the severity of the wildlife hazard. In other words, the greater the wildlife hazard, the more frequently monitoring should be conducted.
- The timing of wildlife monitoring should be such that it provides a complete coverage of wildlife activity, day or night, as appropriate to the aerodrome
- Wildlife monitoring in the vicinity of the aerodrome
  - The monitoring of wildlife in the vicinity of the aerodrome should cover any obvious concentrations of wildlife and/or sources of wildlife attraction (i.e. habitat, migratory routes, feeding and breeding areas etc.) which contribute to the risk at the aerodrome.
  - Monitoring in the vicinity of the aerodrome could include but is not limited to:
    1. areas used for waste, recycling, offal or sewage;
    2. wetlands, marshes, areas of water discharge and open waterways;
    3. areas containing significant food sources for high risk species; and
    4. national parks, wildlife reserves and other significant wildlife corridors.
- The identification of these areas could be achieved by:
  5. the observation of wildlife transiting across the aerodrome between separate sources of attraction;
  6. the physical observation of land uses in the aerodrome environment; and
  7. any wildlife hazard reports received from pilots, authorities and/or the general public.
- The outcome of the wildlife monitoring must be recorded. These records should be maintained in order to provide a detailed history of wildlife populations and behaviour over time.

## 8. WILDLIFE HAZARD TREATMENT

- Once the wildlife hazard has been identified, monitored and assessed, the aerodrome operator should implement appropriate controls to manage the risk. Given the wide variety of wildlife species, it is likely that more than one control measure will be required.
- In order to determine what are appropriate and effective treatments, it is recommended that the aerodrome operator seek guidance from one or more of the following sources:
  - rangers, ornithologists, zoologists, other wildlife experts; and/or
  - other aerodrome operators with experience in treating a similar wildlife hazard.
- Priority should be given to addressing those wildlife species that were identified as being the highest risk. The treatment options themselves generally fall into two categories being Pre-emptive and Active.
- **Pre-emptive treatments.** These are generally applied to the aerodrome environment and can include but are not limited to:
  - provision of appropriate fencing around the aerodrome boundary;
    - removal of food and habitat sources;
    - covering of open water sources, drains etc.;
    - use of spikes, wire, nets and/or mesh to prevent roosting;
    - selection of plant species with reduced attraction qualities;
    - maintenance of grasses at set lengths above the ground;
    - removal or covering of exposed sources of waste, sewage, offal etc.; and
    - the use of appropriate landscaping techniques.
- **Active treatments.** These are generally applied to the actual wildlife hazard and could include but are not limited to:
  - the use of scare tactics such as horns, sirens, loud hailers, gas cannons, pyrotechnics, arm waving and chasing;
  - the simulation of threats to wildlife such as lures, dogs, distress call generators etc.; and
  - the use of capture or culling practices.
- Appropriate approval should be obtained from the relevant authorities before treatment commences. Personnel should be properly trained and qualified in the use of the treatment.
- When using active treatments, care should be taken to ensure that the wildlife responding to the treatment will not be directed towards an aircraft.
- The recommended practice for addressing wildlife hazards in the aerodrome vicinity can be found in section 6.11 of this AC.

## 9. REPORTING REQUIREMENTS FOR CERTIFIED AND REGISTERED AERODROMES

- The following section details the requirements, guidelines and recommendations for the operators of Certified and Registered aerodromes in the reporting of wildlife strikes and wildlife hazards.
- Wildlife strike reports to the Bhutan Civil Aviation Authority (BCAA)
- The DoAT is a key recipient of wildlife strike information and conducts periodic analysis of the information that it receives. Detailed reports on wildlife strikes are then submit to the BCAA in a regular basis.
- The operators of Certified and Registered aerodromes are required to report to the BCAA within 72 hours a wildlife strike occurring at their aerodrome.
- If the wildlife strike results in the death or injury of a person and/or serious damage to the aircraft, reports must be made immediately to the BCAA.
- Reports to the BCAA must include the following information as known by the person making the report:
  1. The name and contact details of the reporter;
  2. The date and time (local) of the strike;
  3. Aircraft part(s) damaged (if any);
  4. The location of the strike (i.e. at aerodrome, greater than 5 kilometres away, etc)
- Reports to the BCAA should also include the following details as known by the person making the report:

### For bird strikes:

- a. The runway number used by the aircraft operation;
- b. The number of birds sighted;
- c. The number of birds struck;
- d. The species involved (or bird type if the actual species is not known);
- e. The size (large, medium, small etc.) of the actual bird(s) involved (not what is the normal size for the particular species);
- f. The details of any engine ingestion (including the number of engines experiencing ingestion).

### For animal strikes:

- g. Specific location (runway, taxiway, etc.);
  - h. The size (large, medium, small etc.) of the animals(s) involved (not what is the normal size for the particular species);
  - i. The species involved (or type of animal if species is not known);
- As the process for identifying the wildlife species can take time, an initial report with the known information must be submitted to the BCAA within 72 hours. If a subsequent investigation uncovers additional details of the strike (such as the species involved), the BCAA should then



be contacted with the new information. The original report can then be updated accordingly.

- Should the aerodrome operator be unable to identify the wildlife species involved in the strike, forensic identification methods such as DNA sampling of the remains may assist.
- Aircraft operators are also required to report a wildlife strike involving their aircraft to the BCAA.
- Wildlife hazard reports through Notice to Airmen (NOTAM)
- Certified and Registered aerodromes are required to report to the NOTAM office any significant increases or concentrations in wildlife both on and in the vicinity of the aerodrome. This practice ensures that pilots and aircraft operators can continuously assess the wildlife hazard at the aerodrome.
- NOTAM action must only be initiated where there is a significant increase in the wildlife hazard. Any such NOTAMs must include the following specific information:
  - the wildlife species;
  - the periods of wildlife activity; and
  - their likely location and flight path.
- Where a standing caution for wildlife hazards at an aerodrome, it is recommended that the following information is also included:
  - the high risk species commonly found at the aerodrome;
  - the location of any significant sources of attraction (both on the aerodrome and in the vicinity) as applicable to the high risk species;
  - any periods, seasons and/or times of increased wildlife activity; and
  - other relevant information that describes the wildlife hazard that is normally present at the aerodrome.



**Bhutan Civil Aviation Authority**

***Advisory Circular No.  
BCAA/AGA/AC-GM/24***

## **10. FURTHER INFORMATION**

- The International Civil Aviation Organization (ICAO) has produced information on bird control and reduction in ICAO Doc 9137: Airport Services Manual - Part 3. Copies are available for purchase through their website at: [http://www.icao.int/icao/en/m\\_publications.html](http://www.icao.int/icao/en/m_publications.html)
-