



International Civil Aviation Organization

Runway and Ground Safety Working Group

Third Meeting (RGS WG3)
(Cairo, Egypt, 19-22 September 2016)

Agenda Item 3: Implementation of Aerodrome Safety Priorities and Objectives in the MID Region

WILDLIFE MANAGEMENT

(Presented by Sudan)

SUMMARY

This paper presents the Regulatory Framework supporting establishment of Wildlife Management and Control Teams as model regulation published by Sudan as part of National Regulation.

Action by the meeting is at paragraph 3.

REFERENCES

- ICAO Airport Services Part 3 Doc. 9137.
- ICAO doc. 9332 (IBIS)
- SUCAR 14 – Aerodromes.
- SMS Regulation SUCAR 19
- Sudan Wildlife control Order 2015

1. INTRODUCTION

1.1 The Wildlife Hazard Management is considered as one of the ultimate condition for airport certification, thus specific regulations, processes and policies were developed by Sudan Civil Aviation Authority (SCAA).

1.2 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 airport.

1.3 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.

1.4 In more serious cases, the damage from a strike could result in the aircraft being unable to maintain safe operations.

1.5 The order provides detailed instructions on the implementation of the requirements contained in Sudan Civil Aviation Regulations (SUCARS) 14, Volume 1

(Aerodromes), on the control of wildlife in the vicinity of an aerodrome. It sets the regulatory framework applicable in Sudan for wildlife hazard assessment, the recording and reporting of wildlife strikes to aircraft as required under ICAO Annex 14 and pursuant to SUCAR 14. This document specifies the requirements for the evaluation of the wildlife hazard by airport operators, the development, and implementation of wildlife control measures to minimize the likelihood of collisions between wildlife and aircraft as shown at **Appendix A** also has been inserted as model regulation at the guidance on regulatory framework supporting establishment of wildlife management as at **Appendix B** (RASG-MID Safety Advisory)

2. DISCUSSION

2.1 Requirements for Wildlife Control:

1. Legal framework applicable in Sudan (2.1.1-2.1.5)
2. Duties & Responsibilities (SCAA & Aerodrome Operator) (3.1-3.2)
3. Wildlife Hazard Assessment (The initial & The continuous assessment.) (4.1-4.11)
4. Effectiveness of the Control measure (4.12)
5. Wildlife Control (5.1- 5.6)
6. Recording and Reporting Wildlife Strikes (6.1- 6.3)

2.2 Guidance on Regulatory Framework Supporting Establishment of Wildlife Management Advisory at **Appendix B**.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information in this working paper;
- b) agree on the Model Regulation done By Sudan on Wildlife Control; and
- c) take appropriate actions to support implementation of the Advisory Circular on Guidance Regulatory Framework Supporting Establishment of Wildlife Management and Control Team done by *Sudan, U.A.E and Egypt Expertise*.

APPENDIX A

1. REQUIREMENTS FOR WILDLIFE CONTROL

1.1 The Sudan Civil Aviation Act 2010 gives to Sudan Civil Aviation Authority (“the Authority”) the powers to set aerodromes standards [Article 4(b)].

1.2 The aerodromes standards have been further specified in Sudan Civil Aviation Regulations (SUCAR) 14 and include the requirements for wildlife strike hazard reduction in the vicinity of aerodromes.

1.3 SUCAR 14 requires an aerodrome operator to evaluate the wildlife hazard in the vicinity of the aerodrome and adopt measures to minimize the likelihood of collisions between wildlife and aircraft.

1.4 It also requires the development and implementation of a procedure for recording and reporting wildlife strikes to aircraft.

1.5 The wildlife hazard assessment and control measures are required to be included in the aerodrome manual.

2. DUTIES & RESPONSIBILITIES

Sudan Civil Aviation Authority

2.1 The Authority is responsible for the development and issuance of the regulatory and guidance material applicable to aerodromes design and operations in Sudan, as well as its implementation.

2.2 The Authority evaluates the aerodrome manual submitted by an aerodrome operator including the wildlife hazard assessment and the wildlife control measures to determine whether it complies with SUCAR 14 requirements and indicate whether the applicant will be able to operate and maintain the aerodrome properly.

2.3 The Authority collects, through the *Sudan Aviation Safety Reporting System* information from aircraft operators, airport personnel, and other sources, on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations.

2.4 Finally, the Authority submits Wildlife strike reports to the ICAO Bird Strike Information System (IBIS) database.

Aerodrome Operator

2.5 The aerodrome operator is responsible for the conduct of a wildlife hazard assessment in the vicinity of the airport.

2.6 The aerodrome operator is also required to include in the aerodrome manual, the wildlife hazard assessment and the measures adopted to control the identified hazards and minimize the likelihood of collisions between wildlife and aircraft.

3. WILDLIFE HAZARD ASSESSMENT

3.1 **Initial Assessment:** An aerodrome operator must conduct for each aerodrome an initial assessment of the existence and level of hazard posed or likely to be posed by wildlife in the vicinity of the aerodrome.

3.2 The initial Wildlife Hazard Assessment must be conducted by wildlife specialists, with proven knowledge of the types and behaviours of the wildlife species present or likely to be present in the area where the aerodrome is located.

3.3 The initial Wildlife Hazard Assessment shall:

- a) identify the wildlife species that have access to the airport, in accordance with 2.1.4;
- b) describe the features that may attract wildlife, in accordance with 2.1.6;
- c) assess the wildlife hazards or potential hazards to aircraft operating to or from the aerodrome, in terms of :
 - the likelihood of occurrence of a wildlife strike; and
 - its impact on the flight
- d) recommend actions for reducing identified wildlife hazards to aircraft operating to or from the aerodrome, using one or more of the control measures prescribed in Chapter 3.

3.4 The methodology used for the identification of wildlife species must be documented in a standardized procedure. As a minimum, it shall include the number and location of the survey points established, the duration of the observation, and how the selected duration allows for adequate assessment of the wildlife species and seasonal patterns.

3.5 For each type of wildlife species, the following information must be provided:

1. methodology used for observation;
2. its scientific and local name;
3. estimated numbers and locations; and
4. Local movements, daily and seasonal occurrences.

3.6 Potential wildlife attractants may include:

- a) waste disposal;
- b) water management facilities;
- c) wetlands;
- d) confined disposal facilities;
- e) agricultural activities (livestock, aquaculture, farming ..etc);
- f) landscaping; or
- g) any other specific land-use activities that may attract wildlife.

3.7 The description of the potential wildlife attractants shall include:

- a) name;
- b) distance from the aerodrome reference point;
- c) direction from nearest approach /take-off path;
- d) dimensions;
- e) type of activities;
- f) seasonality (if applicable); and
- g) wildlife species that may be attracted to it.

3.8 The wildlife hazards or potential hazards can be categorized on the basis of their probability and severity.

3.9 An example of classification of the hazards is given in tables 4-1 to 4-3, indicating the probability of occurrence, its severity if it occurs and the combination of probability/severity.

3.10 A colour coding may be used to indicate what is intolerable (Red – unacceptable under the existing circumstances), tolerable (Yellow – acceptable based on mitigation measures to control wildlife) or acceptable (Green – acceptable).

3.11 **Continuous Assessment:** The aerodrome operator shall establish a procedure for continuous assessment of the wildlife hazard.

3.11.1 **Periodicity:** The wildlife hazard assessment shall be reviewed :

- a) at least once a year; or
- b) after a wildlife occurrence.

3.11.2 **Nature and Level of the Hazards:** The review of the wildlife hazard assessment shall identify any changes in:

- a) wildlife species;
- b) the features that may attract wildlife on, or in the vicinity of the aerodrome; or
- c) the assessment of the wildlife hazards or potential hazards to aircraft operating to or from the aerodrome.

3.11.3 **Effectiveness of the Control Measures:** The review of the wildlife hazard assessment shall identify:

- a) new wildlife control measures that may be required of address newly identified hazards;
- b) existing wildlife control measures that may need to be reinforced; and/or
- c) Wildlife control measures to be discontinued because they are no longer required or are ineffective.

4. WILDLIFE CONTROL

4.1 **General:** The aerodrome operator shall demonstrate that the proposed wildlife control measures are adequate to reduce the risk posed by wildlife to aircraft operating to or from the aerodrome as identified in the wildlife hazard assessment or its subsequent review. Examples of wildlife control measures are provided in 5.3 to 5.6.

4.2 **Description of the Control Measures:** The description of the selected control measures shall include:

- a) type of control measures selected;
- b) wildlife species;
- c) potential wildlife attractants;
- d) actions to be implemented;
- e) periodicity, or season(s) where applicable;
- f) equipment to be used, where applicable; and
- g) personnel involved and the training requirements where applicable.

4.3 **Habitat Modification and Exclusion:** Habitat modification means changing the environment to make it less attractive or inaccessible to the problem wildlife identified during the wildlife hazard assessment. It can be achieved through the reduction, elimination, or exclusion of one or more of the elements that attract wildlife such as:

- a) food;
- b) water; or
- c) shelter.

4.4 **Wildlife Removal:** if legally allowed for the species being considered, wildlife removal may include:

- a) capturing;
- b) destroying eggs and nests;
- c) shooting;
- d) oral or contact toxicants;
- e) fumigants; or
- f) lethal traps

4.5 **Repellent and Harassment Techniques:** Repellent and harassment techniques may be used to keep hazardous wildlife away from specific areas on or near an airport by affecting the animal's senses through chemical, auditory or visual means. Repellent and harassment techniques may include:

- a) patrols of airside areas to disperse birds and other hazardous wildlife;
- b) chemical repellents legally allowed for use in Sudan by the relevant national authorities;
- c) audio repellents appropriate to the type of bird or mammal; or
- d) visual repellents appropriate to the type of bird or mammal.

4.6 **Aircraft schedule modification:** The flight schedules of some aircraft may be adjusted to minimize the chance of a strike with a wildlife species that has a predictable pattern of movement.

5. RECORDING AND REPORTING WILDLIFE STRIKES

5.1 **Aircraft Schedule Modification:** The flight schedules of some aircraft may be adjusted to minimize the chance of a strike with a wildlife species that has a predictable pattern of movement.

5.2 **Recording:** Aerodrome operators shall maintain a log of wildlife strikes containing the date, types and numbers of birds or animals, and aircraft involved. The procedure for recording the wildlife strikes must be documented in the aerodrome manual.

5.3 **Reporting:** A wildlife strike reporting form is made available to aircraft operators, airport personnel, and air traffic controllers to report wildlife strikes. The guidelines for such reporting are provided in the Operational Policy – *Aviation safety Reporting System*.

5.4 **Submission of Wildlife Strike Reports to ICAO:** Upon receiving a wildlife strike reporting form, DASS transmits the information to ICAO for incorporation into the IBIS database. Detailed instructions for processing wildlife strike reports and transmission to ICAO are contained in the Manual for *Aviation safety Reporting System* and the Aerodromes Inspector handbook.

RASG-MID SAFETY ADVISORY – 0x**(RSA-0x)****May 2016**

**Guidance on Regulatory Framework Supporting
Establishment of Wildlife Management**

Date of Issue:	May 2016
Revision No:	First Edition
Document Ref. No.:	RASG-MID/CSC/01
Owner:	RASG-MID

Disclaimer

These guidelines are developed by the Runway and Ground Safety Working Group (RGS WG), as part of MID-RAST/RGS/3 DIP deliverables, based expertise and experience of the Sudanese Civil Aviation Authority, the United Arab Emirates Civil Aviation Authority and the Egyptian Civil Aviation Authority as an integral part of their joint commitment to enhancing safety through the creation of aerodrome wildlife management and control. In doing so, there is one single concern: safety. Within the framework of RASG-MID the Regional Aviation Safety Group - Middle East (RASG-MID).

These guidelines are based on the This circular as it serves to further empower national authorities in their efforts to support wildlife management and control programmes through model national regulation, guidance materials.

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TABLE OF CONTENTS

I Introduction	4
Chapter 1	6
Model Regulation in Support of Aerodrome Wildlife Management & Control	6
1.1 Application	6
1.2 Preface to Model Regulation	6
1.3 Model Regulation	6
Chapter 2	11
Model Process for Assessment of Wildlife Hazard Management	11
2.1 Purpose	11
2.2 Applicability	11
2.3 Regulatory System	11
2.4 Responsibilities	11
2.5 Procedure.....	11
2.6 Records	13
2.7 Forms.....	13
Chapter 3 Development of Wildlife Hazard Management Programs at Airports	14
3.1 Introduction	14
3.2 WHMP Implementation Phases	15
3.3 WHMP Periodic Evaluation	24
3.3 Evaluation of the Airports Wildlife Hazard Management Program:.....	25
Appendix A Wildlife Hazard Management Assessment Checklist	1
Appendix B Data Collection Template for Observed Wildlife.....	1
Appendix C Risk Analysis.....	1
Appendix D Gap Analysis for Wildlife Hazard Management Programme Implementation	1
Appendix E Key Roles and Responsibilities	1

I INTRODUCTION

BACKGROUND

Wild Life Management and Control had been identified by the MID Region Annual Safety Report Team (ASRT) as part of one of three main risk areas (Focus Areas) to be addressed under the MID Region Aviation Safety Group (RASG-MID) framework.

The MID-RAST RGS has undertaken a Safety Enhancement Initiative (SEI) to develop guidance material and training programs to support creation of action plans for Wild Life Management and Control. The Detailed Implementation Plan (DIP) for the SEI included the action to develop and issue regulatory framework supporting establishment of Wild Life Management and Control Teams.

PURPOSE

The purpose of this circular seeks to propose a regulatory framework to support the creation and success of local Wild Life Management and Control entity consisting of the following elements:

(Chapter 1)

Model Regulation including articles related to Wildlife Management and Control that clarify main responsibilities of Civil Aviation Authority (CAA) and Aerodrome Operator and their relation with other national entities regarding wildlife management and control roles and enforcement.

(Chapter 2)

Guidance Material provides detailed instructions on the implementation of the requirements contained in the State's National Civil Aviation Regulations regarding the control of wildlife in the vicinity of an aerodrome. It sets the regulatory framework applicable in each State for wildlife hazard assessment, the recording and reporting of wildlife strikes to aircraft as required by ICAO. These materials should be considered in conjunction with the ICAO PANS Aerodrome. This chapter includes requirements for the evaluation of the wildlife hazard by airport operators as well as the development and implementation of wildlife control measures to minimize the likelihood of collisions between wildlife and aircraft.

(Chapter 3)

Model Guidance for Development of Wildlife Hazard Management Programs at Airports provides guidance to evaluate the Ecological Study (Wildlife Hazard Assessment) and Wildlife Hazard Management Plan (WHMP) submitted by Aerodrome Operators. These materials are developed by the Aerodrome Operator and may be evaluated as part of Aerodrome Certification, during periodic surveillance audits or during the change management process. The evaluation may be conducted by the Aerodrome Operator or the CAA depending on the responsibilities as established by the State.

USING THIS CIRCULAR

The Table of Contents provides key points of the regulatory framework supporting the creation of Wildlife Management and Control Teams.

The reader will choose the depth at which the circular will be used at any given time. Reading may range from using the Table of Contents or elements of the model regulation as a benchmark for gap analysis – to adopting and/or adapting the content of the proposed model regulation and guidance/oversight materials as part of a national regulatory framework.

CHAPTER 1

MODEL REGULATION IN SUPPORT OF AERODROME WILDLIFE MANAGEMENT & CONTROL

1.1 Application

Each State should publish applicable National Civil Aviation Regulation which include requirements for Wildlife Management at and in the vicinity of aerodromes. The following paragraphs contain articles, in support of this objective, which should be assessed by each CAA

1.2 Preface to Model Regulation

The following provides a model order summarising the links between the National Civil Aviation Law, the Civil Aviation Authority (CAA), National Civil Aviation Regulation and the Aerodrome Manual by way of example. The specifics of these relationships will vary from State to States however the obligations of of the CAA and Aerodrome Operator should always be clear.

Model Order entitled Wildlife Control (example)

- The National Civil Aviation Law gives the CAA the powers to set aerodromes standards.
- The aerodromes standards have been further specified in National Civil Aviation Regulation and include the requirements for wildlife strike hazard reduction in the vicinity of aerodromes.
- National Civil Aviation Regulation requires an Aerodrome Operator to evaluate the wildlife hazard in the vicinity of the aerodrome and adopt measures to minimize the likelihood of collisions between wildlife and aircraft.
- National Civil Aviation Regulation requires the development and implementation of a procedure for recording and reporting wildlife strikes to aircraft as well as wildlife hazard assessment and control measures which are included in the Aerodrome Manual.

1.3 Model Regulation

1.3.1 Wildlife Strike Hazard Reduction

1.3.1.2 The wildlife strike hazard on, or in the vicinity of, an aerodrome should be assessed through:

- a) the procedure for recording and reporting wildlife strikes to aircraft prescribed;
- b) the collection of information from aircraft operators, airport personnel, and other sources, on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations; and
- c) an ongoing evaluation of the wildlife hazard by the airport operators.

1.3.1.3 The wildlife hazard assessment should be documented in the Aerodrome Manual.

1.3.1.4 The aerodrome operator should forward wildlife strike reports to the CAA for onward transmission to the ICAO Bird Strike Information System (IBIS) database.

1.3.1.5 Action should be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft. The wildlife control measures should be documented in the Aerodrome Manual.

1.3.2 Roles & Responsibilities

1.3.2.1 Civil Aviation Authority (CAA)

1.3.2.1.1 The CAA is responsible for the development and issuance of the regulatory and guidance material applicable to aerodromes design and operations.

1.3.2.1.2 The CAA evaluates the Aerodrome Manual submitted by an Aerodrome Operator including the wildlife hazard assessment and the wildlife control measures to determine whether it complies with National Regulation and indicate whether the applicant will be able to operate and maintain the aerodrome properly.

1.3.2.1.3 The CAA collects, through its reporting systems, information from aircraft operators, airport personnel, and other sources, on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations.

1.3.2.1.4 Finally, the CAA submits Wildlife Strike Reports to the ICAO Bird Strike Information System (IBIS) database.

1.3.2.2 Aerodrome Operator

1.3.2.2.1 The Aerodrome Operator is responsible for the conduct of a wildlife hazard assessment in the vicinity of the airport.

1.3.2.2.2 The Aerodrome Operator is also required to include in the aerodrome manual, the wildlife hazard assessment and the measures adopted to control the identified hazards and minimize the likelihood of collisions between wildlife and aircraft.

1.3.3 Wildlife Hazard Assessment

1.3.3.1 **Initial Assessment:** An Aerodrome Operator must conduct for each aerodrome an initial assessment of the existence and level of hazard posed or likely to be posed by wildlife in the vicinity of the aerodrome.

1.3.3.2 The initial Wildlife Hazard Assessment must be conducted by wildlife specialists, with proven knowledge of the types and behaviours of the wildlife species present or likely to be present in the area where the aerodrome is located.

1.3.3.3 The initial Wildlife Hazard Assessment should:

- a) identify the wildlife species that have access to the airport, in accordance with 1.3.3.5 cross

- b) describe the features that may attract wildlife, in accordance with 1.3.3.6,
 - c) assess the wildlife hazards or potential hazards to aircraft operating to or from the aerodrome, in terms of :
 - i. the likelihood of occurrence of a wildlife strike, and,
 - ii. its impact on the flight, and
 - d) recommend actions for reducing identified wildlife hazards to aircraft operating to or from the aerodrome, using one or more of the control measures prescribed in Chapter 3.
- 1.3.3.4 The methodology used for the identification of wildlife species must be documented in a standardized procedure. As a minimum, it should include the number and location of the survey points established, the duration of the observation, and how the selected duration allows for adequate assessment of the wildlife species and seasonal patterns.
- 1.3.3.5 For each type of wildlife species, the following information must be provided:
- a) methodology used for observation;
 - b) its scientific and local name;
 - c) estimated numbers and locations,
 - d) local movements, daily and seasonal occurrences.
- 1.3.3.6 Potential wildlife attractants may include:
- a) waste disposal,
 - b) water management facilities,
 - c) wetlands,
 - d) confined disposal facilities,
 - e) agricultural activities (livestock, aquaculture, farming .etc),
 - f) landscaping, or
 - g) any other specific land-use activities that may attract wildlife.
- 1.3.3.7 The description of the potential wildlife attractants should include:
- a) name,
 - b) distance from the aerodrome reference point,
 - c) direction from nearest approach / take-off path,
 - d) dimensions,
 - e) type of activities,
 - f) seasonality (if applicable), and
 - g) wildlife species that may be attracted to it.
- 1.3.3.8 The wildlife hazards or potential hazards can be categorized on the basis of their probability and severity.
- 1.3.3.9 An example of classification of the hazards is given in appendix c, table's appendix c -1 to appendix c-3 indicating the probability of occurrence, its severity if it occurs and the combination of probability/severity.
- 1.3.3.10 A colour coding may be used to indicate what is intolerable (Red – unacceptable under the existing circumstances), tolerable (Yellow – acceptable based on mitigation measures to control wildlife) or acceptable (Green – acceptable).
- 1.3.3.11 **Continuous Assessment:** The Aerodrome Operator should establish a procedure for continuous assessment of the wildlife hazard.

- 1.3.3.12 **Periodicity:** The Wildlife Hazard Assessment should be reviewed :
- a) at least once a year, or
 - b) after a wildlife occurrence.
- 1.3.3.13 **Nature and Level of the Hazards:** The review of the wildlife hazard assessment should identify any changes in:
- a) wildlife species,
 - b) the features that may attract wildlife on, or in the vicinity of the aerodrome, or
 - c) the assessment of the wildlife hazards or potential hazards to aircraft operating to or from the aerodrome.
- 1.3.3.14 **Effectiveness of the Control Measures:** The review of the wildlife hazard assessment should identify:
- a) new wildlife control measures that may be required of address newly identified hazards,
 - b) existing wildlife control measures that may need to be reinforced, and/or wildlife control measures to be discontinued because they are no longer required or are ineffective.
 - c)

1.3.4 Wildlife Control

- 1.3.4.1 **General:** The aerodrome operator should demonstrate that the proposed wildlife control measures are adequate to reduce the risk posed by wildlife to aircraft operating to or from the aerodrome as identified in the wildlife hazard assessment or its subsequent review. Examples of wildlife control measures are provided in 1.3.4.2 to 1.3.4.6.
- 1.3.4.2 **Description of the Control Measures:** The description of the selected control measures should include:
- a) type of control measures selected;
 - b) wildlife species;
 - c) potential wildlife attractants;
 - d) actions to be implemented;
 - e) periodicity, or season(s) where applicable;
 - f) equipment to be used, where applicable; and
 - g) personnel involved and the training requirements where applicable.
- 1.3.4.3 **Habitat Modification and Exclusion:** Habitat modification means changing the environment to make it less attractive or inaccessible to the problem wildlife identified during the wildlife hazard assessment. It can be achieved through the reduction, elimination, or exclusion of one or more of the elements that attract wildlife such as:
- a) food,
 - b) water, or
 - c) shelter.
- 1.3.4.4 **Wildlife Removal:** if legally allowed for the species being considered , wildlife removal may include:
- a) capturing,
 - b) destroying eggs and nests,
 - c) shooting,
 - d) oral or contact toxicants,
 - e) fumigants, or
 - f) lethal traps.

1.3.4.5 **Repellent and Harassment Techniques:** Repellent and harassment techniques may be used to keep hazardous wildlife away from specific areas on or near an airport by affecting the animal's senses through chemical, auditory or visual means. Repellent and harassment techniques may include:

- a) patrols of airside areas to disperse birds and other hazardous wildlife;
- b) chemical repellents legally allowed for use in Sudan by the relevant national authorities;
- c) audio repellents appropriate to the type of bird or mammal; or
- d) visual repellents appropriate to the type of bird or mammal.

1.3.4.6 **Aircraft Schedule Modification:** The flight schedules of some aircraft may be adjusted to minimize the chance of a strike with a wildlife species that has a predictable pattern of movement.

1.3.5 Recording and Reporting Wildlife Strikes

1.3.5.1 **Recording:** Aerodrome Operators should maintain a log of wildlife strikes containing the date, types and numbers of birds or animals, and aircraft involved. The procedure for recording the wildlife strikes must be documented in the Aerodrome Manual.

1.3.5.2 **Reporting:** A Wildlife Strike Reporting Form is made available to aircraft operators, airport personnel and air traffic controllers to report wildlife strikes.

Note: The guidelines for such reporting are provided in the [Operational Policy – Aviation Safety Reporting System].

1.3.5.3 **Submission of Wildlife Strike reports to ICAO:** Upon receiving a wildlife strike reporting form, the CAA transmits the information to ICAO for incorporation into the IBIS database.

Note: Detailed instructions for processing wildlife strike reports and transmission to ICAO are contained in the [Manual for Aviation Safety Reporting System and the Aerodromes Inspector Handbook].

CHAPTER 2 MODEL PROCESS FOR ASSESSMENT OF WILDLIFE HAZARD MANAGEMENT

2.1 Purpose

To provide guidance to personnel appointed to evaluate of Ecological Study (Wildlife Hazard Assessment) and Wildlife Hazard Management Plan (WHMP) submitted by Aerodrome Operators. These materials are developed by the Aerodrome Operator and may be evaluated as part of Aerodrome Certification, during periodic surveillance audits or during the change management process. The evaluation may be conducted by the Aerodrome Operator or the CAA depending on the responsibilities as established by the State.

The model process below is based on requirement for the Aerodrome Operator to submit the Ecological Study (Wildlife Hazard Assessment) and WHMP directly to the CAA for evaluation and acceptance.

2.2 Applicability

This model Operating Procedure is applicable to the assessment of Ecological Study (Wildlife Hazard Assessment) and WHMP.

2.3 Regulatory System

- a. Civil Aviation Law [.....]
- b. [Caa Regulation]
- c. [Advisory Circular]
- d. [Inspector Handbook/ ...]
- e. [...]

2.4 Responsibilities

- a. The Ecological Study (Wildlife Hazard Assessment) may be evaluated by specialist (third party contract / competent inspectors).
- b. The WHMP shall be evaluated by the [xxxx] appointed by [xxxx].
- c. The Team Leader is responsible for conducting and reporting the evaluation process.
- d. The WHMP are approved by the [xxxxx].

2.5 Procedure

2.5.1 Introduction

It is required that aerodromes exposed to wildlife hazards analyse the level of risk posed by the existing hazards to enable a determination of the need for a WHMP. It is not anticipated that such a determination can always be reached before the commencement of initial operations at the aerodrome. Data collection on wildlife activity in the vicinity of the aerodrome and subsequent analysis may take some time after aerodrome operations begin before a meaningful conclusions can be drawn concerning the Wildlife Management Program to be implemented, where applicable. However it is anticipated that a procedure for monitoring bird activity and of recording and reporting bird strike be established and incorporated in the Aerodrome Manual before approval of the Manual by the CAA.

2.5.2 Application of Ecological Study

Aerodrome Operators are required to submit all the documents needed to demonstrate the level of risk posed by the existing hazards to enable a determination of the need for a WHMP.

The application should be accompanied by the following documentation at least

1. Hazard Analysis of the event which prompted the study.
2. Identification of the species, numbers, locations, local movements, and daily and seasonal occurrences of wildlife observed.
3. Identification and location of features on and near the airport that attract wildlife.
4. Description of the wildlife hazard to air carrier operations.
5. Form provided in Attachment 1, signed by the Accountable Manager and by the Safety Manager,
6. Any other document deemed useful by the aerodrome operator or requested by CAA.

2.5.3 Approval/Acceptance of Ecological Study

Step 1: Upon receipt of an application, the [assign Team] should conduct a preliminary check in order to establish if it is compliant with the relevant provisions of Regulation - and if all the documents have been submitted.

Step2: After the preliminary check, the [Team] should evaluate the content of the submitted application, in order to establish if the proposed study can be accepted, taking into account the potential impact of the wildlife hazard on aircraft operation

Step3: [DASS] (or equivalent directorate) should communicate in writing to the concerned Operator the - positive or negative - result of evaluation or the request for further explanations, within the applicable timeframe (ref. [Law...]).

Step 4: Once accepted [DASS] (or equivalent directorate) request from the concerned Operator to submitted the Wildlife Hazard Management Plan.

2.5.4 Approval of Wildlife Hazard Management Plan (WHMP)

Step 1: Upon receipt of an application, the [assigned Team] should conduct a preliminary check in order to establish if it is compliant with the relevant provisions of the National Civil Aviation Regulation.

Step 2:

- After the preliminary check, the [assigned Team] should evaluate the content of the submitted application, in order to establish if the proposed procedure and hazard mitigation can be accepted.
- The assessment can be obtained by using different methods, use form no. 1 (the aim is to demonstrate that the proposed solution ensures the safety of the aircraft operation). By ensuring the following:
 - 1) Its effectiveness in dealing with the wildlife hazard.
 - 2) Indications that the existence of the wildlife hazard, described in the ecological survey, should be re-evaluated.
 - 3) Procedures outlined in the Plan, such as inspections prior to air carrier operations, are carried out.
 - 4) The reporting system are clear and applicable related to size of the aerodrome and the traffic density
 - 5) Procedure to deal with the habitat modification projects or changes in land us identified in the Plan
 - 6) Procedures are established by the Aerodrome Operator for the conduct of a wild life risk assessment
 - 7) Implementation Plan (timeline) be prioritized and respect the mitigation measure

For the purposes of the assessment* - in addition to examining the submitted documents - [CAA] may require to conduct audits or inspections as well as to participate in demonstrations or tests carried out by the operator, as deemed appropriate.

**may use (form 1) and (Model Aerodrome Pre-Audit Assessment Form appendix D RASG-MID SAFETY ADVISORY – 05 (MID-Region Aerodromes Certification Toolkit)*

Step 7: The [assigned Team] should verify if the Aerodrome Operator has reported the related information in the appropriate sections of the Aerodrome Manual and has arranged with the AIS Provider for publishing the relevant data on the AIP (if it needs to demonstrate the hazard to air carrier).

2.6 Records

In order to comply with National Civil Aviation Regulation the [Team Leader] is responsible for ensuring that all the relevant documents relating to wildlife management plan (as listed in the preceding paragraphs) are properly maintained in the [Aerodrome File], providing for adequate storage, accessibility, traceability of data.

The above mentioned documents are maintained in the Aerodrome file for the lifespan of the Certificate.

2.7 Forms

Appendix A - Wildlife Hazard Management Assessment Checklist

CHAPTER 3

MODEL GUIDANCE FOR DEVELOPMENT OF WILDLIFE HAZARD MANAGEMENT PROGRAMS AT AIRPORTS

3.1 Introduction

The extent of a wildlife hazard at particular airport locations is widely variable. Many solutions are available but none are likely to be useful at any one airport, the most important action, upon which any risk management strategy must be founded, is knowing the nature of the hazard; this may vary by time of day and seasonally and must be related to the likely pattern of aircraft movements. For that Aerodrome Operators are required to establish all the documents needed to demonstrate the level of risk posed by the existing hazards of the wildlife hazard to enable them to establish the effective criteria for mitigate the hazard of the wildlife

3.1.1 Phase I: Wildlife Hazard Assessment /Ecological Study

Starting with a Wildlife Hazard Assessment Study is highly recommended which is starting with collecting data (information, records, etc...) (INPUTS), then analyses all these data to identify the hazard which will affect to aircraft operation.

Step 1: Data Collection

- 1- All the previous events and bird strikes records and statistics.
- 2- Analysis of the event which prompted the study.
- 3- All the records of damaging collisions with wildlife other than birds.
- 4- Observed wildlife species.
- 5- Observed wildlife numbers and sizes.
- 6- Observed wildlife locations and local movements.
- 7- Observed wildlife daily and seasonal occurrences.
- 8- Identification and location of wildlife attractants on and near the airport.

Note: An Airport Operator may use the form in Appendix B - Data Collection Template for Observed Wildlife to describe the observed wildlife related to the number, location and wildlife movement period - Otherwise an Airport Operator may establish maps including details about habitats, major topographical features, wildlife movements, etc. (Highlighting the wildlife that are pertinent to the objectives) / Maps over the course of several seasons so as to account for changes in wildlife and habitat. List in details the resources, habitats, and wildlife present on your land. Include details about size of species, movements of animals, seasonal change, etc...

Step 2: Data Analysis

Analysis all collected data of the wildlife hazard to air carrier operations.

Step 3-4: Document Preparation: The study describe in above paragraph should be introduced to CAA to determine whether or not there is a need for a Wildlife Hazard Management Plan (WHMP) taking into consideration some important parameters refer to (Chapter 2 in this manual)

3.1.2 Phase II: Establish Wildlife Hazard Management Plan (WHMP)

The goal of this Wildlife Hazard Management Plan (WHMP) is to promote aviation safety for passengers and flight crews by reducing wildlife hazards and associated risks to aircraft and airport operations caused by wildlife activities on and in the airport vicinity. A wildlife management plan is a document used by airport operator to outline and implement steps for preserving, altering, or exploiting wildlife on /off airport, a management plan usually contains maps, descriptive documents,

The WHMP should be established based on the ecological study (Wildlife Hazard Assessment) and should contain at least the following:

- 1- Foreword
 - 2- Glossary
 - 3- Definitions
 - 4- Objective
 - 5- Duties & Responsibilities
 - 6- Wildlife Hazard identification and Assessment
 - (a) All the previous events and bird strikes records and statistics.
 - i. The most significant wildlife hazard that induces events.
 - ii. The most potential time and date of events occurrences.
 - (b) All the records of damaging collisions with wildlife other than birds.
 - (c) Observed wildlife species.
 - i. Basic information about the wildlife at the airport region.
 - ii. The airport region relevant biodiversity.
 - iii. The most significant wildlife species behavior.
 - iv. The main reasons for such wildlife species existence or flying over.
 - v. Migratory flyway (If it is migratory bird species).
 - vi. Flyway altitude.
 - vii. Determination of the altitudes and geographical sites of interference between aircrafts pathway and the migratory birds' flyway.
 - (d) Observed wildlife numbers and sizes.
 - (e) Observed wildlife locations and local movements.
 - i. The most significant bird flocks gathering points and geographical distribution at the airport region (on or within the airport vicinity).
 - ii. The local movement of bird flocks determination.
 - (f) Observed wildlife daily and seasonal occurrences.
 - (g) Identification and location of wildlife attractants on/in the vicinity of aerodromes.
- | <u>On Airport</u> | <u>Airport Vicinity</u> |
|----------------------------------|---------------------------------|
| i. Solid waste transfer stations | i. Landfills |
| ii. Water treatment facilities | ii. Waste water oxidation ponds |
| iii. Maintenance hangers | iii. Forestry |
| iv. Landscapes | iv. Agricultural activities |
| v. Recycling stations | v. Landscapes |
| vi. Wetlands | vi. Golf courses |
| vii. Agricultural activities | |
| viii. Others | |
- 7- Description of the wildlife hazard to air carrier operations.
 - 8- Wildlife Control
 - (a) Monitoring
 - i. Daily Wildlife Management Log
 - ii. Monthly Summary
 - 9- Establishment of Performance Indicators and Self-Assessment
 - 10- Recording and Reporting Wildlife Strikes

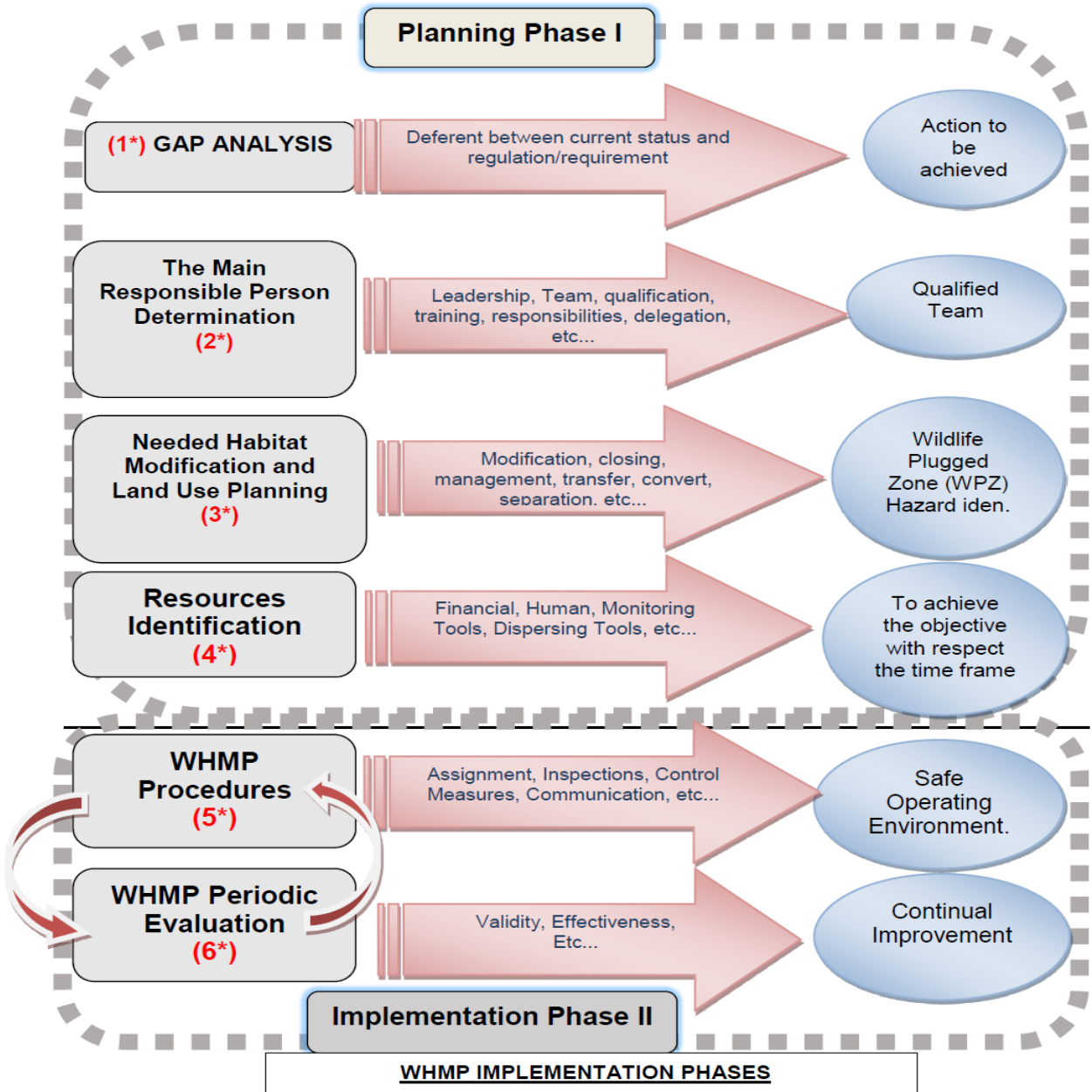
3.2 WHMP Implementation Phases

3.2.1 The purpose of this Section is to establish a criteria for implement the WHMP by the following components:

- 1- Phase I : Planning Phase

- (a) Conduct Gap Analyses
 - (b) Resource Allocation
 - (c) Responsibility Identification
 - (d) Hazard Identification
- 2- Phase II : implementation phase
- (a) WHMP Implementation Procedures
 - (b) Periodic Evaluating

Note: see Figure \ – WHMP implementation phases



Process #	Task Title	Process	Deliverable

<u>Phase I: Planning Phase</u>			
1*	Gap Analysis	Current situation vs objectives	Requirements needed to be fulfilled
2*	Resource Identification	Human, financial, tools, etc...	Allocated all needed resource for Suitable work environment
3*	Responsible Person Determination	Team assignment and training	Qualified team
4*	Habitat Modification	Management, closing, transfer, etc...	Passively created considerable safe operating environment
<u>Phase II: Implementation Phase</u>			
5*	WHMP Implementation Procedures	Inspection, wildlife dispersing, recording, analysis, etc...	Actively created considerable safe operating environment
6*	Periodic Evaluating	WHMP Validity and effectiveness verification	Verified and audited plan which includes continual improvement

Figure -1 WHMP implementation phases

3.2.2 Phase I: Planning Phase

Step 1*: Gap Analysis (Where Are You? And What Should You Be?)

A gap analysis is a method of assessing the differences in performance between a current situation (present state) and standard situation (the target state) to determine whether requirements are being met and, if not, what steps should be taken to ensure they are met successfully. Gap refers to the space between "where we are" (the present state) and "where we want to be".

The first step in conducting a gap analysis is to establish specific target objectives by looking at the strategic goals and improvement objectives which is stated in WHMP.

The next step is to analyze current state processes by collecting relevant data on performance levels and how resources are presently allocated to these processes. This data can be collected from a variety of sources depending on what's being analyzed, such as by looking at documentation and observing current activities. Lastly, after an airport compares its target goals against its current state, it can then draw up a comprehensive implementation plan to fulfill the gap between its current and future states, and reach its objectives level

Note:

C - Risk Analysis may be used to conduct gap analysis

Step 2*: Resources Allocation:

Airport Operator responsible for allocate the resources to implement the appropriate wildlife hazard management techniques these resource is define as:

Human Resources Identification: assign key person from the following department (the Wildlife Hazards Control Team) and other contributing airport personnel for implementing each phase of the plan

- a. Environmental Department
- b. Safety Department
- c. Operations Department
- d. Maintenance Department
- e. Security Department
- f. Air Traffic Control (ATC)
- g. Planning Department
- h. Financing Department
- i. Wildlife Controller (Coordinator): (To oversee the daily activities and analyze the collected data and carry out risk assessments in order to develop and implement the WHMP)

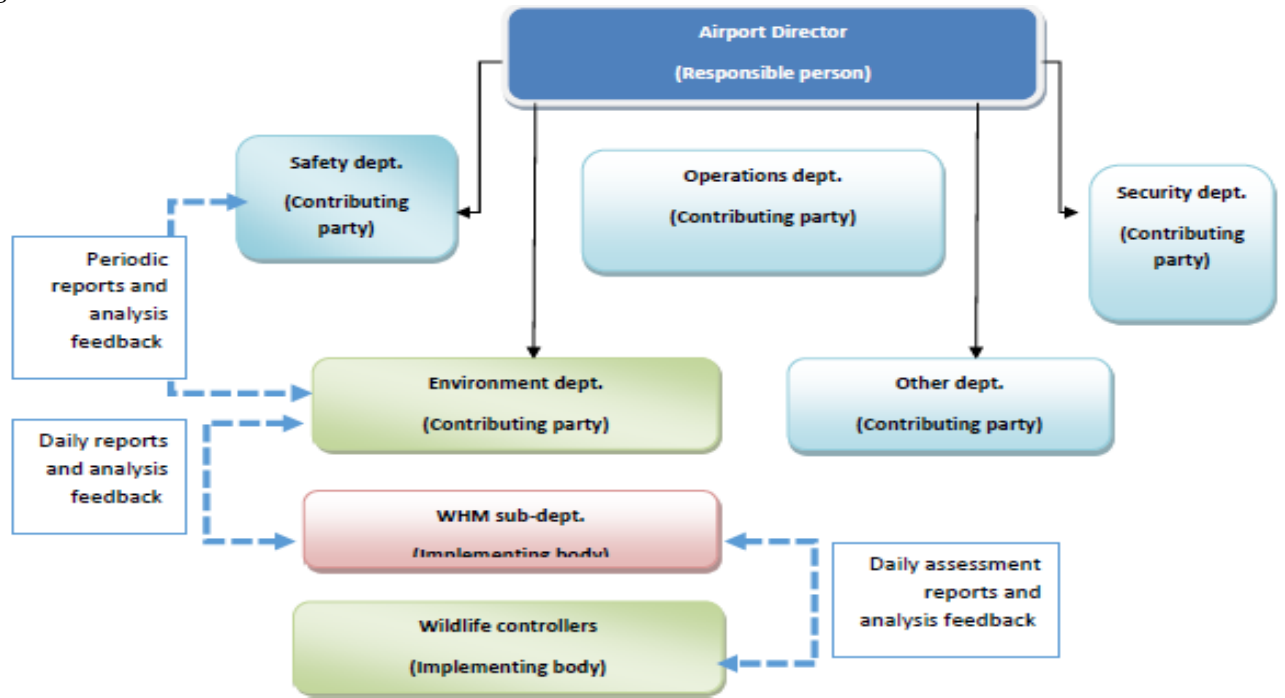
Financial Resources Identification: In coordinating with Planning and Financing Departments, the Airport Operator should determine the most appropriate wildlife monitoring and dispersing tools to be purchased and the training to be provided.

Step3*: Responsibility Determination:

- The Airport Operator's responsibilities should be borne by the senior manager role and this should be specified in the aerodrome Safety Management System (SMS). The Wildlife Control Coordinator is in charge of the implementation of the WHMP. The Wildlife Control Operators carry out the required tasks and field work. A Wildlife Committee will ensure that all stakeholders are engaged in the WHMP.
- The assignment of actual roles, titles and tasks will vary from airport to airport. At smaller airports the roles might be divided or merged to just 1 or 2 levels. Larger airports will require larger, possibly dedicated teams. Some tasks or roles may be contracted to an external company or organization.

Note: see Figure 2 – Organisation Chart ((this organization chart may be differ from one State to another).

Figure 2
Organisational Chart



Roles & Responsibilities of Wildlife Hazard Management (Coordinator) and Relevant Team (Front-Line Personnel (Wildlife Controllers)):

1. Monitoring birds local movements area on/in the airport vicinity using one of the monitoring tools from the highest point at airport (as much as possible) especially the airport movement area with the aim of quick intervention in case of presence of such wildlife hazards to prevent the likelihood of bird strikes or any other damaging collisions.
2. Daily inspections and patrolling of the airport movement area to verify wildlife hazard and/or wildlife hazard attractants absence.
3. Periodical inspection of the wildlife hazards attractants on/in the aerodrome vicinity.
4. Wildlife hazard management and control relevant records and checklist filling out and keeping.
5. Raising up weekly and monthly reports conveying the current situation of his activities, performance, and any other relevant duties.
6. Keeping in contact with quick reaction with the ATC department in case of any emergency notifications regarding wildlife existence.
7. Coordinate the activities of the WHMP with air traffic control (ATC) and other stakeholders and contributors (as mentioned in the following flowchart).
8. Bird/wildlife observations, control and reporting.
9. Review strike reports, monitor daily activity records and maintenance reports to determine the requirements for short- and long-term management plans, and this information should be passed to managers accountable for safety on a regular basis at least on monthly basis (Ref: ICAO Service manual part 3).
10. Regular coordinating with WHMP other contributing parties and informing them with their roles and responsibilities in WHMP implementation.

Note: Appendix E Key Roles And Responsibilities provides a guide for the key roles and responsibility, for further information can be found: ICAO Airport Service Manual, part 3, Wildlife Control and Reduction, 3.3 Role of the Airport Operator and 3.4 Role of Bird/Wildlife Strike Control Coordinator and ACI Wildlife Hazard Management Handbook Section 2

Step 4*: Needed for Habitat Modification and Land Use Planning:

Hazards attractants recognizing (description of wildlife habitats and resources): Habitat management is the heart of airport's Bird/Wildlife Hazard Management Program because it offers ecologically based, long-term measures for reducing the number of hazardous birds/wildlife at the airport. Before undertaking activities to manage the environment, it is important to first carry out an Ecological Survey (refer to item (3.1.2)) of the airport and surrounding area to identify sources of food, water and shelter attractive to wildlife on and in the vicinity of the airport.

Categorized the hazard as the following:

- **1st Landscape Category** which is the airport itself, where habitats and the wildlife using them will be described in detail. This will rely on site-specific field work and standard techniques for describing vegetation communities (e.g., Ecological Land Classification) and wildlife communities, their use patterns and seasonal variations that have been observed or that might be expected.
- **2nd Landscape Category** which is the nearby lands that are not under direct control of the airport. The physical area included in this category generally includes lands up to 8 km from the airport reference point, which should include an area of sufficient size to provide an adequate picture of wildlife movements through the airspace identified later in this document. This assessment is largely based on existing information and remotely sensed habitat analysis rather than site-specific field work. It will describe the location of moderately hazardous land use practices such as wastewater discharge plants and sewage lagoons, crop production, recreational sites and managed or created wildlife habitats. There is no requirement under the regulation to manage these lands however it is important to be aware of potentially hazardous off airport land uses.
- **3rd Landscape Category** which is the determination of the presence of extremely hazardous land use practices that may be many kilometers from the airport. At a minimum, food waste disposal sites, outdoor composting and commercial fish plants will be mapped when they occur within 15 km of the airport reference point. Such features may be mapped at greater distances where wildlife associated with them may become a hazard to aircraft using the airport.

3.2.3 Phase II: Implementation Phase

Step 5*: WHMP Operational Process:

The Wildlife Hazard Implementation Process should have formal mechanism to ensure that the Wildlife Hazard Management Plan (refer to item 3.1.2 in Establishment Phase) will be implemented effectively for that's the following procedures should be followed (Figure 3):

1st Administrative Mechanism

2nd Control Wildlife Mechanism including:

- a. Habitat (wildlife hazard attractants) management mechanism on/in the airport vicinity.
- b. Using most suitable and effective dispersing tools (removing hazardous wildlife).

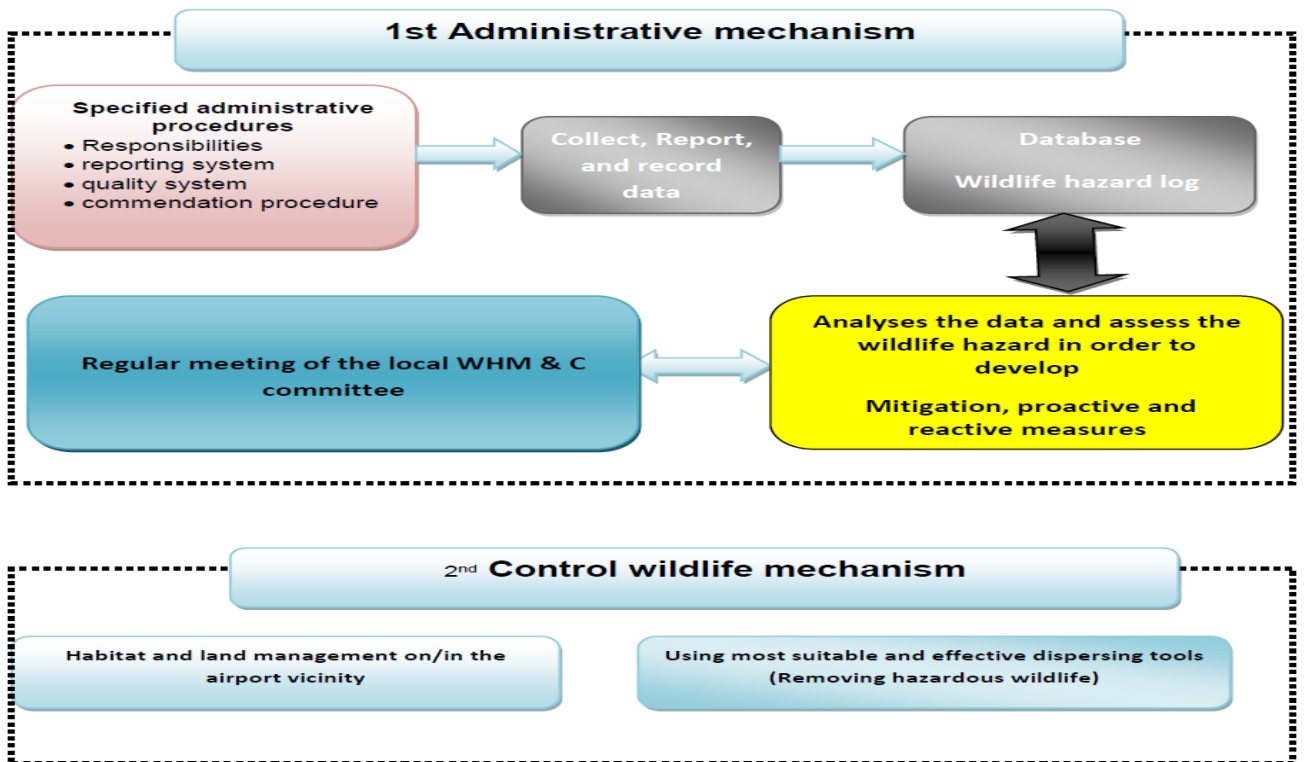


Figure 3

1st Administrative Mechanism

- For effective implementation the Airport Operator should have specified administrative procedures whether to activate the key person responsibilities, writing reports and quality system include documents control system
- Senior airport staff will be responsible for the implementation of this WHMP. This includes the acquisition of the various permits, the provision of training and awareness programs and the review and submission of the annual strike reports and two-year updates.
- Senior management, or their designate, will be responsible for coordinating, supervising and the overall management of the WHMP on a long-term and a daily basis at the site-specific level. This will include the nomination of the key Wildlife Management Officer, co-ordination of training, safety assurance and ensuring that the necessary equipment is available.
- **Appendix E - Key Roles & Responsibilities** provides the roles and responsibilities for all key person

Note: Further information can be found: ICAO Airport Service Manual, Part 3, Wildlife Control and Reduction, 3.3 Role of The Airport Operator and 3.4 Role Of Bird/ Wildlife Strike Control Coordinator and Wildlife Hazard Management Handbook Section 2

- Regular meeting of the Local Wildlife Hazard Management and Control Committee
- Wildlife Hazard Management on an airport often requires communication, cooperation, and coordination among various groups on the aerodrome. Establishment of the Airport Wildlife Committee is required to facilitate this communication, cooperation and

coordination. This committee might be included within the Safety Management Committee.

Members:

- a. Airport Operator.
- b. Bird/Wildlife Department Team.
- c. Maintenance Department Representative/s.
- d. Planning Department Representative/s.
- e. Financing Department Representative/s.
- f. Operations Department Representative/s.
- g. ATC Representative/s.
- h. Security Department Representative/s.
- i. Environment Department Representative/s.
- j. Agriculture Department Representative/s.
- k. Airport Using Airlines Representative/s.
- l. Local Runway Safety Team Representative

Roles and Responsibilities:

- a. Review strike data collected.
- b. Assess bird/wildlife risks.
- c. Summarize trends in order to evaluate and determine what effective and most suitable control measures should be implemented in order to manage the bird/wildlife hazards.

Committee Meeting Intervals:

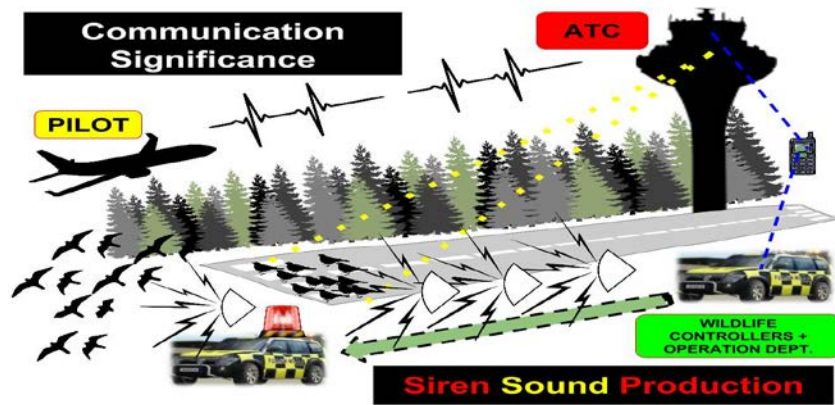
Based on the airport complexity and the level of bird/wildlife existence (recommended monthly).

- An integrated approach is needed to coordinate through the airport organizations. It is important to have effective communication between those involved in bird/wildlife dispersal and air traffic control. Upon receipt of notice of a specific wildlife threat, air traffic control should issue appropriate warnings to aircraft on and in the vicinity of the airport. (Aircraft operators also be part of such an integrated approach by implement their roles upon receipt of the warning of a specific threat.)

Note: Further information can be found: ICAO Airport Service Manual, Part 3, Wildlife Control and Reduction, Chapter 5.

Example of communication procedures should be stated in Wildlife Management Plan (see figure 4) :

1. Information will be provided directly from the wildlife observer on duty to Air Traffic Services (ATS) via radio contact.
2. Wildlife observer responsible for ensuring that updated wildlife information is provided to ATS immediately if an urgent situation arises and on a regular basis depending on the current conditions, or when requested by ATS.
3. ATS deployment any information received from aircraft operator concern wildlife observations to wildlife observer in a timely manner.
4. ATS will provide information to pilots on current wildlife hazards and will ask pilots to report any wildlife observations to ATS especially those observed while taxiing.



(Figure 4)

Further information can be found: ICAO Airport Service Manual, part 3, 3.4 Role of Bird/Wildlife Strike Control Committee- ACI Wildlife Hazard Management Handbook item 2.5

2nd: Wildlife Control Mechanism (*Operational Mechanism*)

Habitat (Wildlife Hazard Attractants) Management Mechanism on/in the Airport Vicinity

- The airport's WHMP should provide details on the actions and procedures necessary to manage both habitat and wildlife given the specific local conditions and considerations. Actions to deal with wildlife on a daily basis starts with patrols and inspections, observation of wildlife and other conditions, making interventions and assessing the response to interventions. It is also crucial to record all actions and observations in order to be able to review the effectiveness of the WHMP and development improvements.
- After working hazard identification and analysis (item 3-1-1) airport operator should have mechanisms to control of wildlife attractants through the following:
 - a. Avoid establishment such kind of wildlife attractants anymore in the airport new projects or expanding.
 - b. Reduce the wildlife attractants from its original source as much as possible.
 - c. Destroying the food chain of such wildlife species at airports by using a series of insecticides, herbicides and rodenticides applications.
 - d. Management of airport's airside ground cover as appropriate with its relevant wildlife species and its behaviors.
 - e. Choosing the optimum way of habitat modification based on the existing and expected wildlife.
 - f. Definitely short grass cover is more convenient for visual and physical access of wildlife control team.
 - g. Eliminate all standing water on an airport to the greatest extent possible.
 - h. Modify waste water oxidation ponds whether by monitoring and dispersing birds regularly to form a wildlife plugged zone (WPZ) or covering it using nets or any other relevant suitable techniques (exclusions techniques).
 - i. Proper fencing installation.
 - j. Others.

Using Most Suitable and Effective Dispersing Tools

- Repellent and harassment techniques should be used to keep hazardous wildlife away from specific areas on or near an airport. The long-term cost-effectiveness of repelling hazardous wildlife does not compare favourably with habitat modification or exclusion techniques. Wildlife will return as long as the attractant is accessible. However, habitat modification and exclusion techniques will never rid an airport of all hazardous wildlife. Repellent techniques are a key ingredient of any wildlife hazard management plan.
- Repellents work by affecting the animal's senses through chemical, auditory or visual means. Habituation or acclimation of birds and mammals to most mechanical repellent techniques is a major problem. When used repeatedly, without added reinforcement, wildlife soon learn that the repellents or techniques are harmless and the repellents or techniques are ignored.

When Using Repellents, Four Critical Factors should be Remembered:

1. there is no single solution to all problems;
 2. there is no standard protocol or set of procedures that is best for all situations. Repelling wildlife is an art and a science. Motivated, trained and suitably equipped personnel who understand the wildlife on the airport are critical for the successful use of repellents;
 3. each wildlife species is unique and will often respond differently to various repellent techniques. Even within a group of closely related species, such as gulls, the various species will often respond differently to various repellent techniques; and
 4. to lessen habituation to repellent techniques:
 - use each technique sparingly and appropriately when the target wildlife is present;
 - use various repellent techniques in an integrated fashion; and
 - Reinforce repellents with occasional lethal control (only when necessary depredation permits are in place) directed at abundant problem species.
- Advances in electronics, remote sensing and computers have resulted in "intelligent" systems that can automatically dispense repellents (for example, noisemakers, chemical sprays) when targeted wildlife enter selected areas. These devices are used to reduce habituation and increase the effectiveness of other repellent techniques. It should be remembered that automated repellents are not a substitute for trained people on the ground, who can respond appropriately to incursions by various wildlife species, and should be considered only when more traditional methods of control and dispersal have proved ineffective.

Note: for further information can be found: ICAO Airport Service Manual, Part 3, and chapter 8 Wildlife Control and Reduction and ACI Wildlife Hazard Handbook section 4

3.3 WHMP Periodic Evaluation

3.3.1 Purpose:

Aerodromes should have a process to review and evaluate the wildlife management plan to provide safety assurance that the plan 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 are always current and fully functional at all times.

Procedures to monitor and evaluate the effectiveness of bird or wildlife control strategies might include:

- Airport’s WHMP include wildlife control performance monitoring, measurement and improvement systems;
- Personnel training, competence assessment and appraisal.

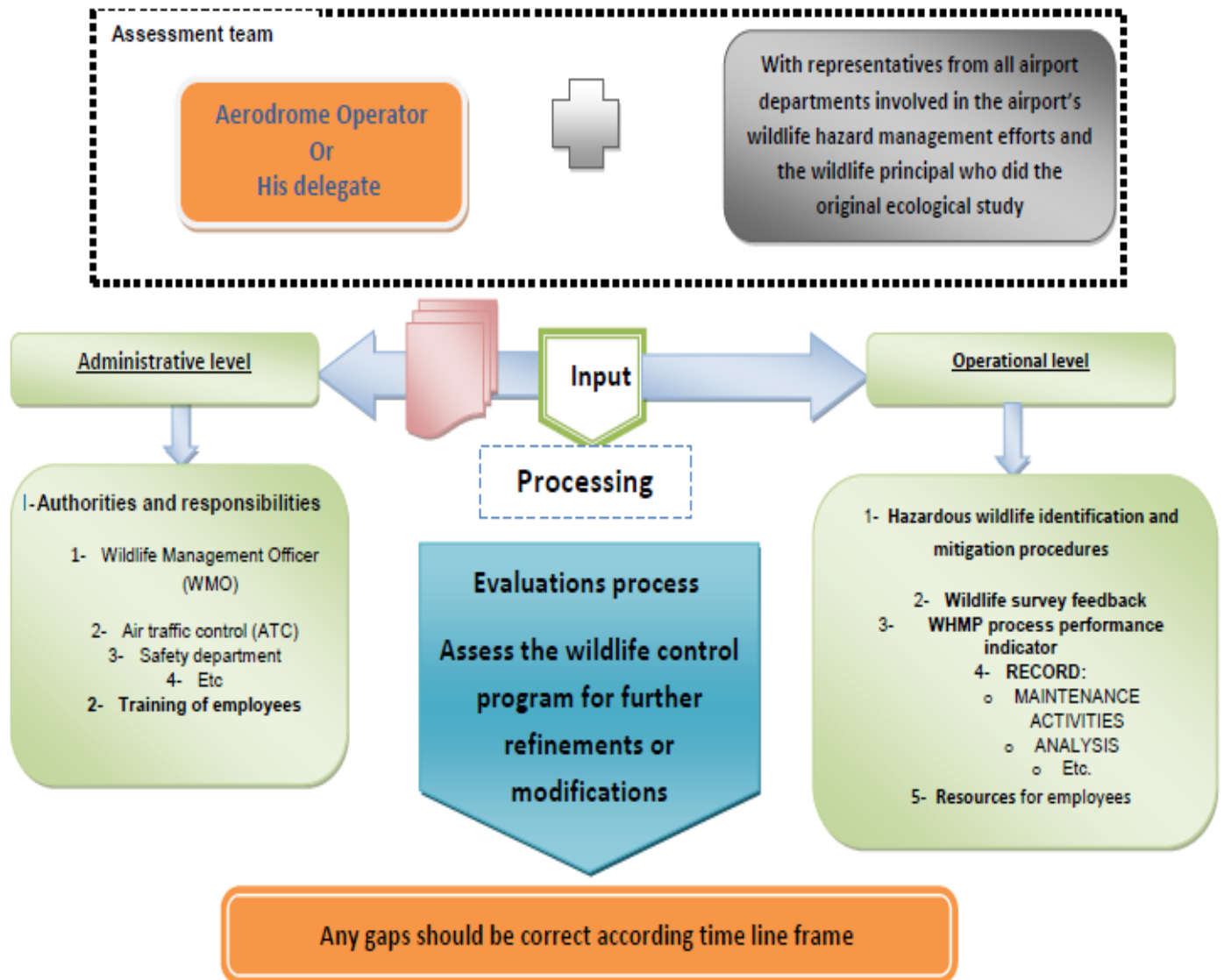


Figure 5 -Evaluation Process

3.3 Evaluation of the Airports Wildlife Hazard Management Program:

3.3.1 Administrative Level

- Evaluation the Authorities** and responsibilities: to ensure that all roles clearly defined and understood by all and the aerodrome personnel understand their roles and responsibilities

- ii. **Evaluation the Training** of employees: to ensure the computability with the training program

Note: For further information about the training program can be found in the ICAO Airport Service Manual, Part 3, Chapter 4 Wildlife Control and Reduction and ACI Wildlife Hazard Handbook Section 5

3.3.2 **Operational Level:** Assessment should include at least the following:

- i. **Evaluation The Hazardous Wildlife Identification and Mitigation Procedures:** include assessment the records of any habitat modifications and adjacent land use management which will consequently affect the presence of wildlife (time, locations, dates, migratory flyways, numbers, etc...)
- ii. **Wildlife Survey Feedback:** is a valuable tool for aerodromes to ensure their wildlife management and habitat plans are effective, meet all regulations and standards required (ATC, Airlines andetc).
- iii. **Evaluation the WHMP Process Performance Indicator*:** Performance indicators is critical to determine the need for enhancement or modification. It is also very necessary because actions to reduce one wildlife hazard will inevitably result in improved conditions for some other wildlife species.
 - a- The number of wildlife strikes;
 - b- Strike rate;
 - c- Damage associated with strikes;
 - d- Individual species' hazard assessments;
 - e- Risk rankings for airport; and
 - f- The status of action items that have been recommended in the plan.

**Taken together, these seven measurements will form an effective and objective measurement of performance of the WHMP for airport. The hazard and risk assessment will be updated and compared to the previous assessments in the WHMP every two years (or earlier if there is a significant change in hazards or risk). A discussion of any changes will be provided. Feedback from airport users will be sought and reported in time for each two-year update this will help determine if the wildlife program is being responsive to their needs.*

3.3.3 **Evaluation of the Keeping Records:**

- a) **Records of wildlife activity**, wildlife strikes, and wildlife management actions
- b) **Maintenance activities** and any other corrective and preventative actions: keep records of any corrective and preventative actions serving wildlife hazard management and control concept, such actions might be installing or repairing fencing, thinning trees, clearing construction debris, applying pesticides or repellents, conducting grass-height management, installing netting in hangers or wires over ponds or oxidation tanks, and regarding pavement or grass areas to eliminate standing water.

- c) **Recorded Information Analysis:** the information recorded will be most useful if it is summarized into monthly and annual statistics. The use of computerized database systems customized to provide summaries of wildlife control activities is recommended.

Note: Furthermore, without accurate records and proper evaluation, it might be difficult to justify and defend certain management actions such as wildlife removal.

- d) **Evaluation of Resources for Employees:** Periodic analyses of daily wildlife reports, will reveal:

- The effectiveness of applied control techniques for various wildlife species;
- The effectiveness of different dispersal techniques at different times of the day and under different weather conditions; and
- The amount of time wildlife remain dispersed.

Note: see figure 5 -Evaluation Process

**APPENDIX A
WILDLIFE HAZARD MANAGEMENT ASSESSMENT CHECKLIST**

Name of Aerodrome:		Inspection Date:				
Name of Operator:		Inspector(s) Name (s):				
Regulation						
	Item	Reg Ref	Yes	No	N/A	Remark
1.	Has Bird/Wildlife Control Officer(s) at the site been appointed and responsibilities assigned?					
2.	Has a training programme been developed to train those involved in Bird/Wildlife Control Programme?					
3.	Have the control officer(s) being trained accordingly?					
4.	Has the Bird/Wildlife Control Co-Coordinating Committee been established with well-defined responsibilities?					
5.	Has a Bird/Wildlife Control Programme (Management Plan) been developed?					
6.	Is level of implementation of measures in control programme (including those below) satisfactory?					
7.	Does the Aerodrome Operator maintain an observation log? Does the content of the log give an indication of the actual status during inspection					
8.	Does the aerodrome operator on a regular basis remove the attraction to birds particularly water, food, nesting sites and resting places?					
9.	Does the operator maintain a wildlife/bird dispersal log? Does the content of the log give an indication of the actual status during inspection?					
10.	Does the Aerodrome Operator regulate the creation of refuse dumps that would attract birds in the vicinity of the aerodrome where the safety of aircraft operations is endangered?					
11.	Has a reporting procedure been documented covering all aspects of the Bird/Wildlife Control Programme?					
12.	Does the Aerodrome Operator keep records of timely reports on bird strike incidents or accidents occurring at the aerodrome?					
13.	Does the Aerodrome Operator submit reports to the CAA for onward submission to ICAO on a regular basis, bird strike reports to facilitate effective use of the IBIS programme in accordance with eac139-20?					
14.	Does the operator make available information on the presence of birds and associated hazards to ATC for advising arriving and departing aircrafts?					
15.	Does the Aerodrome Operator take active part in workshops on bird hazard control and reduction organized by ICAO and other relevant bodies for exchange of views and experiences conclusion?					
16.	Has a list of all bird/wildlife attractants at the aerodrome been completed?					
17.	Has a list of all birds/wildlife surrounding the aerodrome been completed?					
18.	Has a Land Use Plan been established with regard to effective land use on and off the aerodrome as it pertains to the bird/wildlife control programme?					
Inspector's Remarks:						
Recommendation:						
Name Of Inspector: _____ Sign: _____ Date: _____						

APPENDIX B
DATA COLLECTION TEMPLATE FOR OBSERVED WILDLIFE

Wildlife Description	Location and Round Figure of No.				Movement period Season/ month
	1 st point	2 nd point	3 rd point	4 th point	
<i>White Stork</i>					August
<i>Prey</i>					May- Jun- July
<i>Water Birds</i>					From September
<i>Others</i>					all over the year

APPENDIX C RISK ANALYSIS

Table Appendix C-1: Probability

Qualitative Definition	Meaning	Value
Frequent	Likely to occur many times (has occurred frequently)	3
Occasional	Likely to occur sometimes (has occurred infrequently)	2
Remote	Unlikely, but possible to occur (has occurred rarely)	1

Table Appendix C-2: Severity

Qualitative Definition	Meaning	Value
Major Damage	Aircraft may incur damage or structural failure that adversely affect the structure strength, performance, or flight characteristics and that would normally require major repair or replacement of the affected component, or make it inadvisable to restore aircraft to airworthy condition.	C
Damage	Aircraft may incur at least some damage (destroyed, substantial, minor, or unknown) from strike	B
Effect on Flight	Aborted takeoff, engine shutdown, precautionary landing, or other	A

Table Appendix C-3 Probability /Severity

Probability	Severity		
	Major Damage C	Damage B	Effect on Flight A
Frequent 3	3C	3B	3A
Occasional 2	2C	2B	2A
Remote 1	1C	1B	1A

APPENDIX D
GAP ANALYSIS FOR WILDLIFE HAZARD MANAGEMENT PROGRAMME
IMPLEMENTATION

Priority Level	Target state	Current State	Reg. Ref.	Remarks
High	Ecological study	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Events and Strikes records	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Other wildlife damaging collision records	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Wildlife species identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Wildlife species numbers and sizes	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Wildlife locations on/in aerodrome vicinity	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Daily and seasonal occurrence records	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Recognizing wildlife attractants	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Most significant wildlife species identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Most potential date and time of event occurrence identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Migratory birds flyways identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Flyway altitude identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Migratory birds flyway interference with aircraft pathway mapping	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Most important wildlife gathering points identification and mapping	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Responsible person determination	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Wildlife controllers determination	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Wildlife controllers qualifications and training requirements identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Providing the needed training for both wildlife controller and other airport personnel	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Wildlife attractants modifications procedures identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Individual roles and responsibilities assignment	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Resources identification	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Suitable wildlife control strategies determination	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
High	Suitable wildlife control measures (Monitoring and Dispersing tools) determination	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Daily inspection checklist preparation	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Weekly inspection checklist preparation	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Monthly inspection checklist preparation	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Actions taken records	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Wildlife hazard management and control internal committee records	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		

Priority Level	Target state	Current State	Reg. Ref.	Remarks
Medium	Wildlife hazard management and control internal committee recommendations and enforcement follow-up sheets	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Wildlife hazard management and control national committee records	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	Wildlife hazard management and control national committee recommendations and enforcement follow-up sheets	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	WHMP implementation evaluation forms	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		
Medium	WHMP evaluation forms for its effectiveness	<input type="radio"/> yes <input type="radio"/> partial <input type="radio"/> no		

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**APPENDIX E
KEY ROLES AND RESPONSIBILITIES**

Title	Key WHMP Responsibilities
Airport Manager	<ul style="list-style-type: none"> • Implementation of this WHMP; • Acquisition of the various permits; • Provision of training and awareness programs; • Review and submission of the annual strike reports and two year updates.
Assistant Manager	<ul style="list-style-type: none"> • Coordinating, supervising and the overall management of the WHMP; • Nomination of the key Wildlife Management Officer (WMO); • Co-ordination of training, safety assurance; • Ensuring that the necessary equipment is available.
Wildlife Management Officer (WMO)	<ul style="list-style-type: none"> • Maintenance of the Wildlife Management Log (e.g., including strike data, details on wildlife numbers and activity; • WHMP measures undertaken, firearm use details; • details on the use of lethal reinforcement and monthly summaries); • Co-ordination of the monitoring program; • Preparation of the annual strike report; • Ensuring that Airport operations are consistent with the requirements of the WHMP; • Ensuring that the appropriate permits are current and present on-site; • Undertaking deterrent activities; • Ensuring all activities are undertaken following standard practices and safety protocols; and • identification of equipment, resource and training needs.
Back-up to WMO	<ul style="list-style-type: none"> • Filling in for WMO during vacations, lunch, sick time etc.
Air traffic Control (ATC)	<ul style="list-style-type: none"> • Informing wildlife hazards controllers, environmental dept. and operations dept. in case of observing any of these birds and/or wildlife gathering on/in airport vicinity or when receiving any relevant notification from pilot. • Warning pilots in case of wildlife observations (risky operating environment) and hazards expectation. • Report any unsafe conditions including hazardous wildlife on or in airport vicinity to the appropriate airport personnel anytime they are observed. • Actively attend the local wildlife hazard control committee meetings and any other relevant meetings.
Safety Department	<ul style="list-style-type: none"> • Receiving all wildlife strikes and events with the aim of risk assessment formation to ease the future forecasting based on accurate database and risk assessment strategy. • Actively attend the local wildlife hazard control committee meetings and any other relevant meetings

Title	Key WHMP Responsibilities
Maintenance Department	<ul style="list-style-type: none"> • Periodical inspection of the wildlife attractants (such as ponds, transfer stations and water treatment facilities) or airport infrastructure (such as fence) which ease the wildlife invasion. • Corrective maintenance actions and preventative maintenance actions to be taken for wildlife hazards management and control verification.
Environmental Department	<ul style="list-style-type: none"> • Receiving wildlife strike reports from the wildlife hazard coordinator or wildlife hazards controllers. • Wildlife existence notification receiving from ATC and then verification of wildlife hazards controllers moving to the place of wildlife existence. • Database formation including wildlife species, numbers, sizes, date and time of existence, local movements, behaviours, the most suitable way of dispersing, etc... • Wildlife hazards management plan evaluating for effectiveness and verification of its compliance with the original wildlife hazard assessment (Ecological study). • Preparing under direct supervision of aerodrome operator for the local wildlife hazards control and management committee and other relevant meetings. • Follow-up decisions and recommendations taken by the mentioned above committee.
Other governmental municipalities (such as agriculture offices/corporations, solid waste and sewage disposal offices / corporations, state national environmental offices, natural reserves corporations, defense, representatives of the major airlines using airport, even the private sectors located in airport vicinity and others)	<ul style="list-style-type: none"> • Advance cooperation and coordination with airport management regarding land use planning for those located in airport vicinity. • Exchange information on research and development in airport wildlife control. • Providing and updating much relevant information for those in the aviation community.

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