INTERNATIONAL CIVIL AVIATION ORGANIZATION

**ASIA PACIFIC GUIDANCE FOR EVALUATION OF
AERODROME WILDLIFE HAZARD MANAGEMENT PROGRAMM**

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RECORD OF AMENDMENTS

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

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1. INTRODUCTION

1.1 Wildlife populations in and around the vicinity of aerodromes are constantly changing in response to land use, national and local management policies, and environmental factors such as climate changes. In addition, wildlife might adapt or habituate to control strategies that were once effective, adopting new behavioural patterns of feeding, resting and nesting on or near the aerodrome. New wildlife control technologies might become available, or established products or techniques might be withdrawn or banned. Finally, there might be changes to wildlife control and management personnel at an aerodrome.

1.2 Once a Wildlife Hazard Management Programme (WHMP) is in place, aerodromes should develop a process for ongoing review of the WHMP to provide safety assurance that the programme is fully effective and correctly implemented. An evaluation should be completed on an annual basis but also must include an on-going review process to ensure that the programme is always current and fully functional at all times. If there is an external agency being used for the evaluation of WHMP The outsourcing evaluation should consider the general workings of the programme with a view to efficiency and effectiveness and follow respective country legislation on management of wildlife habitat and species.

2. EVALUATION PROCESS

2.1 Periodic evaluations of an aerodrome's WHMP including the activities undertaken for its implementation are critical because of the dynamic nature of wildlife hazards and control technologies. The foundation for these evaluations is the maintenance of consistent records of wildlife control activities and the submission of accurate and timely wildlife strikes and wildlife-related incident reports.

2.2 The following should be considered in the evaluation of an aerodrome WHMP:

1) Comprehensive periodic evaluation should be prepared and compiled by an appropriately qualified wildlife control team/or outsourced agency who has full knowledge of the programme and the standards required for effective delivery. This report would nominally be prepared annually. The completed report along with all conclusion and recommendations should be considered by the aerodrome wildlife committee and the senior management responsible for delivery of the programme.

2) The wildlife manager (or appropriate professional) tasked with performing the annual evaluation should seek feedback from staff on general effectiveness and observations on all aspects of the programme during evaluation. The evaluation seeks areas for improvement. Staff are often best positioned to provide valuable feedback on the plans. Feedback should be sought from WHMP team and staff, Runway Safety Team of the Aerodrome, Airline personnel (in particular aircraft engineers and pilots), Pilot Association(s), Air traffic control, Ground handlers and other parties as required.

3) A wildlife survey is a valuable tool for aerodromes to ensure that WHMP are effective, meets all national and international regulations and standards requirements including environmental protection. The survey should ideally be completed formally on an annual basis by a qualified independent professional/organisation. Evaluation of all operational, practical, procedural and technical aspects of wildlife management will form part of this survey.

4) It is extremely important that accurate statistics are gathered and interpreted by a competent person (who understands WHM) to ensure that aerodromes can have effective control measures in a timely fashion. Reference should be made to previous

statistical activity and strike data over the last five years and recommendations and action points raised accordingly. In case there is no 5 years available data, any available data can be used. Particular attention should be placed on the quality and accuracy of aerodrome wildlife species activities, incidents and strikes statistics and how these statistics are interpreted so that trends are measured, and mitigation measures immediately put into place.

5) A comprehensive review of all control procedures and practices should be undertaken to ensure that effective control measures are in place and are correctly followed and documented. The Wildlife survey should include seasonal migration.

6) A full equipment audit shall be undertaken annually or biannually to establish serviceability and effectiveness to support wildlife management and also consideration of new technologies or equipment.

7) A systematic review of rotational control procedures and the perceived effectiveness of the process should be done. Particular attention shall be paid to emerging/existing species of concern to identify the most important risk and prepare proper control measures to reduce the risk.

8) Where possible, aerodromes should have a dedicated Wildlife Control Team, internal or outsourced organisation, that will ensure advances in the field of wildlife management and habitat management; whether that is scientific, procedural or proven improved control techniques, are reflected in the aerodrome's WHMP of aerodrome also to be reviewed.

9) Wildlife activity monitoring on and in the aerodrome and 13 km range can contribute greatly to ensuring that control measures are effective. As a part of the aerodrome's safety management system (SMS) the WHMP should include interfaces with the SMS including, but not exclusively, a commitment in part to educate people. A plan for sharing information with other local aerodromes is a useful process of mutual benefit where control measures are compared and evaluated.

10) Maintain a record of, and annually summarise, all training that WHMP team have received. Include attendance at conferences, course, workshops, self-study courses, and specialized on the-job training.

11) An evaluation of all reports and records to ensure these meet appropriate standards as accurate information that can be understood and that will be of value in the evaluation process must be provided.

12) A full check of all WHMP documentation, paying particular attention to following:

    i. Recording of wildlife activities like, feeding, resting patterns, and analysis of this information;
    ii. Identification of wildlife species of concern;
    iii. Nuisance species reports, pest wildlife;
    iv. Protected species, endangered species register;
    v. Was displacement measures used? What precise methodology and how effective this was/wasn't?
    vi. Monthly alert reports;
    vii. Wildlife Control Unit's survey records - analysis;
    viii. Identify and record aerodrome wildlife hot spots (on/off aerodrome) and potential high risk or near miss records; must require further analysis to remove the high risk.

ix.	Analysis of wildlife dispersal technique records;
x.	Analysis of reported wildlife strikes and incidents (over last 5 years) reports;
xi.	Analysis of unconfirmed wildlife strike e.g. carcases found;
xii.	Analysis of the quality of all records in particular daily logs to ensure best practice is established and this information can be reported back into the plan in a timely fashion.

3. WHMP Evaluation Checklists

Note:- The following checklists are developed based on guidance provided in Section 9.2 Wildlife Hazard Management Programme Evaluation provided in Airport Services Manual (Doc 9137), Part 3 – Wildlife Hazard Management.

3.1 An evaluation of a WHMP should seek to determine the effectiveness and future outcomes of the WHMP, not simply a compliance 'tick the box. This said, the most basic level of WHMP evaluation should be to respond affirmatively or negatively to the questions contained in **Table 1**. If the answers to the questions below are negative or unclear, measures should be established to address these negatives to mitigate the identified risks.

Table 1: Basic checklist for evaluation of WHMP

S. No	Description	Response (Yes/No/NA)	If No/N/A Why	Comments
1	Are wildlife management roles, tasks and responsibilities adequately established at the aerodrome?			
2.	Is the "wildlife manager or coordinator" considered in the WHMP?			
3	Is there a reporting process in place to alert the different stakeholders about the presence of strikes with wildlife?			
4	Are the wildlife management personnel aware of the species that pose a risk to air traffic and about attractive areas for wildlife at the aerodrome and in its vicinity?			
5	Are wildlife observations and strikes recorded and reported in the correct format?			
6	Does the WHMP include an appropriate wildlife risk assessment conducted by competent personnel?			
7	Are habitat management measures and measures of dispersion and extraction of wildlife undertaken at the aerodrome?			
8	How Is the effectiveness of these measures measured?			
9	Is there regular WHM meetings with external stakeholders?			
10	Is the local wildlife committee effective?			
11	Is there support from local councils and external stakeholders towards WHM?			
12	Is training on wildlife management given to personnel involved in wildlife management duties (at all different levels)?			
13	Is there regular review of evaluation of the WHMP being performed?			

3.2   Once the base for WHMP is established, complexity can be increased by asking more specific questions as per **Table 2** to determine the degree of compliance.

Table 2: Advance checklist for evaluation of WHMP

S. No	Description	If No/NA why?	Comments
1	Has a land use plan been established with regard to effective land use on and off the aerodrome, as it pertains to the WHMP?		
2	What ecological measures are implemented to reduce wildlife attractiveness on and off the aerodrome		
3	Are there illegal garbage dumps been identified around the aerodrome?		
4	If yes, within what distance are they?		
5	What mitigation steps have been taken to reduce risk of attracting wildlife to the garbage dumps?		
6	Is the aerodrome perimeter fencing suitable to prevent hazardous wildlife incursions?		
7	Which repellent methods are implemented at the aerodrome?		
8	Have any repellent methods which work on certain species been identified?		
9	Are aerodrome personnel employed and trained specifically to control and disperse wildlife at the aerodrome?		
10	What is the wildlife strike rate at the aerodrome over the last five years (with or without damage to the aircraft)?		
11	Is there a procedure to regularly collect information about wildlife on, and in the vicinity of, the aerodrome, both dead and living?		
12	Has a procedure for the positive identification of wildlife remains been established?		
13	How many reports from pilots were related to intrusions of wildlife, other than birds, over the last five years?		
14	Do the pilot reported strikes match the reported strikes at your aerodrome?		
15	Has a list of wildlife attractants at, and in the vicinity of, the aerodrome been identified?		
16	What mitigation steps have been taken to reduce risk of wildlife towards the attractants?		

4.   Performance Measurement of WHMP

4.1   The most rigorous and systematic method to know how well wildlife is being managed at the aerodrome would be to use a performance measurement mechanism. Performance indicators (parameters used for monitoring and assessing performance) are select metrics that are most closely aligned with the ultimate goal of reducing wildlife risks, and will help to assess if the wildlife hazard is adequately managed by the aerodrome operator.

4.2   Performance indicators should be metrics obtained and measured in a simple way, and which are clear about what they measure. They can be primary (lagging) or secondary (leading) indicators.

4.3   Lagging indicators are typically reactionary oriented, easy to measure but hard to improve or influence (e.g. number of wildlife strikes), while leading indicators are typically proactive oriented, hard to measure and easy to influence (e.g. number of repellent activities).

4.4   Although there has generally been a tendency to use lagging indicators (number of wildlife strikes related to aircraft movements, percentage of strikes resulting in damage or effect on flight, etc.) as measures of the effectiveness of a WHMP, leading indicators are good indicators. Leading indicators show how personnel are performing their tasks and how the system is prepared to prevent the worst events (incidents and accidents) from happening, through good safety practices, correct use of procedures, etc.

4.5   Performance measurement matrix indicators and targets for different components of the WHMP that may be considered by aerodrome operators is provided in **Table 3**.

Table 3: Performance Measurement Matrix

S. No	Performance Measurement	Performance Indicators	Performance Target
1.	WHM Programme	Review at least once a year and revise based on the learnings from wildlife management	● Status and reporting of wildlife strike and activity. ● Update on wildlife/bird movement and wildlife/bird strike data half yearly ● Adopt probability to forecast strikes by analysis based on previous strike history, activity reporting and number of flights.
2.	Habitat Management	Review at least once a year based on the wildlife and environment.	● Review status and reporting of habitat measures must be as required and at least annually
3.	Airport Environment Management Committee meeting	Minimum two AEMC (Airport Environment Management Committee) stakeholders comprising of CAA, ATC, WCT, Council/local country Municipality meetings in a year	● Prepare planned actions from the meeting outcomes ● Monthly follow up to be recorded based on the planned actions

S. No	Performance Measurement	Performance Indicators	Performance Target
4.	Airport Wildlife Assessment Survey	Aerodrome wildlife assessment survey to be conducted every 2 years	Survey reports to be shared with stakeholders including proposed resolution and adoption plans
5.	Public Awareness Program	1. On Airport 2. Off Airport	Meeting minutes and records to be maintained and published.
6.	Equipment for control of wildlife activities	Maintain check lists of equipment/pyrotechnics	Serviceability records of individual equipment is to be maintained. Inventory control of usage of pyrotechnics, understand which pyrotechnics work for which species.
7.	Competency of staff	Ensure staff are adequately resourced with proper wildlife hazard management training and experience.	Records of recruitment to be maintained.
8.	Training	Specialised and refresher courses must be conducted by ICAO recognised authority.	● Minimum 2/3 training/workshops to WHM team (local) in a year ● Records to be maintained and updated. ● Ensure staff are well versed in new techniques and share knowledge.
9.	Wildlife Strikes (ground)	Number of reported wildlife strikes at airports per 10,000 aircraft movements	Reduce the number of wildlife strikes - need to determine the reduction by number or percentage
10.	Wildlife runway incursion	Number of runway incursions by animal at airport per 10,000 aircraft movements	Reduce the number of incursions by wildlife – need to determine the number or percentage
11.	Wildlife Documentation Audit	Annual audit to be conducted by relevant wildlife management authorities recognised by ICAO.	Consolidated report/ record to be available to Safety department and Wildlife Hazard management team
12.	Annual report	Annual report to contain all WHM related data and analysis	Sharing of report with airport stakeholders
13.	Adoption of technology for wildlife hazard management	Manual paper forms will not be accepted. Ensure new technology like wildlife reporting application tools are adopted to save time and reduce manual and excel analysis, adopt automated reporting tools which are more cost effective	Adopt a simple smart WHM tool.
14.	Wildlife strike Incident Reporting	Report to airlines regarding wildlife control measures engaged by the aerodrome after wildlife strike incident	Maintain data recording of the presence of wildlife and action taken

5.   REFERENCES

1)   Airport Services Manual (Doc 9137), Part 3 - Wildlife Hazard Management

2)   World Birdstrike Association Recommended Practices No. 1 Standards for Aerodrome