ATTACHMENT 4

BUSSELTON-MARGARET RIVER AIRPORT

WILDLIFE MANAGEMENT PLAN

Version 1

November 2016

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1 BACKGROUND

FUNCTION

The function of this Wildlife Management Plan (WMP), is to define the risk that wildlife pose to air traffic at Busselton-Margaret River Airport (BMRA), and to set objectives, performance indicators and procedures in place for the systematic management of that risk. It aims to support the requirements of Appendix 1 to *Civil Aviation Safety Regulations 1998* (CASR 1998), subparagraph 139.095(a) (ii) in relation to the content of the Aerodrome Manual. It also aims to support the requirements of Manual of Standards (MOS) Part 139, Section 10.14 in relation to the preparation of a WMP. This Plan has been designed to be incorporated as part of the BMRA Safety Management System.

POLICY

Busselton-Margaret River Airport (BMRA) is committed to ensuring the safety of aircraft using BMRA. While the safety of aircraft at BMRA is paramount, it is not possible to prevent all wildlife strikes. The WMP aims to reduce the frequency and severity of strikes by focusing management efforts on species and habitats that constitute significant hazards to aircraft that operate at BMRA.

GOALS AND OBJECTIVES

The goal of this WMP is to minimise risk 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 vicinity of the airport.

The objectives of the WMP are to:

- Target high and moderate risk species and habitats that primarily support them both on and off the airport
- Ensure compliance with all relevant airport operational and environmental legislation and regulations
- Ensure that adequate systems are in place to define roles, responsibilities and procedures for managing wildlife risks at BMRA.
- Define the methods by which wildlife hazards are managed at BMRA.

THE AIRPORT

Busselton-Margaret River Airport is situated in the City of Busselton in south west of Western Australia.

A description of the airport is provided in Table 1 below.

Table 1 - Busselton-Margaret River Airport (BMRA) general information

Element	Description
Airport location	Vasse Highway, Busselton. Approximately 6.25 km's South/East of the City of Busselton CBD
Surrounding land use(s)	Mixed agriculture and grazing pasture
Geography	Low lying coastal flood plain, inland from the sheltered Geographe Bay and the Busselton township. Mainly featureless landscape with areas of cleared native forests to make way for agriculture. Predominately sandy loam soil which supports some agricultural enterprise mainly as pasture for the grazing of beef cattle.
Elevation	17m above sea level
Airport ownership	City of Busselton
Airport operator	City of Busselton
Traffic profile	Closed charter (FIFO) operations and general light aviation, Emergency services and Helicopters.
Runways	21 (210°)/ 03 (030°) single 1800m/ 30m
Navigation aids	NDB (Non Directional Beacon) BLN 386 (RWY21) S 33 41.5 E 115 23.7 Range 50n/m
Communications	AIR BAND VHF - CTAF 127.0
Hours of operation	Monday – Friday 0800 – 1700 staffed. Ref BMRA Noise Management Plan.
Climate	Mediterranean
Other	Airport Reporting Officer (ARO) 0417 928 916

1.5 SUPPORTING INFORMATION

The following documents provide further background to the WMP:

- Wildlife Data Review 2016
- Wildlife Species Strike Risk Assessment

2 STRUCTURE

BMRA adopted a rigorous risk-based approach to develop this WMP and established management procedures to ensure the WMP is properly implemented in accordance with the relevant requirements of CASR 1998. The planning, implementation and review structure detailed in this document is provided in Figure 1 below.

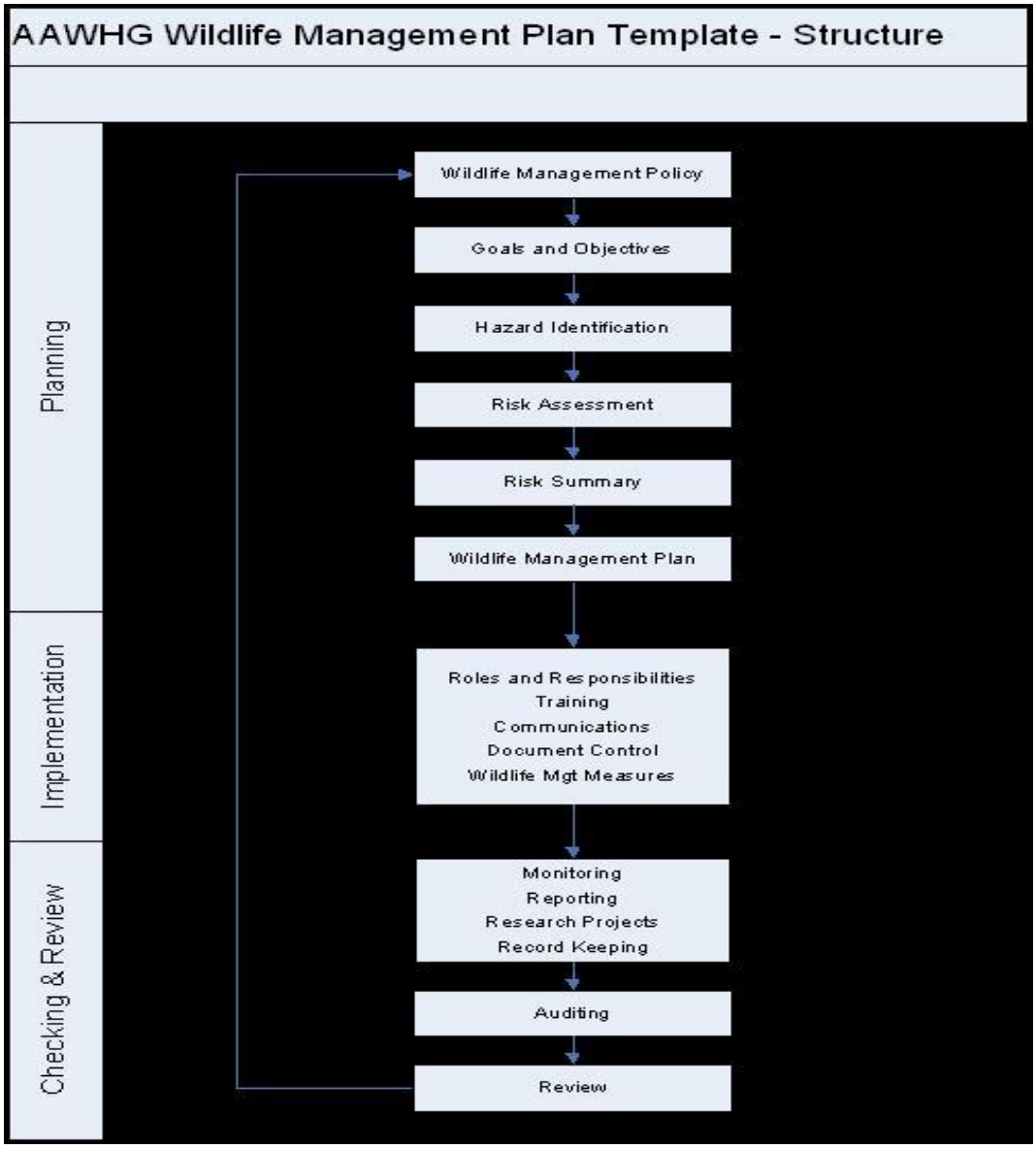


Figure 1 – Structure of Wildlife Management Plan for BMRA

3 PLANNING

Busselton-Margaret River Airport (BMRA) has adopted a three-step approach to assessing and reducing the risk posed by wildlife to aircraft:

1. **Hazard identification** – broad assessment of the airport's hazard profile, including aircraft movements, the habitat and activities that attract wildlife both on and off airport, the species most observed on and off airport, and the trends observed in wildlife strikes

2. **Risk assessment** – a risk assessment based on the information available on wildlife numbers, behavior, characteristics and/or strikes for each species encountered on and around the airport

3. **Wildlife Management Plan** – a plan identifying each of the highest risk species, supported by a summary of their relevant characteristics, identified by key airport staff that help the airport reduce the degree of risk and meet its wildlife management goals and objectives

3.1 HAZARD IDENTIFICATION

3.1.1 AIRCRAFT MOVEMENT AND TYPES

Generally, the more aircraft movements at an aerodrome the greater the chances of wildlife strike.

Different aircraft have different susceptibility to wildlife strikes. Large turbo fan aircraft tend to fly fast, have a large frontal surface area, have a great sucking power through their engines, rendering them more likely to strike wildlife than propeller driven aircraft. In Australia, Regular Passenger Transport aircraft are 16 times more likely to report a strike than general aviation aircraft[1]. On the other hand, light aircraft are not subject to the same rigorous design standards imposed on commercial jet aircraft.

It is therefore important to identify current and projected trends for aircraft movements, as provided in Table 2 below.

Table 2 - Busselton-Margaret River Airport (BMRA) aircraft movement information

AIRCRAFT CLASSIFICATION	STRIKE SUSCEPTIBILITY LEVEL	APPROXIMATE ANNUAL MOVEMENTS	FORCAST ANNUAL MOVEMENTS
1 TURBO FAN TURB JET	HIGH	550	STEADY
2 HELICOPTER TURBO PROP	MODERATE	250	STEADY
3 PISTON PROP	LOW	4500	STEADY

3.1.2 **ON AIRPORT HAZARDS**

Habitats

Habitat types at Busselton-Margaret River Airport (BMRA) that can be attractive to wildlife are identified in Figure 2 on the following page and include:

- Grasslands, seasonal wetlands - managed
- Drains
- Dam
- Buildings and sealed surfaces

GRASSLANDS – SEASONAL WETLANDS- MANAGED

A significant portion of the aerodrome precinct consists of managed grasslands, areas of which become seasonal wetlands during the winter months.

During the dry months the grasslands are mowed in rotation throughout the season in order to reduce the fire fuel load.

When dry there is no significant increase in bird habitation, but there is an increase in hunting activity and thermalling from birds of prey such as Kestrel, Whistling Kite and occasionally Wedge tail eagles. All of these pose a significant threat to aircraft. There is also an increase in activity from aerial foragers such as Pipit, Shrike and Swallow due to the abundance of insect life on the grasslands, but these present less of a threat to aircraft due to their flight characteristics and size.

During the winter month's large portions of the grassland become water logged, and there is a significant increase in seasonal wetland bird activity such as Australian Ibis, and a variety of Ducks, which feed and nest in the transformed landscape. Australian Ibis can present a significant threat to aircraft when aloft due to flight habits and size, i.e. large, slow formations and occasional thermalling. Ducks present less of a threat due to the short, rapid and direct nature of their flight habit.

LAND DRAINS

There is a surface and storm water drainage system throughout the aerodrome. The networks of drains are deep open channels cut into the land surface. The smaller drains discharge into the larger drains running parallel to the runway strip edge which in turn discharge into the dam.

During the dry months the deeper drains retain about 30 - 50% capacity and the smaller drains dry out.

There is no significant attraction of birds to the drains during the dryer months.

During the winter season water birds in low numbers or groups are attracted to the drains. They consist of resident Ducks who mate and nest along the drains but only in very low numbers of pairs and are easily dispersed or left in situ as they do not present a significant hazard whilst on the ground. There are also a number of itinerant birds, such as Australian

Spoonbills and White faced Heron that feed and forage along the drains but again in low numbers and are easily spotted and dispersed or again left on the ground.

DAM

There is a permanent dam within the airside area of the aerodrome with a surface area of approximately 8000M2. It is located 450M south, south west of Runway 03 threshold.

The dam has a small and insignificant number of permanent resident water birds, i.e. Australasian Grebe, however it does attract seasonal water birds such as Shelducks, Pacific Black ducks and Wood Ducks in larger numbers. Whilst on the water they do not pose a threat but the Shelduck in particular can be a significant hazard whilst in flight due to size and flocking habit, although they tend to fly directly to and from the water source at a low altitude and do not usually remain and linger aloft like the Ibis.

Tree Martins will also frequent the dam site, aerial foregoing for insects, but again do not present a hazard for air traffic as they remain in very close proximity to the dam area and water surface.

BUILDINGS & SEALED SURFACES

Buildings at the aerodrome consist mainly of 3 light aviation hangars, the aero club, which is basically a domestic size dwelling, and the main terminal which has a footprint of approximately 1000M2 on a single level, and other small ancillary buildings.

There are very few species resident in or around the buildings other than nesting Welcome swallows and a resident group of Magpie’s that forage around the landscaped grassed areas.

The main sealed areas are the runway, taxiway and aprons, and carpark.

The aprons are mainly bird free apart from the odd Magpie in transit, aerial foraging Swallows and Martins. There is evidence of Ducks roosting overnight, but do not present a significant hazard in this location.

The runway is the highest risk area and most species present at the aerodrome will be seen at one time or another on the runway or the runway strip. There are also seasonal visitors such as the Banded Lapwing which come to breed and nest on the runway strip and RESA areas, in close proximity to the runway. These birds present a significant risk of strike due to their aggressive territorial instincts and flying behaviour, day and night.

Other birds that are a significant hazard on the runway and strip are the Magpie, especially at dawn and dusk, and the Nankeen Kestrel.

The Magpie generally has the capacity to learn and is wary of vehicles and aircraft, therefore can be easily spotted and dispersed. However, at dawn and dusk, in low light conditions, they are reluctant to flee and remain aloft and so become dispersed into smaller groups which prefer to remain stationary unless threatened at close quarters. This presents a high risk of strike if the birds return onto the paved runway undetected after initial dispersal.

During the day, the Nankeen Kestrel also presents a high risk of strike in the air due to its habit of hunting and so hovering, especially over the RESA areas, seemingly oblivious to the approach of air traffic.

ACTIVITIES

Activities at BMRA that can be attractive to wildlife include:

- Mowing

MOWING

During the dry months the grasslands are mowed in rotation or as necessary by means of mechanical hoe (flail). Flail cutting is relatively precise and if done correctly contact and disturbance of the surface soil is minimal. Therefore, this activity does not attract a great deal of interest from birds present at the aerodrome other than Magpies and Australian Ravens in small numbers that will pick over the freshly mowed areas searching for insects.

Opportunistic birds of prey, especially Whistling Kite's, will occasionally circle directly overhead in search evacuating Rabbits or Stubble Quail which are present and nest in the grasslands.

NATURAL PHENOMENA

Natural phenomena that attract wildlife at BMRA include:

- THERMAL CONVECTION (solar radiation)
- COLD NIGHT TEMPERATURES
- SEASONAL HEAVY RAIN
- SEASONAL BIRD MIGRATION
- STRONG WINDS
- FOG

THERMAL CONVECTION caused by solar radiation

Busselton is located in the South West of Western Australia, on latitude of 33°.65"south and longitude of 115°.35" East. The climate is described as Mediterranean and is distinguished by warm, wet winters under prevailing westerly winds and calm, hot, dry summers, as is characteristic of the Mediterranean region and parts of California, Chile, South Africa, and SW Australia.

Temperatures can range throughout the year from 0°C winter dawns to 38°C + summer days.

During the summer, and on fine days throughout the year, convection heat from the land causes columns of warm air to rise from the surface of the grasslands and paved runway.

This phenomenon attracts soaring birds such as raptors, and flocking birds such as Ibis, which glide in a spiralling pattern above the earth's surface. The height of the soaring birds in a thermal can range from below a hundred feet to many thousands of feet.

COLD NIGHTS

Cold winter nights, especially after fine warm days, can attract some species of birds to the paved runway and apron areas to roost. The paved areas retain heat absorbed during the day which is re-radiated at night. This makes an attractive temporary roosting site for the birds overnight.

This is not a regular occurrence and it may be caused by the birds being disturbed at their usual roosting spot by a nocturnal predator, i.e. fox.

SEASONAL HEAVY RAIN

Seasonal heavy rains and subsequent water logging of the grasslands will attract numbers of seasonal water birds such as Ducks, herons, and Ibis to the aerodrome, as described previously.

Another unusual consequence of the heavy rains and water logged grasslands, especially the runway strip, is that it causes a massive number of earthworms to escape the saturated soil and move onto the runway surface.

This does not seem to attract any other birds other than the Magpies and Ravens that usually frequent the runway.

SEASONAL BIRD MIGRATION

Winter sees an increase in seasonal bird migration. The main species that can affect the aerodrome is the Australian Straw and White Ibis.

The Ibis migrate daily in very large V formations from their nesting sites, trees on or around water, to their feeding sites, water logged grasslands.

In the early morning just after dawn, and through the morning they will migrate from West to East across the aerodrome, and again return, East to West before sunset.

The large flocks are slow moving and can range from under 100 to1000 feet plus above ground level.

STRONG WINDS

The South West capes region is relatively exposed and can be subject to high winds. In the summer months the winds come predominantly from the East in the morning with stronger winds coming from the South West during the afternoon.

In the winter the strong winds and storms come from the South West through to North West.

During strong wind events the birds will generally seek refuge in trees or at roosting sites. Magpies and Ravens will still maintain their usual patterns of behaviour but are more reluctant to stay aloft, especially if the adverse winds coincide with dawn or dusk. Once aloft in such conditions the birds will fly higher than usual for the short transit flights.

It has been observed that the Magpies and to an extent the Ravens, loose some of their situation awareness in windy conditions and are more difficult to disperse as a group. It is sometimes necessary to target individuals, at close quarters, in order to move them on.

FOG

During the cold and still early winter mornings the aerodrome becomes susceptible to fog. On such occasions there is a reduction in bird flight activity, and observance of flight activity.

Again, Magpies and Ravens and Banded Lapwings seasonally, will still be present and active around the runways and strip, but as described above are more reluctant to stay aloft and are more difficult to disperse and see if re-entering the aircraft movement areas.

3.1.3 OFF AIRPORT HAZARDS

Habitat types and activities occurring in the vicinity of BMRA that can be attractive to wildlife are identified below:

- Wetlands
- Pastoral land

3.1.4 WILDLIFE STRIKE HISTORY

Wildlife strike records are an important source of information for determining the hazards present at airports. The information collected allows an assessment of species struck and trends across years, seasons, months and time of the day.

At BMRA, from beginning 2013 to date, there has been a total of 21 confirmed strikes and 9 suspected strikes recorded. Total strikes reported have been calculated at an annual average of 7.05 strikes/10,000 aircraft movements. Damaging strikes to aircraft result in costs to operators, and potentially compromise safety. Therefore these are the most important strikes to prevent. Between May 2013 and December 2016 a total of 21actual strikes resulted in delays to aircraft. A summary of annual strike trends in Table 3, a more detailed analysis of strike data in Table 4, and charts showing strike trends are provided below.

BMRA has approximately 10638 aircraft movements per annum.

Table 3 – Busselton – Margaret River Airport annual wildlife strike trend summary

Year	**Total No. Strikes**	**No. Strikes / 10,000 aircraft movements**	**Total No. Confirmed strikes**	**Comments** (e.g. species most frequently struck, changes to airport reporting processes that may influence data)
2013	12	11.32	7	Banded lapwing represents 57% of actual strikes
2014	6	5.6	2	Banded lapwing 50%
2015	3	2.83	2	Banded lapwing 100%

2016	10	9.4	10	Banded Lapwing 40%

Table 4 – Busselton – Margaret River Airport detailed wildlife strike analysis summary

SPECIES	TOTAL NO. STRIKES 2013	No. reported strikes/10,000 a/c movements	ANNUAL STRIKE TREND	When/where strike mostly occur		
				Month/Season	Time of day	Location on Airport
Banded Lapwing	7	6.6	Increased	Aut/Win/Spr	AM/PM	R/W 21/03
Kestrel	1	0.94	Steady	Summer	PM	R/W21
Duck	2	1.88	Increased	Aut/Win	AM/PM	R/W 03
Unidentified	2	1.88	Increased	Aut/Sum	N/K	R/W 21/03

SPECIES	TOTAL NO. STRIKES 2014	No. reported strikes/10,000 a/c movements	ANNUAL STRIKE TREND	When/where strike mostly occur		
				Month/Season	Time of day	Location on Airport
Banded Lapwing	1	0.94	Decreased	Summer	N/K	R/W 03
Kestrel	3	2.83	Increased	Sum/Aut	PM	R/W 21
Unidentified	2	1.88	Steady	Sum/Win	AM/PM	R/W 03

SPECIES	TOTAL NO. STRIKES 2015	No. reported strikes/10,000 a/c movements	ANNUAL STRIKE TREND	When/where strike mostly occur		
				Month/Season	Time of day	Location on Airport
Banded Lapwing	2	1.88	Increased	Spring	N/K	R/W 21/03
Kestrel	1	0.94	Decreased	Spring	PM	R/W 21

SPECIES	TOTAL NO. STRIKES 2016	No. reported strikes/10,000 a/c movements	ANNUAL STRIKE TREND	When/where strike mostly occur		
				Month/Season	Time of day	Location on Airport
Banded Lapwing	4	3.76	Increased	Spr/Sum	N/K	R/W 21
Kestrel	1	0.94	Steady	Sum/Aut	AM	R/W 21
Pipit	2	1.88	Increased	Spring	AM	R/W 21/03
Australian Magpie	2	1.88	Increased	Win/Spr	AM	R/W 21/03
Tree Martin	1	0.94	Increased	Autumn	AM	R/W 03

3.2 **BUSSELTON - MARGARET RIVER AIRPORT WILDLIFE MANAGEMENT PLAN DATA REVIEW**

OBJECTIVE:

To provide a system where by raw wildlife activity data collected at Busselton – Margaret River Airport (BMRA) can be interpreted to provide meaningful statistics and provide a means of measuring the threat of bird hazard at the airport.

OUTCOME:

- An analysis of the species of birds identified that represent an actual or real threat at BMRA from the data collected.
- Provide a formula used to categorise and rank the **consequence hazard** potential of each identified real threat species of bird represented at BMRA.
- Provide a formula used to categorize and rank the **probability hazard** potential of each identified real threat species of bird represented at BMRA.
- Provide a probability and consequence model to assess the severity of a bird/wildlife hazard based on the identified species represented at the airport. This will be modelled by a simple matrix.
- Provide a seasonal analysis of bird species by number represented at BMRA by use of a graph.
- Provide a hazard ranking analysis of bird species represented at BMRA by use of a graph.

3.2.1

ANALYSIS OF SPECIES REPRESENTED AT BUSSELTON-MARGARET RIVER AIRPORT

Based on information provided in the current Wildlife Management Plan (WMP) and daily bird count records there are 30 different, regularly identified transitory or resident bird species represented at BMRA.

Each Identified species can be individually ranked to provide an assessment of the hazard potential (consequence) that each species represents and therefore provides the greatest risk.

3.2.2 CONSEQUENCE RANKING

From an airport environment perspective there are two consequences that result from bird hazard:

1) Damage to aircraft from bird strike

2) Disruption to aircraft movement.

3) Reduction in Airline on time performance.

The consequence rank or score is calculated by taking into account a number of factors particular to each species.

They are:

- Body mass
- Flocking habit
- Flight behaviour

Table 1. Ranking of bird species by body mass.

Body Mass	**Bird species**	**Body Mass Score**
< 20g	Welcome Swallow, Fairy Martin	1
21 – 50g	Australasian Pipit, Rock parrot	2
51 – 200g	Banded lapwing, Nankeen Kestrel	4
201 – 1000g	Australian Magpie, Brown Falcon	8
1 – 5 Kg	Ibis, Pacific Black Duck	16
> 5Kg	Black Swan	32

Table 2. Ranking of bird species through flocking habit.

Flock size and/or type	**Bird Species**	**Flock Score**
Usually solitary	Nankeen Kestrel, Brown falcon	1
Loose flocks	Magpie, Welcome Swallow	2
Tight flock or formation	Ibis, Black Swan, Shelduck	4

Table 3. Ranking of bird species by flight behaviour.

Flight behaviour	**Bird species**	**Flight Score**
Rapid direct	Magpie, Ducks generally, Ibis	1
Slow, meandering, hovering	Nankeen Kestrel, Galah	2

Scoring Formula:

= Body mass score x flock Score x flight score = Consequence score*

Table 4. Consequence categories based on consequence score.

Consequence score*	**Consequence Category**
64 - 128	Extreme
32	Very high
16	High
8	Medium
4	Low
1 - 2	Very low(negligible)

3.2.3 **PROBABILITY RANKING.**

Probability of a bird strike can be directly drawn from the data collected at BMRA to make a quantitative assessment.

The data available that can be used is:

- Relative abundancy of a species as a percentage of the total birds counted

- Frequency of bird strike by species.

Table 5. Ranking by probability of bird strike by species represented.

Criteria	Very High	High	Medium	Low
Relative abundance	>30%	> 20%	>10%	<10%

By Bird strike

Relative frequency	>5	1 - 5	1	0

Additional factors may be considered in assessing the likelihood of a species being involved in a bird strike incident and may reduce or increase the risk category allocated to that species.

Other behaviour	Species displays attribute	Change in category
Slow, erratic flight behaviour	Yes	+1
Nocturnal flight activity	Yes	+1
Trending increased abundancy	Yes	+1
Trending decreased abundancy	Yes	-1
Trending increase of strike	Yes	+1
Trending decrease of strike	Yes	-1

Table 6. Risk assessment matrix for modelling potential bird hazard by species.

Once a species has been ranked by consequence and probability it can be assessed by use of the matrix to determine the severity that it presents as a hazard.

PROBABILITY					
CONSEQUENCE	VERY HIGH	HIGH	MEDIUM	LOW	NEGLIGIBLE
EXTREME	EXTREME	EXTREME	VERY HIGH	HIGH	NEGLIGIBLE
VERY HIGH	VERY HIGH	HIGH	HIGH	MEDIUM	NEGLIGIBLE

HIGH	HIGH	HIGH	MEDIUM	MEDIUM	NEGLIGIBLE
MEDIUM	MEDIUM	MEDIUM	LOW	LOW	NEGLIGIBLE
Low	LOW	LOW	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
Very Low	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

References and acknowledgements

Bird Risk Assessment Model for airports and aerodromes – David C Paton Adelaide University

3.2.4 **BIRD SPECIES SCORES** (Consequence)

Common name	Body Mass	Mass score	Flock Score	Flight Score	Hazard Score	Individual Hazard Rank
Australian Shelduck	1400	16	4	1	64	EX
Ibis	2000	16	4	1	64	EX
Black Swan	6270	32	4	1	128	EX
Pacific Black Duck	1120	16	4	1	64	EX
Wood Duck	810	8	4	1	32	VH
White Faced heron	600	8	1	2	16	H
Australian Magpie	330	8	2	1	16	H
Australian Raven	650	8	2	1	16	H
Ring Neck Parrot 28	230	8	2	1	16	H
Wedgetail Eagle	3950	16	1	2	32	VH
Nankeen Kestrel	185	4	1	2	8	M
Whistling Kite	910	8	1	2	16	H
Brown Falcon	625	8	1	1	8	M
Barn Owl	355	8	1	1	8	M
BF Cuckoo Shrike	115	4	1	1	4	L
Fairy/Tree Martin	27	2	2	1	4	L

Welcome Swallow	15	1	2	2	4	L
Banded lapwing	200	4	4	1	16	H

3.2.5 **RISK ASSESSMENT SPECIFIC TO BUSSELTON - MARGARET RIVER AIRPORT.**

Common name	Overall seasonal risk assessment for BMR Airport (BMRA) (hazard/probability)				BMRA year average ranking per species
	SPRING	SUMMER	AUTUMN	WINTER	
Australian Shelduck	H	VH	VH	E	VH
Ibis	H	E	H	H	VH
Black Swan	H	N	N	H	M
Pacific Black Duck	E	H	H	VH	VH
Wood Duck	H	H	H	H	H
White Faced heron	M	M	M	M	M
Australian Magpie	H	M	M	M	H
Australian Raven	M	H	M	M	H
Ring Neck Parrot 28	N	N	N	N	N
Wedgetail Eagle	N	N	N	N	N
Nankeen Kestrel	M	H	H	M	H
Whistling Kite	M	M	M	M	M
Brown Falcon	L	L	L	L	L
Barn Owl	N	N	N	N	N
BF Cuckoo Shrike	N	N	N	N	N
Fairy/Tree Martin	N	N	N	N	N
Welcome Swallow	N	N	N	N	N
Banded Lapwing	H	E	N	N	H

3.3 WILDLIFE MANAGEMENT PLAN SPECIES RISK RANKING

The following pages represent a summary of species risk ranking for BMRA from section 3.2, together with an overview of the key hazard information from section.

NOTE: Confirmed bird strikes are evidence based from eyewitness or reports by air crew and carcass retrieved. Non-confirmed are carcases recovered in vicinity of runway, within the manoeuvring area, some with obvious trauma but cannot be directly linked to a particular aircraft movement

Animal	Name	Facts	Seasonal Hazard Ranking				Activity	Body Mass	Flocking	Flight
			SPR	SUM	AUT	WIN				
	Whistling Kite	Medium sized Bird of Prey Slow to take off	MED	MED	MED	MED	Present all year round	1-5kg	Usually Solitary	Slow to take off
	Wedge Tail Eagle	Large sized Bird of Prey Slow to take off	NEG	NEG	NEG	NEG	Present all Year round Mostly Summer months	>5kg	Usually Solitary or pairs	Very Slow to take off High altitude flight
	Australian White Ibis	Large sized flocking Water Bird Slow to take off	HIGH	EXT	HIGH	HIGH	Present all year round and Abundant Aug – Nov	1-5kg	Tight Flock or "V" Formation	Slow to take off
	White Faced Heron	Large sized Water Bird Slow to take off	MED	MED	MED	MED	Present all Year round and Abundant Dec – Feb	1-5kg	Tight Flock or Formation	Slow to take off

	Australian Magpie	Medium sized Grassland Bird	HIGH	MED	MED	MED	Abundant all year round	201g – 1000g	Loose Flocks	Fast to take off
	Welcome Swallow	Small sized Aerial Forager	NEG	NEG	NEG	NEG	Present all year round.	<20g	Loose Flocks	Very fast to take off
	Australasian Pipit	Small sized Ground Forager	NEG	NEG	NEG	NEG	Present all year round.	21g-50g	Pairs	Very fast to take off
	Rock Parrot	-Small sized Ground Forager	NEG	NEG	NEG	NEG	Present all year round	21g-50g	Loose Flocks	Slow to take off Fly at ground level
	Banded Lapwing	Medium size	HIGH	EXT	NEG	NEG	Present Aug – Dec and may be present Jan – Jul Aggressive and Territorial when breeding	51g-200g	Loose Flocks or pairs	Slow to take off

	Brown Falcon	Medium sized Bird of Prey	LOW	LOW	LOW	LOW	Present all year round	201g-1000g	Usually Solitary	Slow to take off
	Pacific Black Duck	Large sized Water Bird	EXT	HIGH	HIGH	VERY HIGH	Present all year round	1 – 5 kg	Loose Flocks	Slow to take off
	Black Swan	Very large sized Water Bird	EXT	NEG	NEG	EXT	Present Apr – Jul and may be present Aug - Mar	>5kg	Tight Flock or Formation	Very slow to take off
	Nankeen Kestrel	Medium sized Bird of Prey	MED	HIGH	HIGH	MED	Present all year round	51g-200g	Usually Solitary	Slow to take off
	Shelduck	Large sized Water Bird	VERY HIGH	VERY HIGH	VERY HIGH	EXT	Present all year round Can be Abundant	1 – 5kg	Tight Flocks or Formation	Slow to take off
	Wood Duck	Medium sized Water Bird	HIGH	HIGH	HIGH	HIGH	Present all year round	201g – 1000g	Tight Flocks or Formation	Slow to take off

	Australian Raven	Large sized Grassland Bird	MED	HIGH	MED	MED	Abundant all year round	201g-1000g	Loose Flocks	Slow to take off
	Barn Owl	Medium sized Nocturnal Bird	NEG	NEG	NEG	NEG	Present all year round Low numbers	201g-1000g	Singular	Slow to take off
	Black faced Cuckoo Shrike	Medium sized Aerial Forager	NEG	NEG	NEG	NEG	Present all year round	21g-50g	Pairs	Rapid Direct flight
	Fair/Tree martin	Small sized Aerial Forager	NEG	NEG	NEG	NEG	Present all year round	<20g	Loose Flocks	Very fast to take off
	Galah	Medium sized Grassland Bird	MED	MED	NEG	NEG	Present Aug-Jan	51g-200g	Tight Flock or Formation	Slow meandering erratic flight

NOTE: Confirmed bird strikes are evidence based from eyewitness or reports by air crew and carcass retrieved. Non-confirmed are carcases recovered in vicinity of runway, within the manoeuvring area, some with obvious trauma but cannot be directly linked to a particular aircraft movement.

4 IMPLEMENTATION

4.1 ROLES AND RESPONSIBILITIES

The City of Busselton Airport Manager will be responsible for the overall coordination, supervision and management of the WMP. This includes allocating resources, designating responsibility, coordinating training, and reviewing performance of the Plan's implementation.

The Airport Operations Coordinator will be responsible for implementing this WMP at their BMRA. This includes obtaining permits, providing training, monitoring bird numbers, collating strike data, auditing conformance to the WMP, and drafting reports for review by Airport management.

A detailed description of the roles and responsibilities of the staff at Busselton – Margaret River Airport for managing wildlife hazards is provides in Appendix 2.

4.2 COMMUNICATIONS

4.2.1 WILDLIFE HAZARD REPORTING

In the event of identified risk on or in the vicinity of the airport steps will be taken to remove, or alternatively advise pilots of the hazard (see Table 8).

A bird hazard warning notice is included in the En Route Supplement Australia (ERSA).

Where a wildlife hazard is present that cannot be effectively managed by the Airport operator, or where there is a significant increase in risk the Airport operator arranges a NOTAM to be issued. The NOTAM must provide specific information on species, period of risk, likely location.

Table 8 – Wildlife hazard reporting

Task	Description	Frequency	Responsible	Procedure/Reference
Reporting hazard (immediate)	Notify pilots of additional risk levels. The BMRA Manager/Operations coordinator is also notified.	As required	ARO	BMRA SOP
Reporting hazard via NOTAM	Issue NOTAMs where risks are significantly increased.	As required	ARO	BMRA SOP

Bird and animal strike reports are essential for understanding and managing risks. Strikes need to be accurately categorised and reported. Strikes are reported regardless of strike confirmation or damage. All strike reports are forwarded to the ATSB and also entered into the BMRA strike database. The steps in processing and reporting strikes are detailed in Table 9.

To assist in identifying the species involved, carcasses or remains (feathers or fragments) are collected where possible and stored for possible further analysis which may provide information relevant to the management program.

Table 9 – Wildlife strike processing and reporting

Task	**Description**	**Frequency**	**Responsible**	**Procedure/Reference**
Recording strikes	Record every strike they become aware.	As required	ARO	Strike reporting procedure WMP-03
Reporting strikes	Forward all reports to ATSB and entry into the strike database.	As required	ARO	Strike reporting procedure WMP-03
Data management	Maintain electronic records of wildlife strikes and review monthly to assess changes in populations	Ongoing	ARO	NA
Strike remains	Collect struck remains when possible and store them for annual analysis by the ornithological consultant	As required	ARO	Identification and handling of remains procedure WMP-04

4.2.2 **STAKEHOLDER CONSULTATION**

The Airport Safety Management Committee is an important avenue for sharing information, identifying risks and ensuring stakeholders are engage in collaborative management of these risks BMRA conducts Safety Management Committee meetings on quarterly basis. Wildlife issues and management are included in the agenda of these meetings. Relevant on and off airport stakeholders are invited to participate in these meetings. Participants include:

- City of Busselton - Airport operator
- Commercial operators based at the airport.
- Airline representatives

- Local Aeroclub representatives
- Ground handling operators
- RFDS and emergency services representatives

4.3 WILDLIFE MANAGEMENT MEASURES

Strategies for reducing the risk of strikes at BMRA focus on managing wildlife populations on and surrounding the airport. Management measures, summarised in the sections below, can be classified into the following two categories:

Passive management – modifying habitats or other aspects of the environment to indirectly remove or reduce the number of birds; or

Active management – directly removing or reducing the number of birds or animals.

4.3.1 PASSIVE MANAGEMENT

Passive management methods employed at BMRA include:

- Habitat modification
- Regular grasslands management
- Monitoring of nesting sites

4.3.2 ACTIVE MANAGEMENT

Active management methods employed at BMRA include:

- Regular bird dispersals from aircraft movement areas prior to scheduled arrivals/departures
- Harassment of individual birds present in the aircraft movement areas
- Removal of nests

5 CHECKING AND REVIEW

5.1 MONITORING

Monitoring is a critically important tool in wildlife management at BMRA. Effective monitoring provides essential information that assists management to adapt the program, as required, to reduce hazards and levels of risk. It also provides evidence of (a) conformance to regulatory and other standards (see Appendix 4), and (b) efficacy of the WMP in minimizing wildlife strike risk to aviation.

5.1.1 ROUTINE HAZARD MONITORING

Routine detection of hazards on the aerodrome is achieved through regular runway and runway strip inspections and during airside wildlife surveillance. Both aspects are important to ensure early detection of wildlife hazards in airside areas, particularly inside runway strips.

The frequency of wildlife monitoring (beyond the activities detailed in Table 10 below) is a matter of professional judgement by the observer and depends on wildlife numbers, species composition, weather and aircraft activity at the time.

Table 10 – Routine monitoring activities

TASK	DESCRIPTION	FREQUENCY	RESPONSIBLE PARTY	PROCEDURE/ REFERENCE
Wildlife patrols (routine)	Conduct airside wildlife management and surveillance patrols	Daily - ongoing	ARO	Wildlife hazard surveillance procedure - WMP-02
Wildlife patrols (post-strike)	Conduct airside wildlife management and surveillance patrols	Daily - ongoing	ARO	Strike reporting procedure - WMP-03
Wildlife patrols data management	Record all strikes, management, surveillance and inspection actions in relevant logs and forms	Daily - ongoing	ARO	Wildlife hazard surveillance procedure - WMP-02 Strike reporting procedure - WMP-03
Wildlife counts (staff)	Conduct wildlife counts	Daily	ARO	Wildlife count procedure WMP-01
Wildlife counts (external consultant)	Conduct wildlife counts	As requested	Aviation ecologist/ ornithologist	
Wildlife counts data management	Maintain electronic records of wildlife counts and review monthly to assess changes in populations	Ongoing	ARO	Charting of trends and numbers counted

Wildlife management and surveillance patrols are conducted by ARO daily. Standard data is entered into the wildlife management record and includes areas of the airport patrolled, numbers, location and species of birds/wildlife seen, action taken to disperse the birds/wildlife, results of the

action. More general information such as the name of the officer on duty, weather conditions etc are recorded at the start of a duty period.

Wildlife strike data is logged as described in Section 5.3.1 Wildlife Strike Reporting.

5.1.2 **PERFORMANCE INDICATORS**

Performance indicators will be established to help effectively assess how well BMRA is conforming to the requirements of this WMP and, thereby, determine the need for making adjustments to how hazards are managed and/or modifying the Plan.

Primary (lead) performance indicators adopted at BMRA are:

- Scheduled counts being routinely completed
- Post-strike carcasses removed
- Correct post-strike identification
- Staff training and adequate resourcing
- Pre-flight bird dispersals
- Feedback from stakeholders
- Correctly collecting and recording data

Secondary (lag) performance indicators adopted at BMRA are:

- Number of strikes recorded per 10,000 aircraft movements
- Strikes resulting in aircraft damage
- Strikes involving aircraft disruption

5.1.3 **RECORD KEEPING**

BMRA recognises the strength of its monitoring program is in good record keeping. Records of the above monitoring activities are kept in relevant logs, spreadsheets and database to provide evidence of management actions and to demonstrate WMP processes are in place to routinely detect and, where feasible, remove hazards.

All records are legible, accessible and stored in a secure environment that prevents loss or damage.

5.2 REPORTING

Routine reporting ensures that all staff and managers are equipped with the information needed to adapt hazard management activities and the WMP when required. The following regular reports will be generated and distributed to relevant staff by ARO :

- Monthly update of count numbers report

5.3 REVIEW

The CASR Sections 139.230(f)(iii) and 139.230 (h)(ii) and MOS Part 139 Section 10.14.1.5 together require the WMP to be reviewed at least annually. To ensure the BMRA WMP remains effective and is updated to fulfil future requirements the following processes have been established.

5.3.1 **MAJOR REVIEW**

A review of the WMP will be undertaken on a annual basis and is the responsibility of Airport Manager. The review may result in a revision of the document. The review will be supported, where necessary, by a suitably qualified and experienced consultant.

Major reviews will take the place of annual updates in the years they occur.

5.3.2 **ANNUAL UPDATE**

The CASR requirement to review the WMP at least as part of each technical inspection means that BMRA is mandated to ensure it is reviewed annually. The review involves key personnel, including executive management, and is supported, where necessary, by a suitably qualified and experienced consultant. The annual update of the WMP will:

- be based on performance indicators and audit findings;
- ensure compliance with all current legislation;
- update the assessment of risk using updated strike and monitoring data and observations;
- ensure all procedures, roles, responsibilities and associations listed are current and relevant; and
- ensure all management actions undertaken are appropriate and listed in the WMP.

GLOSSARY

Active Management	The use of short-term management techniques such as distress calls, pyrotechnics, trapping and culling to disperse or remove wildlife.
Airside	The movement area of the airport, adjacent terrain and buildings or portions thereof within the airport security fence line.
Bird or animal strike (all must be reported)	A "reported bird or animal strike" is deemed to have occurred whenever: . a pilot reports a strike to the ATSB . aircraft maintenance personnel find evidence of a bird or animal strike on an aircraft . personnel on the ground report seeing an aircraft strike one or more birds or animals . bird or animal remains are found within the runway strip, unless another reason for the bird or animals death can be found A "suspected bird or animal strike" is deemed to have occurred whenever a bird or animal strike has been suspected by aircrew or ground personnel but upon inspection: . no bird or animal carcass is found, and . there is no physical evidence on the aircraft of the strike having occurred A "confirmed bird or animal strike" is deemed to have occurred whenever: . aircrew report that they *definitely* saw, heard or smelt a bird strike . bird or animal remains are found within the runway strip, unless another reason for the bird or animals death can be found . aircraft maintenance personnel find evidence of a bird or animal strike on an aircraft A "bird or animal near miss" is deemed to have occurred whenever a pilot takes evasive action to avoid birds or animals. An "on-aerodrome bird or animal strike" is deemed to be any strike that occurs within the boundary fence of the aerodrome, or where this is uncertain, where it occurred below 500 ft on departure and

	200ft on arrival. A “bird strike in the vicinity of an aerodrome” is deemed to have occurred whenever a bird strike occurs outside the area defined as “on aerodrome” but within an area of 15 kilometres radius from the aerodrome reference point (ARP) or up to 1,000 feet above the elevation of the aerodrome. A “bird or animal strike remote from the aerodrome” is deemed to have occurred whenever a bird strike occurs more than 15 kilometres from an aerodrome or more than 1,000 feet above the elevation of the aerodrome.
Consequence	The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.
Foraging	When wildlife search for and obtain food.
Habituation	The tendency for wildlife to become accustomed to certain stimulus when repeatedly exposed to it.
Hazard	A source of potential harm or a situation with potential to cause loss.
Migration	When wildlife pass periodically from one region to another.
Nocturnal species	A species which is most active during the night.
Passive Management	The modification of habitat to render it less attractive to wildlife.
Probability	The likelihood of a specific event or outcome, measured by the ratio of specific events or outcomes to the total number of possible events or outcomes.
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and probability.
Risk Treatment	The process of selection and implementation of measures to modify risk.
Roosting	When birds repeatedly return to a particular place in numbers to loaf or spend the night.
Transit	When birds fly from one place to another.
Wildlife	Wildlife refers to animals that may pose hazards to aircraft when struck. This includes birds, bats and terrestrial mammals such as

	rabbits, hares, foxes, dogs etc.
Wildlife Count	Scheduled counts conducted by airport staff.

ABBREVIATIONS

AAA	Australian Airports Association
AAWHG	Australian Aviation Wildlife Hazard Group
ATC	Air Traffic Control
ATSB	Australian Transport Safety Bureau
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
ERSA	Enroute Supplement of Australia
FOD	Foreign Object Debris
MOS	Manual of Standards
NOTAM	Notice to airmen
RWY	Runway
WMP	Wildlife Management Plan

APPENDICES

APPENDIX 1 – WILDLIFE MANAGEMENT PROCEDURES

EXTRACT FROM AERODROME MANUAL SOP:

WILDLIFE AND BIRD CHECKING, REPORTING AND DISPERSAL

When:

Daily as part of inspection, 10 mins before major fights or as required.

Equipment Required:

Bird count form, located in Airport vehicle.

Bird dispersal form.

Procedure: Bird and wildlife count

1. First on duty ARO: Fill in required fields on bird count form, date, time, and officer and weather conditions.

2. Record wildlife numbers as per species and location.

3. A zoned map of the aerodrome can be found on the last page of the daily inspection sheets. (Extracted from aerodrome manual)

4. A bird identification book is located in the aerodrome vehicle.

Procedure: Bird dispersal

1. Approximately 5-10 mins before scheduled charter carry out a bird dispersal on the manoeuvring area

2. Sign bird dispersal “Record of runway bird dispersals by Reporting Officer” form for each flight as appropriate (form located in daily inspection sheets and aerodrome manual)

Extract from Aerodrome manual SOP:

Wildlife Management Database and Stats Recording

When:

Monthly

Equipment Required:

City Of Busselton networked computer

Procedure: Recording and updating of database

1. Access F drive, Community and Commercial services/Airport/Airport/Wildlife Management/WMP Count Database.

2. Copy paste to desktop Bird count Template.

3. Record all details from Daily bird count sheets and add into template.

4. Ensure Template folder is named by current corresponding month and year.
5. Send finished template back into WMP count database where it was sourced

WMP-01 WILDLIFE COUNT PROCEDURE

Objective	To assist in the detection and subsequent removal of hazards and to provide data for comparison of numbers and locations of wildlife.
Responsibilities	ARO
Frequency	Daily. Mornings at commencement of first shift
Equipment	Vehicle Binoculars Bird identification field guide

Consistent application of the Wildlife Count Procedure is essential for obtaining quality data to be used for analysing for trends. If hazardous conditions are identified during the course of a count, it will allow for its timely removal using active dispersal techniques.

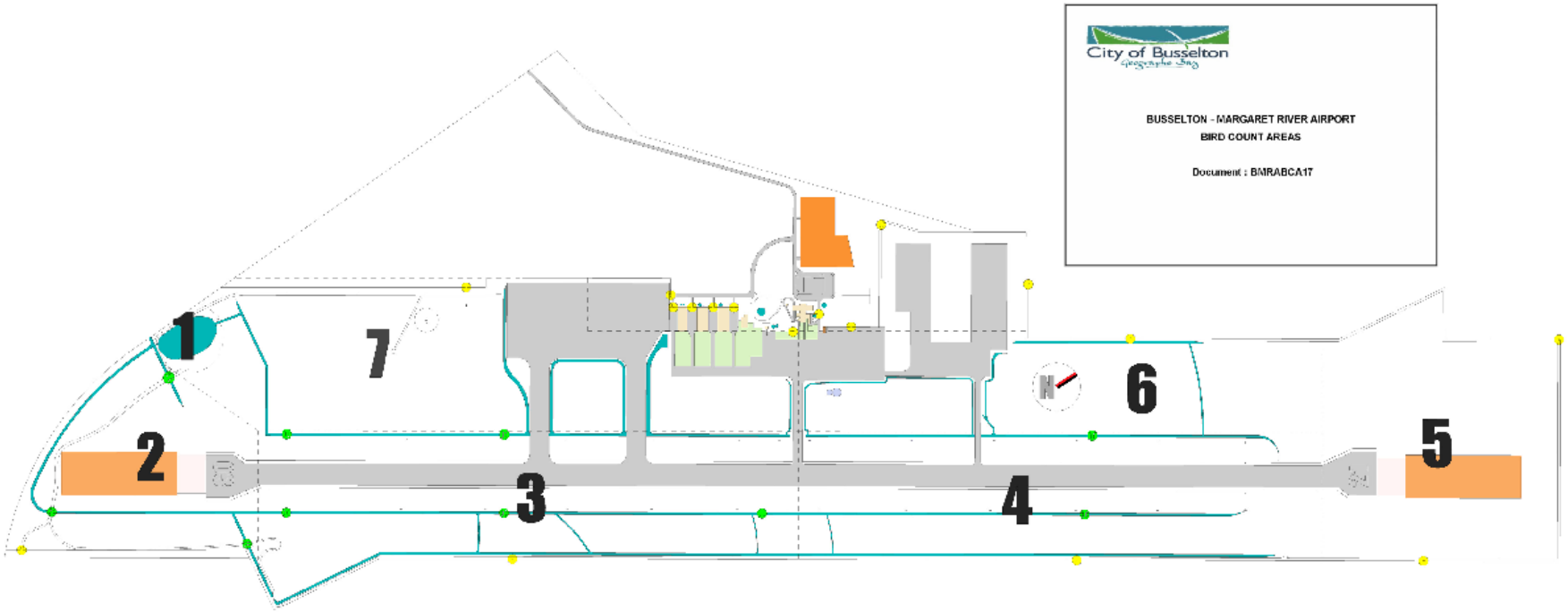
Procedure

1. The person doing wildlife counts must always follow the same route.
2. The aerodrome is divided into 7 Wildlife Count Areas.
3. Within each Area, stop the vehicle at the same marked location each time and scan the entire Area using binoculars.
4. Record all species and numbers observed on a Wildlife Count Form. Information to be recorded includes:
   - date
   - name of observer
   - time of commencement and completion of the count
   - weather conditions
   - species and number observed
   - area recorded (including birds transiting the airfield)
   - special notes such as mowing or ponded water that may cause additional attractions.
5. The form includes frequently observed bird species and allows room for additional species and as well as unidentifiable bird types. Mammals such as rabbits, hares, kangaroos or foxes are also recorded.
6. Transfer the data onto a spreadsheet or into a database for ongoing trend analysis.

Attachments

1. BMRA Wildlife Count Form. 2. Wildlife count area map.

Busselton Margaret River Airport – Wildlife Count Form								
Date						Wind direction		
Observer						Wind speed		
Start time						Temperature		
						Cloud		
		Count areas as per map						
Waterbirds		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Australasian Grebe								
Australian Shelduck								
Australian White Ibis								
Black Swan								
Cormorant								
Pacific Black Duck								
Straw necked Ibis								
Wood Duck								
White faced Heron								
Yellow billed Spoonbill								
Grassland Birds								
Australian Magpie								
Australasian Pipit								
Australian Raven								
Australian Ringneck (28)								
Banded Lapwing								
Carnaby's Black Cockatoo								
Rock Parrot								
Raptors								
Brown Falcon								
Nankeen Kestrel								
Wedge tail Eagle								
Whistling Kite								
Aerial Foragers								
Black faced Cuckoo shrike								
Fairy/Tree Martin								
Welcome Swallow								
Willie Wagtail								
Terrestrial Mammals								
Fox								
Rabbit								
Kangaroo								
Dugite								
Tiger Snake								
Other observations								


City of Busselton
BUSSELTON - MARGARET RIVER AIRPORT
BIRD COUNT AREAS
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WMP-02 STRIKE REPORTING PROCEDURE

Objective	To accurately report all possible information on bird and other wildlife strikes via ATSB
Responsibilities	ARO
Frequency	As required, within 72 hours of strike
Equipment	Vehicle PPE as required for collection of remains

Strike reports provide one of the most important pieces of information regarding the risks posed by birds and other wildlife to aircraft. It is essential that all possible sources of information are investigated and details accurately recorded.

Procedure

1. Always complete on line Aviation accident or Incident report form (ATSB) with as much information possible.
2. Where a pilot report indicates a strike has or may have occurred, examine the areas where the strike was reported to have occurred for evidence of carcasses or remains.
3. Contact operator or ground crews to organise inspection of the aircraft for remains, evidence of strike such as blood smear or damage to the aircraft.
4. Process all remains found as per WMP - 04 (Identification and Handling of Remains).
5. Corroborate all information from airline and ATC.
6. Categorise the strike according to the definitions for confirmation and strike location (see Glossary).
7. Submit forms to ATSB and BMRA Operation Coordinator for inclusion in respective databases.

Note: Reports can be completed and submitted online at
https://www.atsb.gov.au/notifications/ReportOccurrence.aspx

WLMP-03

IDENTIFICATION AND HANDLING OF REMAINS PROCEDURE

Objective	To safely collect and store bird and other wildlife remains. To accurately obtain as much information from bird and wildlife remains found at BMRA.	
Responsibilities	ARO	
Frequency	As required	
Equipment	Vehicle Tongs/tweezers Re-sealable bags Labels Hand wash	Disinfectant Freezer Gloves Reference book

For determining trends in strikes at BMRA, it is essential to wherever possible identify the species involved. In order to accurately assess both the cause of death and identification of the species, carcass retrieval is essential. This information ultimately aids in better wildlife management on airport.

Procedure

1. Locate remains.
2. Follow the procedures below for each type of remains found. All strikes and carcasses should be reported, follow Procedure WMP-03– Strike Reporting.

Whole Carcasses (collect sample for professional identification)

1. Depending on size of sample - use disposable gloves, thick gloves or a pair of tongs to collect remains from runway, ground, aircraft etc and seal carcass in plastic bag (taking care not to contaminate the outside of the bag).
2. Remove gloves and dispose, wash hands.
3. Disinfect tongs and tweezers.
4. Fill out strike form and place inside a separate sealed plastic bag with the carcass.
5. Freeze in designated bird carcass freezer for analysis by consultant at a later date if required.
6. Bird carcasses taken during culling will be handled as outlined above. Where more than one specimen of a common and easily identifiable species is culled, one will be placed in a bag,

tagged and frozen and the others disposed of appropriately (e.g. buried to exclude scavenging animals, or to landfill).

7 Follow Procedure WMP-03– Strike Reporting.

Feathers and fragments (collect sample for professional identification)

1. Use disposable gloves.
2. If single feathers, or with small amounts of flesh attached, place in re-sealable bag.
3. Remove gloves and dispose, wash hands.
4. Fill out strike form with all details and staple to bag.
5. Freeze in designated bird carcass freezer for analysis by consultant at a later date.
6. Follow Procedure WMP-03– Strike Reporting.

Safety Considerations

Dead animals may carry diseases harmful to humans. Wear gloves, and if necessary, disposable coveralls when handling carcasses or biological materials. Avoid direct skin contact with biological materials and avoid contaminating your normal work clothing. Ensure that the outside of sample bags, vehicles and freezers are not contaminated. Wear a mask and eye protection if there is a risk of body fluids or organic material misting into the atmosphere. Wash hands thoroughly when you are done.

If an animal is sick or injured, it may be necessary to humanely destroy the animal then process the carcass according to the procedures below. Seek veterinary advice if required and regularly liaise with local wildlife authorities to ensure your species knowledge and euthanasia competency is adequate. Regular competency checks will help avoid unnecessary euthanasia of an endangered species or delayed euthanasia of a suffering individual.

Flying-foxes and Micro bats may carry viruses that can cause serious disease in man and particular care must be taken when handling dead bats.

A sick or injured bat should only be handled by suitably experienced and vaccinated persons.

If a person is bitten or scratched by a bat,

1. The wound should be immediately washed with soap or disinfectant and water for at least five minutes
2. Seek medical advice immediately.

Attachments

Nil

WMP-04

WILDLIFE DISPERSAL PROCEDURE

Objective	To remove immediate wildlife hazards from the airport.
Responsibilities	ARO
Frequency	Prior to scheduled arrivals/departures, or as required.
Equipment	Motor vehicle – Lights & siren

Dispersal of wildlife hazards is an integral aspect of active management on the airport .Early detection and immediate removal of hazards is essential to effective management of risks.

Detection is achieved during wildlife counts (Wildlife Count Procedure WMP-01) and wildlife hazard surveillance (Wildlife Surveillance Procedure WMP-02). Personnel should be present on the airport and equipped to manage wildlife hazards as required for scheduled counts and inspections and also during routine daily surveillance.

The following details are recorded, time; areas of the airport patrolled; numbers, location and species of wildlife seen; action taken to disperse the wildlife; results of the action.

Some important guidelines to be followed when dispersing wildlife:

- Dispersal needs to be most intense at the end of the breeding season to discourage young wildlife from foraging at the airport. Young are easily deterred from airports providing they recognize the airport as an unattractive and threatening environment (note that different species breed at different times of the year).
- Do not allow settling wildlife to feed in order to discourage regular visitation. It is easier and more effective to harass newcomers to the airport than birds that have established their territory on-site.
- Concentrate dispersal activities for most species in the early morning and midafternoon, prior to peak feeding periods. Early morning harassment discourages visitors settling in for the day.
- It may be necessary to continuously patrol and disperse during periods where aircraft movements are scheduled closely together.
- Where wildlife identify a particular vehicle as a risk and move to a different airside location, consider undertaking dispersal in a different type of vehicle.

Procedure

1. Identify wildlife requiring dispersal.
2. Position yourself between the runways and the wildlife to ensure dispersal is away from aircraft manoeuvring areas.
3. Choose the most appropriate equipment for the task (See attached equipment guidelines)
4. Check for no aircraft activity.
5. Activate equipment.
6. Determine effectiveness.
7. Continue until hazard is successfully removed.
8. Record details on BRMA Wildlife Surveillance and Dispersal Record Form.

Attachments

1. Equipment Overview
2. BMRA Wildlife Surveillance and Dispersal Record Form

Equipment Overview

There are a number of options available for undertaking dispersal and all will be used at various times to limit the likelihood of birds habituating to any one option.

Vehicle siren lights and horn can be used to herd and disperse birds.

Arm waving, lures and whips are inexpensive and sometimes effective means of dispersing flocks of some species of birds. The arm wave requires the officer to stand on high ground or a vehicle and flap both arms slowly at around 1 beat per second. Flocks respond as if to a predator such as a raptor and disperse. A well-used stock whip lets off a sound similar to that of a firearm and is an effective tool for dispersing some species.

Bird distress calls transmitted by megaphone or other equipment can also be effective but must be used by trained personnel to ensure the most effective outcome as different distress calls can either attract or disperse a flock, dependent on the species.

Trained dispersal animals, such as dogs and raptors, must only ever be used by highly trained specialists to avoid creating additional risk to aircraft.

APPENDIX 2 – ROLES AND RESPONSIBILITIES

Roles and Responsibilities

Position or entity	Responsibilities
BMRA Manager	Endorse the final version of the WMP.
	Ensure the resources for implementing the WMP are provided
BMRA Operations coordinator	Oversee the implementation and review of the WMP
	Ensure that BMRA Aerodrome Reporting Officers are trained in the functions required for wildlife hazard management, including bird counts, bird and animal identification, bird harassment and reporting techniques
	Ensure the WMP and procedures are issued to relevant staff and applied where necessary.
	Ensure Aerodrome Reporting Officers monitor, inspect, assess, record and report as described in the WMP.
	Ensure Aerodrome Reporting Officers and other relevant BMRA staff deal with wildlife and their habitats as described in the WMP.
	Liaise with airport operators, local government and other stakeholders to assist in identifying and managing wildlife issues at BMRA. Invite relevant external stakeholders to quarterly SMS meetings to assist with wildlife management at off airport sites.
	Engage a consultant to conduct an annual review of the wildlife hazard at BMRA if required
	Update and apply data collected as part of the WMP to assess trends and hazards.
	Ensure the relevant section of the WMP is reflected in the aerodrome manual.
	Provide information regarding bird and animal hazard and its management at BMRA to regulatory authorities and operational publications as required

Position or entity	Responsibilities
BMRA ARO	Count, survey, inspect, assess, record and report as described in the relevant sections of the WMP and any procedures
	Deal with birds, animals and their habitats as described in the relevant sections in the WMP and adhere to wildlife management procedures.
	Attend bird and animal hazard management training as required
	Accurately record management actions as per wildlife management procedures.
	Ensure waste is disposed of appropriately and bins and other waste storage facilities are maintained with closed lids or other suitable covering wherever practicable
	Monitor and report wildlife attraction to landscapes on BMRA land.
	Maintain or modify grass, landscapes and ground conditions where need is identified.
Aircraft Operators	Require air and ground crews to promptly inform Aerodrome Reporting Officers of all bird and animal strikes or hazardous conditions
	Require ground staff to relay evidence of strikes including damage, carcasses, feathers, or other material to Aerodrome Reporting Officers for collection.
	Provide copies of strike records for inclusion in the WMP database.
	Annually review the WMP and forward recommendations to the Airport Manager
	Where appropriate, consider changing operations to avoid times and locations where consistent bird hazards occur
	Attend quarterly SMS meetings and provide feedback on wildlife management issues at BMRA.

Position or entity	Responsibilities
BMRA tenants	Ensure waste is disposed of appropriately and bins and other waste storage facilities are maintained with closed lids or other suitable covering wherever practicable
	Promptly report observations of bird nesting in hangers to BMRA Aerodrome Reporting Officers
	Attend quarterly SMS meetings and provide feedback on wildlife management issues at BMRA
City of Busselton Planning	Consider the potential for bird and wildlife attraction when developing land use strategies.
	Review and discuss with BMRA management all proposals for land use changes within 6 kilometres of BMRA, giving due consideration to potential bird and wildlife hazards. Where necessary, ensure such proposals are modified to ensure that the risk posed by birds to aircraft is not increased.
DPAW	Consider the safety imperative when assessing the application by BMRA for permits.
	Assist BMRA to determine the appropriate actions where rare or threatened species become an aviation hazard.
AVISURE Aviation Ecologist/Ornithologist	Undertake professional risk based surveys at BMRA and surrounding bird attractions when requested.

APPENDIX 3 – REVIEW CHECKLIST

Review Checklist

Component	Task	Responsibility	Timeframe	Requirement	Compliance
Administration					
Bird strike reporting	All bird strikes reported to ATSB	ARO & Air operators	As required - ongoing	All strikes recorded with all available information and forwarded to the appropriate parties.	□ N/A □ Non-compliant □ Completed
Permits and licensing	All permits for bird and animal management activities held and kept valid	Airport Management	As required - ongoing	All permits held and valid	□ N/A □ Non-compliant □ Completed
Records of activities	All records of activities kept (i.e. counts, ammunition, cull etc) and where necessary entered into an electronic database	ARO	Ongoing	All records maintained	□ N/A □ Non-compliant □ Completed

Component	Task	Responsibility	Timeframe	Requirement	Compliance
SMS Committee Meetings.	Agenda to cover wildlife issues and management actions. Relevant on and off airport stakeholders must be included.	Airport Management/Operations Coordinator	Quarterly	Meetings held on a quarterly basis. Minutes taken to record achievements and progress	□ N/A □ Non-compliant □ Completed
Review of proposed land use changes- on airport land	All proposed land use changes within BMRA controlled land with potential to increase the risk of bird strike must be scrutinised appropriately.	Airport Management	As required - ongoing	Where risk increase is likely, modification to proposals is sought or the development is refused.	□ N/A □ Non-compliant □ Completed
Review of proposed land use changes – off airport land	Ensure a mechanism exists with within 6km of BMRA to refer land use changes or developments that have potential to impact on wildlife hazards at BMRA.	Airport management	As required - ongoing	Where risk increase is likely, BMRA should formally object to the development and request modification to proposals.	□ N/A □ Non-compliant □ Completed
Training					
Wildlife management training	Competency based assessment for bird control staff	Airport management	As required	Assessment as part of annual audit.	□ N/A □ Non-compliant □ Completed

Component	Task	Responsibility	Timeframe	Requirement	Compliance
Firearm safety training	Firearm safety training undertaken	N/A	N/A	training session attended by all relevant personnel as required	☐ N/A ☐ Non-compliant ☐ Completed
Monitoring Risks					
Wildlife counts	Counts undertaken daily and recorded in the electronic database	BMRA ARO	Ongoing	All data collected and entered into database	☐ N/A ☐ Non-compliant ☐ Completed
Risk based surveys	Professional wildlife surveys undertaken on and off airport.	Consultant	As required	Surveys conducted, results presented to SMS	☐ N/A ☐ Non-compliant ☐ Completed
Detecting Hazards and Active Management					
Perimeter fence inspections	Daily perimeter fence inspections	ARO	Daily – ongoing	Nil breaches of fence by medium and large sized mammals	☐ N/A ☐ Non-compliant ☐ Completed

Component	Task	Responsibility	Timeframe	Requirement	Compliance
Discouraging breeding on airport	Nest removal or destruction animal breeding place	ARO	As required - ongoing	No birds nesting airside	☐ N/A ☐ Non-compliant ☐ Completed
Recording activities	Logging bird/animal monitoring and management efforts	ARO	Daily - ongoing	Records kept for counts inspections dispersal and patrol	☐ N/A ☐ Non-compliant ☐ Completed
Passive Management					
Vegetation management	Identification and removal of vegetation that attracts significant birds/wildlife as specified in plan.	ARO	As required - ongoing	No additional attraction of birds due to vegetation and landscaped areas of BMRA	☐ N/A ☐ Non-compliant ☐ Completed
Waste management	Ensure waste on airport land is disposed of effectively to reduce bird attraction	BMRA tenants	As required - ongoing	Ensure bin lids remain closed and waste is not accessible for wildlife to feed.	☐ N/A ☐ Non-compliant ☐ Completed
Review					

Component	Task	Responsibility	Timeframe	Requirement	Compliance
Technical inspection	Technical inspection in accordance with MOS 139 Section 10.14.1.5	Consultant	Yearly - ongoing	Conducted annually	☐ N/A ☐ Non-compliant ☐ Completed
Major review of plan	Undertake major review 5 yearly	Consultant	5 yearly - ongoing	Major review every 5 years or when triggered	☐ N/A ☐ Non-compliant ☐ Completed
Update plan	Update Bird and WMP annually	Airport Operations coordinator	Yearly - ongoing	Plan updated annually	☐ N/A ☐ Non-compliant ☐ Completed
Records of review	Records of review and audits kept	Airport Management	Yearly - ongoing	Records kept yearly in Plan	☐ N/A ☐ Non-compliant ☐ Completed

APPENDIX 4 – STANDARDS REFERENCE TABLE

Standards Reference Table

CASR Manual of Standards

CHAPTER 5: AERODROME INFORMATION FOR AIP

Section 5.1: General

5.1.3.24	**Additional Information.** Significant local data may include the following: (a) animal or bird hazard.	

Section 10.14: Bird and Animal Hazard Management

10.14.1 Introduction

10.14.1.1	The aerodrome operator must monitor and record, on a regular basis, the presence of birds or animals on or in the vicinity of the aerodrome. Monitoring personnel must be suitably trained for this purpose.	
10.14.1.2	Where regular monitoring confirms existence of a bird or animal hazard to aircraft operations, or when CASA so directs, the aerodrome operator must produce a bird or animal hazard management plan, which would be included as part of the Aerodrome Manual.	
10.14.1.3	The management plan must be prepared by a suitably qualified person such as an ornithologist or a biologist, etc.	
10.14.1.4	The management plan must address: (a) hazard assessment, including monitoring action and analysis; (b) pilot notification; (c) liaison and working relationships with land use planning authorities; (d) on-airport bird and animal attractors which provide food, water or shelter; (e) suitable harassment methods; and (f) an ongoing strategy for bird and animal hazard reduction, including provision of appropriate fencing.	

10.14.1.5	The bird and animal hazard management plan must be reviewed for effectiveness, on a regular basis, at least as part of each technical inspection.	
10.14.1.6	Where the presence of birds or animals is assessed as constituting an ongoing hazard to aircraft, the aerodrome operator must notify the AIS in writing, to include an appropriate warning notice in the ERSA.	
10.14.1.7	Where a bird or animal hazard is assessed as acute, of short term or seasonal nature, additional warning must be given to pilots by NOTAM.	
10.15.4.2	Paved runway surfaces should be maintained so that standing water is neither formed nor retained. Birdbath depressions should be repaired at the earliest opportunity.	
12.1.3.2	**Aerodrome Serviceability Inspections** The checklist must encompass at least the follow areas: (e) Animal or bird activities on and in the vicinity of the aerodrome;	
13.1.8.2 (for those operating under CASR 121B only)	The aerodrome operator has a duty of care to provide information that is as accurate as possible. This would require physical inspection of the aerodrome, ideally before the departure of the airline's aeroplane from its base aerodrome, but always before the arrival of the aeroplane. To maintain the accuracy of the aerodrome serviceability status, it is essential that the aerodrome be inspected after strong wind or rain. The information provided should include: (e) other hazardous condition or object known to the aerodrome operator, e.g. animal or bird hazard.	
6.2.23.2	Effective drainage in the graded area must be provided to avoid water ponding and thus attracting birds. Open drains must not be constructed in the graded portion of a runway strip.	
10.2.2.1	Any significant object found in the course of the inspection, including aircraft parts which may have fallen from the aircraft, or the remains of birds which may have been struck by an aircraft, must be reported immediately to Air Traffic Control, where appropriate, and to the Australian Transport Safety Bureau (ATSB). *Note: Any bird strike incident is to be reported to ATSB. Contact ATSB for*	

	the format of reporting details	
10.2.7.1	**Birds or Animals on, or in the Vicinity of, the Movement Area** The inspection must include: (b) climatic or seasonal considerations, such as the presence of birds at certain times of the year, or related to the depth of water in drainage ponding areas; (c) possible shelter provided by aerodrome infrastructure such as buildings, equipment and gable markers; (d) bird hazard mitigating procedures incorporated in the environmental management procedures for the aerodrome; (e) off-airport attractors like animal sale yards, picnic areas, aeration facilities and waste disposal or landfill areas, and (f) use of harassment procedures where appropriate.	
10.3.2.2	The following occurrences must be reported to the Australian NOTAM Office: (e) a significant increase in, or concentration of birds or animals on or in the vicinity of the aerodrome;	

Section 10.3: Bird or Animal Hazard Warning

10.3.6.1	At aerodromes where a standing caution is included in ERSA for a bird or animal hazard, NOTAM must only be initiated where there is a significant increase of birds or animals. The NOTAM must provide specific information on species, period of concentration, likely location and flight path.	

Section 10.6: Monitoring Activities outside Aerodrome

10.6.4.1	The reporting function must also include monitoring activities outside but in the vicinity of the aerodrome which may result in hazards to aircraft operations. This includes:	

	(b) land planning and use which may attract birds.	

CASR (1998)

Part 139 - 16	Civil Aviation Safety Regulations *Bird and animal hazard management* (k) particulars of the procedures to deal with danger to aircraft operations caused by the presence of birds or animals on or near the aerodrome, including details of the following: i. the arrangements for assessing any bird or animal hazard; ii the arrangements for the removal of any bird or animal hazard; iii the names and roles of the persons responsible for dealing with bird or animal hazards, and the telephone numbers for contacting them during and after working hours;	
139.220	Aerodrome serviceability inspections, which must include the following to be completed daily: ▪ an inspection for any birds or animals on or near the movement area; ▪ an inspection of any measures to control the inadvertent entry of persons or animals into the movement area (including aerodrome fencing);	
139.230 (f)	Facilities at the aerodrome used for (iii) bird and animal hazard management are to be inspected	
139.230 (h)	A check of the currency and accuracy of (ii) aerodrome operating procedures specified in the aerodrome manual for the aerodrome is to be undertaken.	
139.315	Appendix 1 to paragraph 139.315 (4) (a) (Matters to be dealt with in safety inspections) (4) Check the following: (g) equipment used for dispersing birds; (h) aerodrome fencing.	

ICAO (2003)

(Annex 14, Volume 1 to the Convention on International Civil Aviation; Chapter 9; Section 9.5 - Bird hazard reduction)

9.5.1	The bird strike hazard on, or in the vicinity of, an aerodrome shall be	

	assessed through: (a) the establishment of a national procedure for recording and reporting bird strikes to aircraft; and (b) the collection of information from aircraft operators, airport personnel, etc. on the presence of birds on or around the aerodrome constituting a potential hazard to aircraft operations. *Note. See Annex 15, Chapter 8, Section 8.3*	
9.5.2	Recommendation. – Bird strike reports should be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) Database. *Note. The ICAO Bird Strike Information System (IBIS) is designed to collect and disseminate information on bird strikes to aircraft. Information on the system is included in the* Manual on the ICAO Bird Strike Information System (IBIS)	
9.5.3	When a bird strike hazard is identified at an aerodrome, the appropriate authority shall take action to decrease the number of birds constituting a potential hazard to aircraft operations by adopting measures for discouraging their presence on, or in the vicinity of, an aerodrome. *Note: Guidance on effective measures for establishing whether or not birds, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the* Airport Services Manual, Part 3.	
9.5.4	The appropriate authority shall take action to eliminate or prevent the establishment of garbage disposal dumps or any such other source attracting bird activity on, or in the vicinity of, an aerodrome, unless an appropriate aeronautical study indicates that they are unlikely to create conditions conducive to a bird hazard problem. *Note. Due consideration needs to be given to airport operators' concerns related to land development close to the airport boundary that may attract birds/wildlife.*	

Transport Safety Act 2003

Part 3—Compulsory reporting of accidents etc.

19	Written reports within 72 hours (1) If a responsible person has knowledge of an immediately reportable matter or a routine reportable matter, then the person must within 72 hours give a written report of the matter (containing the particulars prescribed by the	

	regulations) to a nominated official.	

Bird and animal species listed under the following international conventions have legislation in place to protect and maintain populations and individuals;

EPBC Act (1999)

Japan-Australia Migratory Bird Agreement (JAMBA),

China-Australia Migratory Bird Agreement (CAMBA),

Korea-Australia Migratory Bird Agreement (ROKAMBA) and

Convention on the Conservation of Migratory Species of Wild Animals – (Bonn

Convention) – (International conventions and agreements on migratory species)