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Management Working Group (AP-WHM/WG/7)

*Pokhara, Nepal, 5 to 9 May 2025*

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

**SPECIES SPECIFIC APPROACH AND MICROHABITAT MANAGEMENT AS A BEST  
PRACTICE FOR WILDLIFE HAZARD MANAGEMENT**

(Presented by India)

**SUMMARY**

This paper presents information about the successful implementation of species specific mitigation strategies to control the bird strike incidents at GMR Hyderabad International Airport, India by emphasizing the case study of Red-Wattled lapwing. The Scientific approach of microhabitat management along with best practices to prevent the bird hazard at GHIAL are also discussed for the benefit of forum.

**1. INTRODUCTION:**

1.1 GHIAL is the green field airport built under public private partnership model in India. Total area spanning the airport is 2,200 hectares, out of which 810 hectares have been developed towards airport needs which mainly constitutes 690 hectares (1,700 acres) of land is airside and 120 hectares (300 acres) of land is landside facilities.

1.2 Currently handling 1.95 Lakhs of air traffic movement in a year. On this background GHIAL has ensured a stringent wildlife/bird control process managed by the trained and dedicated team.

1.3 A total of 134 bird species were recorded in the airport, among these 103 species are resident and 31 are migratory. Thirteen species of birds were considered for risk assessment and 4 species categorized under high risk.

1.4 Red-Wattled lapwing is one of the high risk category species which is a ground dwelling bird resident to India and also a major contributor to bird strike incidents in GHIAL.

1.5 Success of any Wildlife Hazard Management depends upon the process of knowing your species. All the active and passive methodology has to be planned accordingly to achieve the desired result.

1.6 Species specific approach to wildlife hazard management is to be based on the ecology and site specific behavior of species of concern.

1.7 Microhabitat is a small scale environment that differ from surrounding habitat, offering specific condition suitable for certain organisms.

1.8 Identification microhabitats in airport environment is the major part of WHM, through which we can cut the source and address the issue in root level.

## 2. DISCUSSION

### Behavioral ecology of Red Wattled lapwing (*Vanellus indicus*)

2.1 Red-wattled lapwing normally found in small groups around water bodies, agricultural fields, and dry land. They feed primarily on insects with running a short distance and picking up food from ground. This bird well known for its characteristics loud alarm call. The breeding season is mainly March to August. The eggs are laid in a ground scrape or depression/bald patches sometimes fringed with pebbles. About 3–4 black-blotched buff eggs shaped a bit like a peg-top (pyriform), 42x30 mm on average. Nests are difficult to find since the eggs are cryptically coloured and usually matches the ground pattern.

2.2 In Hyderabad, the pair formation in lapwing typically begins in the middle to late of February, and egg laying occurs between mid-March to June. According to our records from the previous years, peak nesting occurred within the airfield during March to April. Red wattled lapwings prefer open/bald patches in the dense grassy areas with grass heights less than 8 cm-15 cm available in the runway strip.

2.3 Seasonal variation in sighting of Red-Wattled lapwing in the airfield was recorded through daily monitoring (Fig. 01).

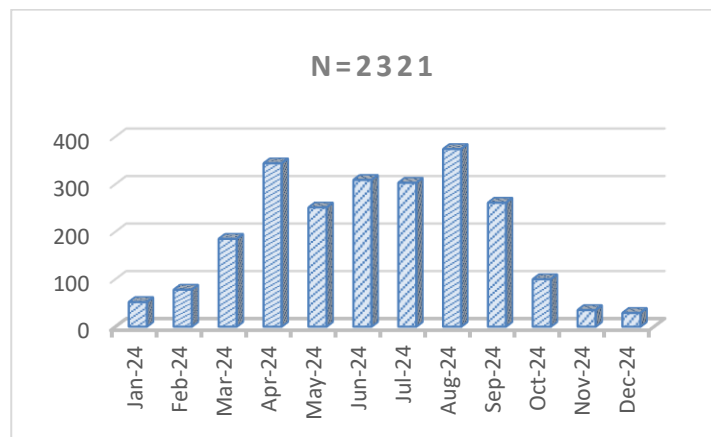


Fig:- 01 Seasonal activity of Red-Wattled lapwing in the Airfield

### Species specific mitigation strategy for Red-Wattled Lapwing

2.4 Night patrolling by the wildlife control personnel to deter the birds on continuous basis by using flashing torch light and acoustic device.

2.5 Practice of selective grass cutting to optimize the height, which will be a deterrent for lapwing nesting yet will be short enough to avoid other big birds (Plate 01).

2.6 Removal of termite mounds from the runway strip, termites are major source of protein diet for lapwings during summer season and thereby supporting their breeding activity (Plate 02).

2.7 Made sure that no water source is available in the critical areas as lapwings use the water to cool their eggs during the incubation period.

2.8 Maintained the undisturbed areas away from the runway strip, being a highly territorial bird it will restrict their courtship behavior and defensive flight pattern close to their nesting ground which will keep them away from the path of aircraft.

2.9 Checked and controlled the stray dog population outside the airport in coordination with local Govt. bodies. Stray dogs being a natural predator of lapwing eggs and chicks, they were forced to select the airport area as their breeding ground.

2.10 Walk in search of egg- The nest and eggs spotted in the runway strip were collected and submitted to Nehru Zoological Park.

2.11 Sprayed Bird repellent “Bird X” in the runway graded areas which is acting as olfactory repellent to birds.



Plate 01:-Runway edges with grass bed to avoid lapwing nesting.



Plate 02:-Removed termite mounds to cut the source of food

## Result

2.12 Lapwing activity in the critical area was reduced and achieved the result of zero bird strike due to lapwing (Fig 02)

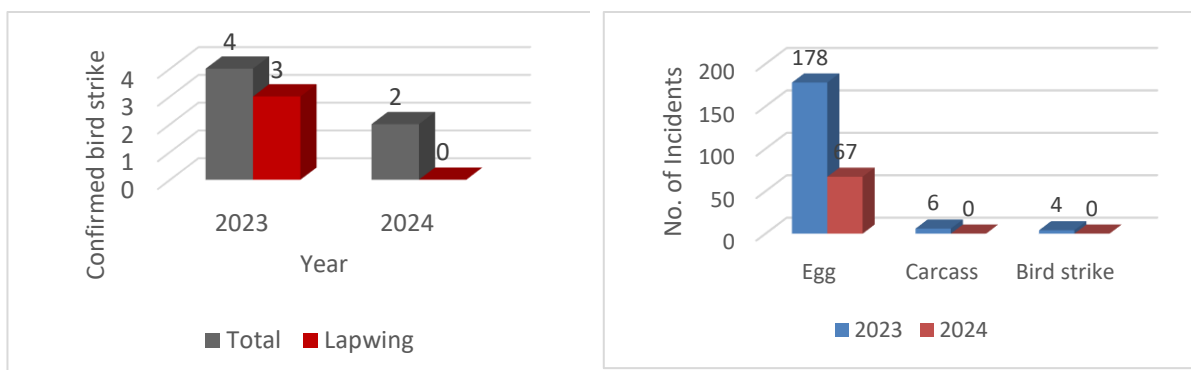


Fig:- 02 year wise comparison of lapwing activity during breeding period (April)

### Microhabitat Management (Scientific approach)

2.13 Observed seasonal infestation of caterpillar on the runway which attracted the bird species such as common myna, pigeon and crow and thereby posing threat to the aircraft operations (Plate 03).

2.14 Collected the caterpillar and identified its adult form. It was a moth called yellow orange moth (plate 04).

2.15 In the next step the host plant of the moth was identified as *Boerrhavia sp.* on which it lays eggs. (Plate 05).

2.16 Spotted and removed all the host plant from the graded area by manual uprooting and treated the area with Neem oil to kill the caterpillar.



Plate 03:- Caterpillar on runway



Plate 04:- Host plant- *Boerrhavia sp.*



Plate 05:- **Adult moth-** Yellow orange moth (*Aegocera venulia*)

### Best Practices

2.17 Frequent checking and close monitoring of airside infrastructures to prevent any nesting and breeding activity of birds in critical areas.

2.18 Extensive measures to prevent bird perches/roosting by installing nets and bird-spikes at all strategic locations, roof structures and ledges on terminal buildings, PBB structures.

2.19 Maintaining microhabitat such as burrows, crakes, algal blooms and vegetation growth on drains and water stagnated areas to prevent the attraction of birds/wildlife.

2.20 Daily habitat management through grass cutting and pest control in graded areas. A secondary buffer zone is also maintained by clearing trees, vegetation and bushes in the non-graded areas between the runway and boundary walls.

2.21 FOD bins in the airside are properly covered and the common waste collection yard is also maintained with enclosed structure. Regular clearance of collected waste is ensured by the professional waste management agency and the waste material is disposed through authorized waste recyclers.

2.22 Bird & rodent repellents like Methyl anthranilate, Bird-X and Naphthalene balls are used in graded areas as an effective bird preventive measures.

2.23 Documentation of daily bird/wildlife activity logs are captured to analyze the trend and seasonality for risk assessment and planning the species-specific strategies for effective mitigation.

2.24 Bird scarers with acoustic devices and pyrotechnics are positioned at critical locations to deter the bird/wildlife from aircraft maneuvering areas.

2.25 Cages are placed at strategic locations in the airfield for trapping and translocation of small mammals and birds as a supplementary measure.

2.26 To augment the active deterrence, tool box is added with the devices such as ultrasonic whistle, wooden clap, loud hailer and agri-cannon to produce different frequencies of sounds to scare the birds.

2.27 Special drives were conducted through local Govt. bodies prior to the start of festival seasons to raise awareness and promote proper waste management.

2.28 Periodic random surveys were conducted across the airport region to identify and report instances of open dumping of animal carcasses and to locate the roosting of birds/bats.

2.29 The consolidated reports and observations are discussed in the AEMC meeting chaired by District collector for review and issuing directives to the concerned agencies for their necessary action.

### **3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) share the best practices for WHM and;
- c) discuss any relevant matters as appropriate.

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