The Wildlife Hazard Management Plan/ Program Evaluation Report Card (PERC) Tool

Evaluating the Effectiveness of an Airport's Wildlife Hazard Management Program

ACRP AIRPORT COOPERATIVE RESEARCH PROGRAM

Mead&Hunt

ARA

Environmental Resource Solutions
A Division of SES Energy Services LLC

BLUE WING ENVIRONMENTAL

World Birdstrike Association

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Presentation Overview

Discussion Topics

- Project Background and Objectives
- Data Collection and Research Findings
- Tool Approach, Development and Output
- Successes and Challenges

Project Background and Objectives

Project Background: Available Guidance

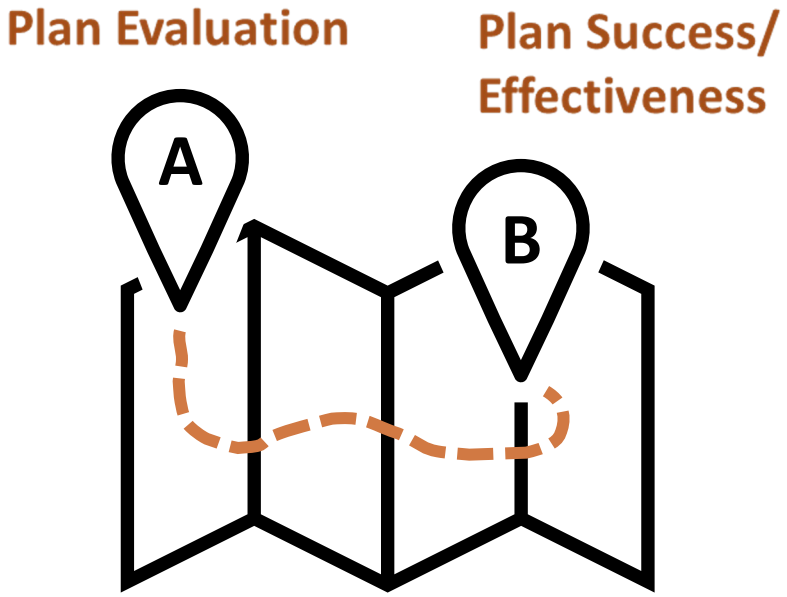
FAA Regulation

14 CFR Part 139.337 Wildlife Hazard Management

- Identifies plan contents (139.337 (f)(1) to (5)
- Requires 12-month review and evaluation (139.337 (6) to identify:
  - WHMP “effectiveness in dealing with known hazards on and in airport vicinity” (i)
  - “Aspects identified in the WHA” that should be re-evaluated (ii)

AC 150/5200-38 Protocol for the Conduct and Review of WHSVs, WHAs, and WHMPs.

- Describes required contents of WHMP
- Provides Annual Review Form for WHMP Review/Audit



What to review, not how….

Research Background: Goals and Objectives

Objective

- "Provide airport operators *of all types and sizes* with tools to evaluate the *effectiveness* of their WHMP/Programs to reduce wildlife strike risks to aviation."

- "Provide a universal, scalable, process to evaluate and improve wildlife hazard management plans."

Research Background: Project Goals (Problem Statement)

Project Goals

1. Create a new, scalable tool and guidance
2. Provide a self-evaluation report card
3. Provide a path to identify and modify ineffective measures or processes.
4. Tool characteristics
   - Easy to use
   - Replicable process
   - Incorporate Key Performance Indicators (KPIs)
   - Promote/identify areas of improvement
   - Promote Efficiency

…..to enhance aviation safety

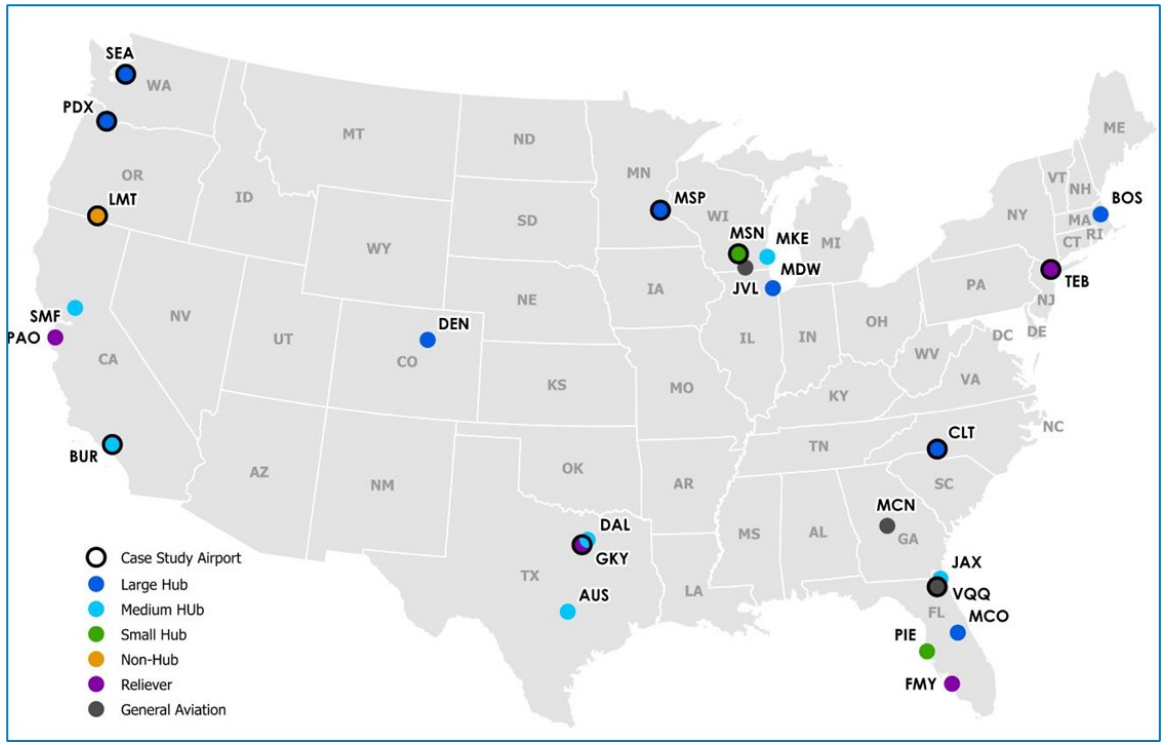
Data Collection and Outreach: Research Approach

Focus Groups and Case Studies

- Regulatory, Resource, and Transportation Agencies
- Large, Medium, and Small Hub Airports
- GA and Joint-use Facilities
- Wildlife Strike Database Managers
- Wildlife Management Practitioners and Stakeholders.

Participation

- 49 Participants
- 43 Organizations
- 10 Case Study Airports



Research Topics/Discussion

Compliance v. Effectiveness

- Compliance and effectiveness are *not* synonymous
- To be effective, a plan requires:
  - ✓ Implementation
  - ✓ Review
  - ✓ Adaptation

Source: Mission Matters Group

Research Topics/Discussion: Compliance and Effectiveness

Approach for Tool Development

- Consider *both* Compliance and Effectiveness

  (Necessary components *and* their implementation)
- Stick to the basics (training, resources, etc.)
- Provide easy-to-understand visual output and KPIs

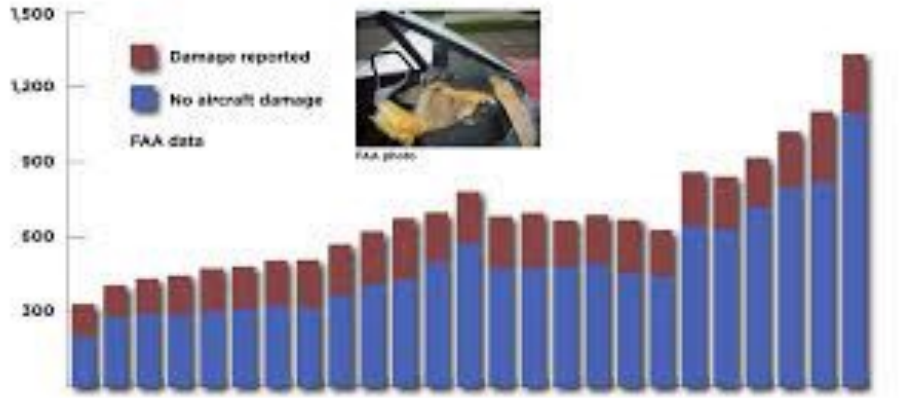
Provide a learning approach for users and stakeholders!

Source: Bitblog

Research Topics/Discussion: Database Analysis

Strike Data and Program Effectiveness

- Strike data was identified primary factor for evaluating considering effectiveness
- Dominant belief that effectiveness is defined by a reduction in strikes
- FAA's Wildlife Strike Database is a useful resource, but paints an incomplete picture
- Supplemental data should be considered (observational data, qualitative data).
- Comparisons among airports are undesirable



Tool Approach

- Consider strike record *and* incorporate supplemental data

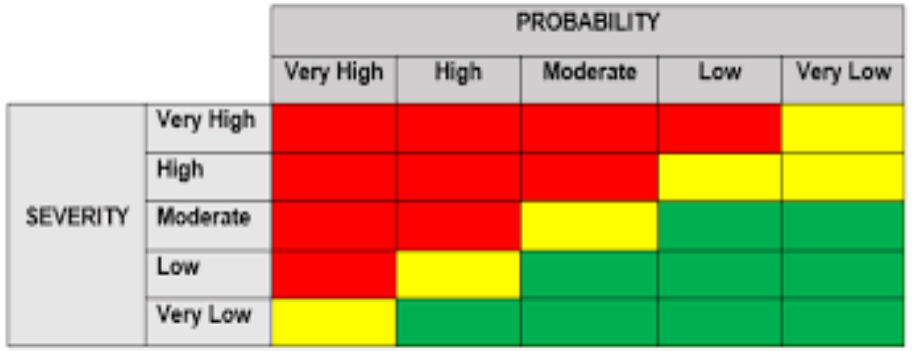
Research Topics/Discussion: Role and Level of Risk Management

Risk Management/High-Risk Species

- FAA requires this review during annual evaluation
- Simple model provides an incomplete picture (e.g., strikes v. strike rates)
- More sophisticated approaches are available, but require additional data and resources (Falcon Environmental, WHAMRAT)

Tool Approach

- Enhance simple method by incorporating total strikes, damaging strikes, and observation data.



Research Topics/Discussion: Tool Development

Overall Approach and Guidance

- Easy to Use (drop-down menus, easy to complete format
- Avoid additional training or software needs
- Stick to the basics
- Incorporate qualitative and quantitative data
- Evaluate overall programs *and* individual measures over time
- Identify opportunities for improvement

Photo Source: Baldwin Aviation

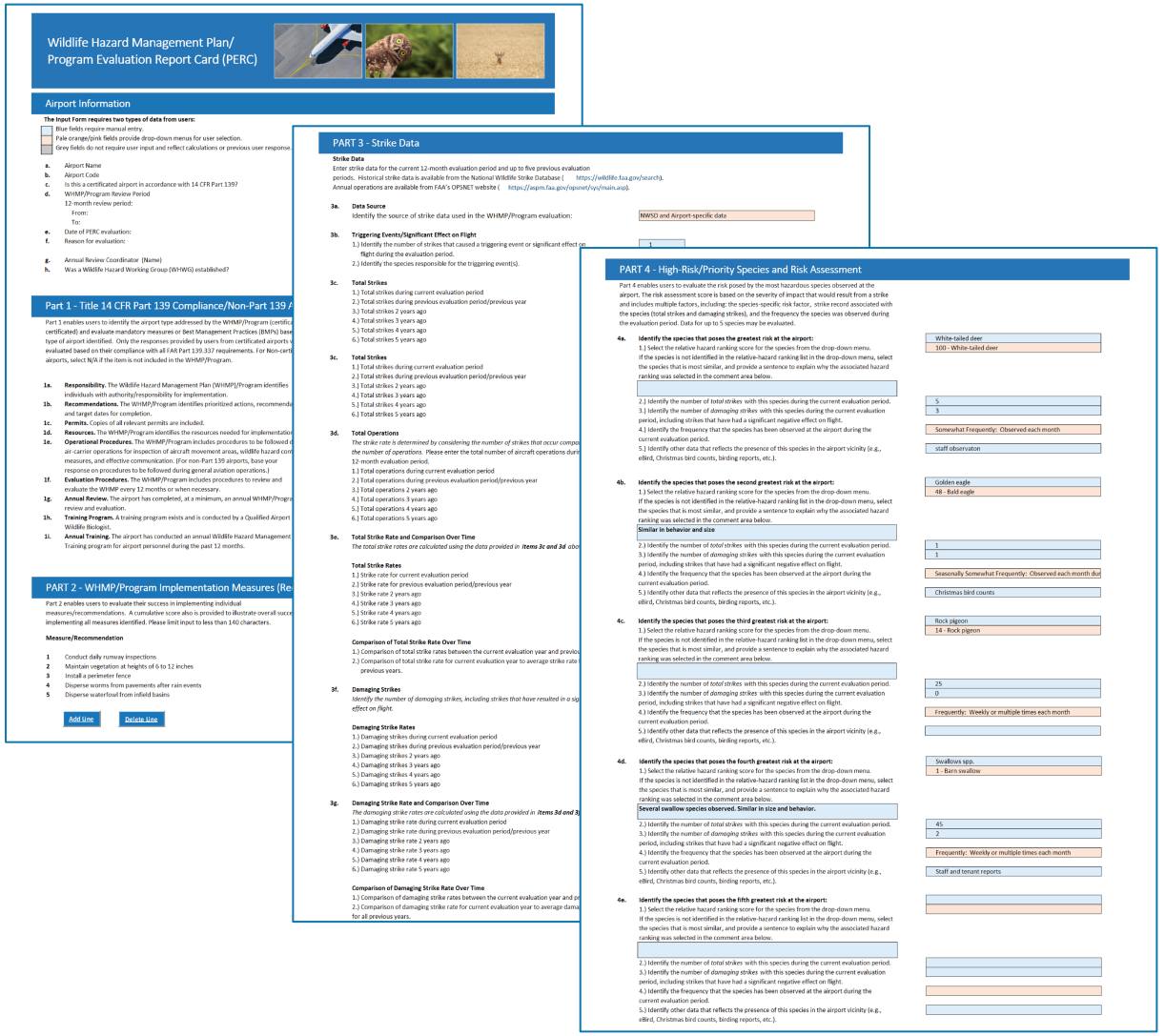
…Get beyond the data!

Tool Development

Program Evaluation Report Card (PERC) Tool

Evaluation Framework

- Compliance first
- Consider Airport-specific Recommendations/Measures
- Strike Record and Trends
- Simple Risk Assessment (high-risk species)
- Availability Equipment and Resources
- Staff Training
- Managing Off-site Attractants
- Ongoing Improvement
- Staff and Stakeholder and Education

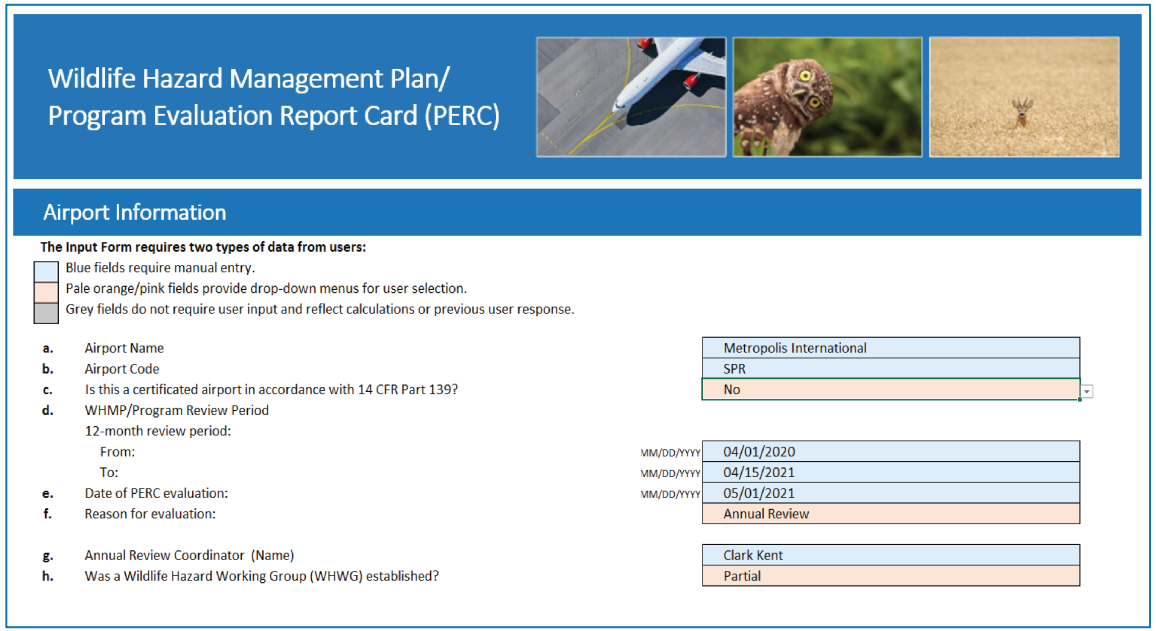


Program Evaluation Report Card (PERC) Prototype

Structure and Assumptions

- Excel-based self-reporting tool

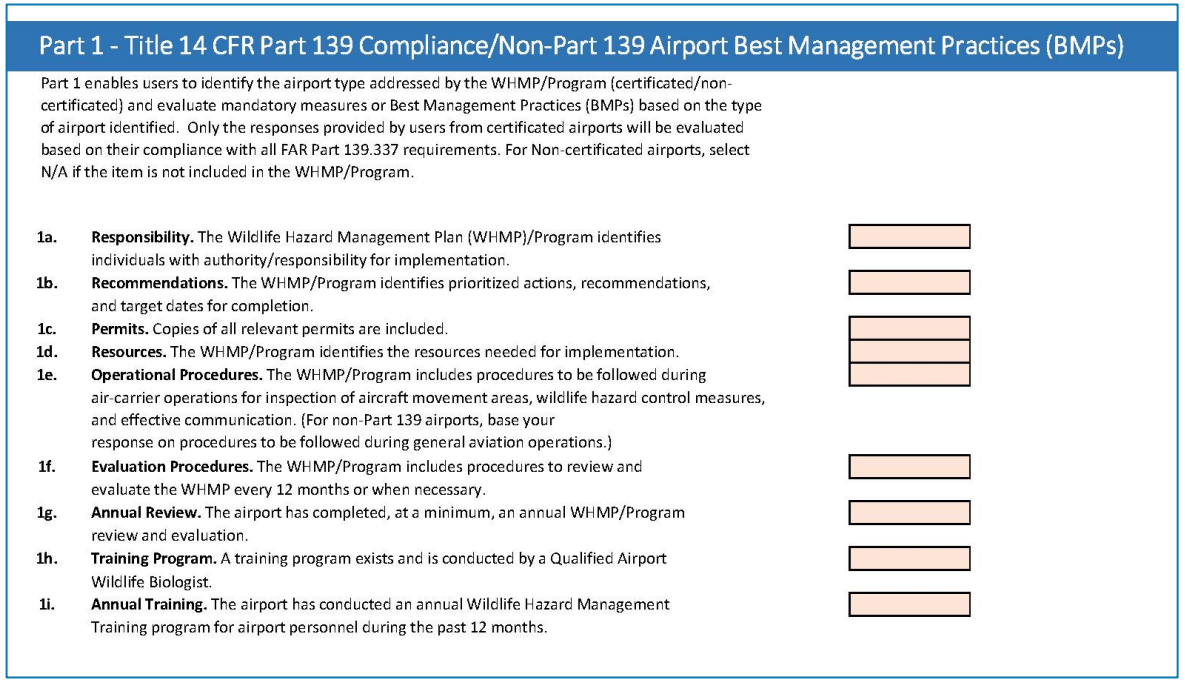
  (No new software or training!)
- Flexibility
  - Part 139 and GA Airport
  - Standalone analyses/KPIs
- Easy entry (color-coded typing, drop-down menus, and auto-fill features)
- Data storage for up to 5 evaluation periods
- Dashboard output
- Teaching approach – learn from input and output!



Compliance and Best Management Practices

Compliance Evaluation

- Begin with compliance!
- For Certificated airports, the criteria aligns with 14 CFR Part 139
- GA Airports are required only to have a documented set of recommendations/management measures.



Part 1 - Title 14 CFR Part 139 Compliance/Non-Part 139 Airport Best Management Practices (BMPs)

Part 1 enables users to identify the airport type addressed by the WHMP/Program (certificated/non-certificated) and evaluate mandatory measures or Best Management Practices (BMPs) based on the type of airport identified. Only the responses provided by users from certificated airports will be evaluated based on their compliance with all FAR Part 139.337 requirements. For Non-certificated airports, select N/A if the item is not included in the WHMP/Program.

1a.	**Responsibility.** The Wildlife Hazard Management Plan (WHMP)/Program identifies individuals with authority/responsibility for implementation.	
1b.	**Recommendations.** The WHMP/Program identifies prioritized actions, recommendations, and target dates for completion.	
1c.	**Permits.** Copies of all relevant permits are included.	
1d.	**Resources.** The WHMP/Program identifies the resources needed for implementation.	
1e.	**Operational Procedures.** The WHMP/Program includes procedures to be followed during air-carrier operations for inspection of aircraft movement areas, wildlife hazard control measures, and effective communication. (For non-Part 139 airports, base your response on procedures to be followed during general aviation operations.)	
1f.	**Evaluation Procedures.** The WHMP/Program includes procedures to review and evaluate the WHMP every 12 months or when necessary.	
1g.	**Annual Review.** The airport has completed, at a minimum, an annual WHMP/Program review and evaluation.	
1h.	**Training Program.** A training program exists and is conducted by a Qualified Airport Wildlife Biologist.	
1i.	**Annual Training.** The airport has conducted an annual Wildlife Hazard Management Training program for airport personnel during the past 12 months.	

Compliance and Best Management Practices

Compliance Evaluation and Output

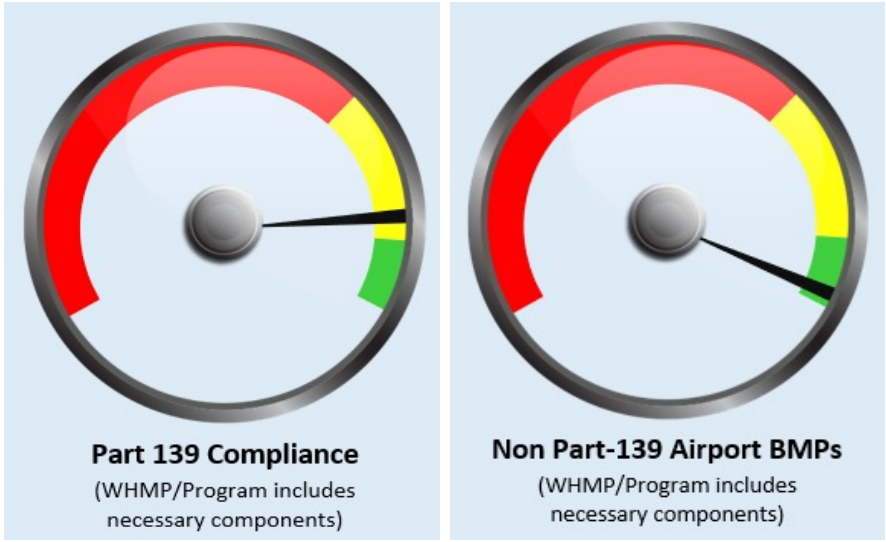
- Three possible outcomes:

  Green – Good or Satisfactory

  Yellow – Improvement Needed

  Red – Poor; substantial improvement needed

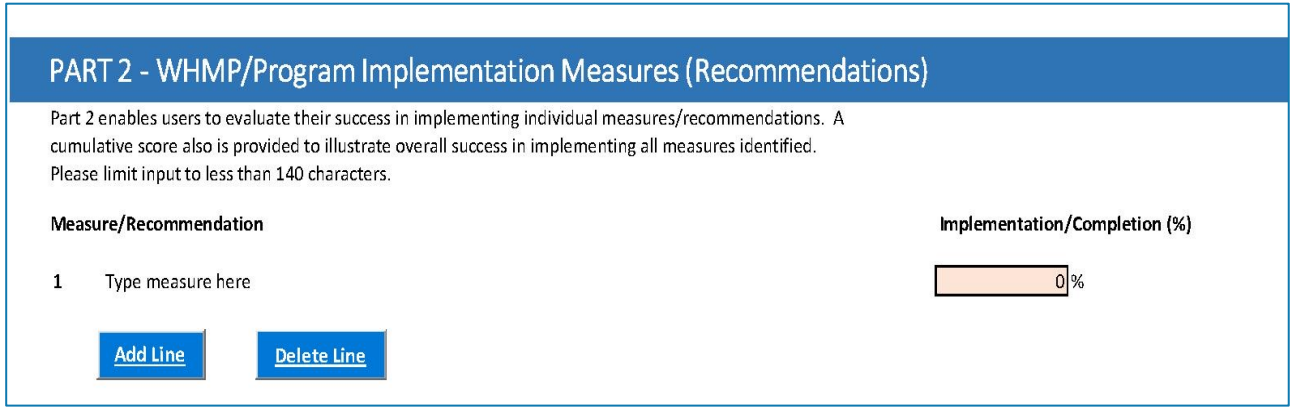
- Certificated airports must have achieved eight of nine criteria to be compliant
- GA Airports must provide a list of documented measures/ recommendations to be satisfactory



Recommendations/Management Measures

Evaluate WHMP/Program Implementation Measures

- Input up to 40 site-specific measures
- Self-report progress (% completion)
- Includes frequent and long-term measures



Recommendations/Management Measures

Evaluate WHMP/Program Implementation Measures

- Identifies progress toward implementation/completion of individual measures
- Provides cumulative/average score for all measures.

Individual Recommendations/Measures

1	Conduct daily runway inspections
2	Maintain vegetation at heights of 6 to 12 inches
3	Install a perimeter fence
4	Disperse worms from pavements after rain events
5	Disperse waterfowl from infield basins

Composite Score Recommendations/Measures
(Average score for all recommendations/measures)

Evaluation of Strike Data Over Time

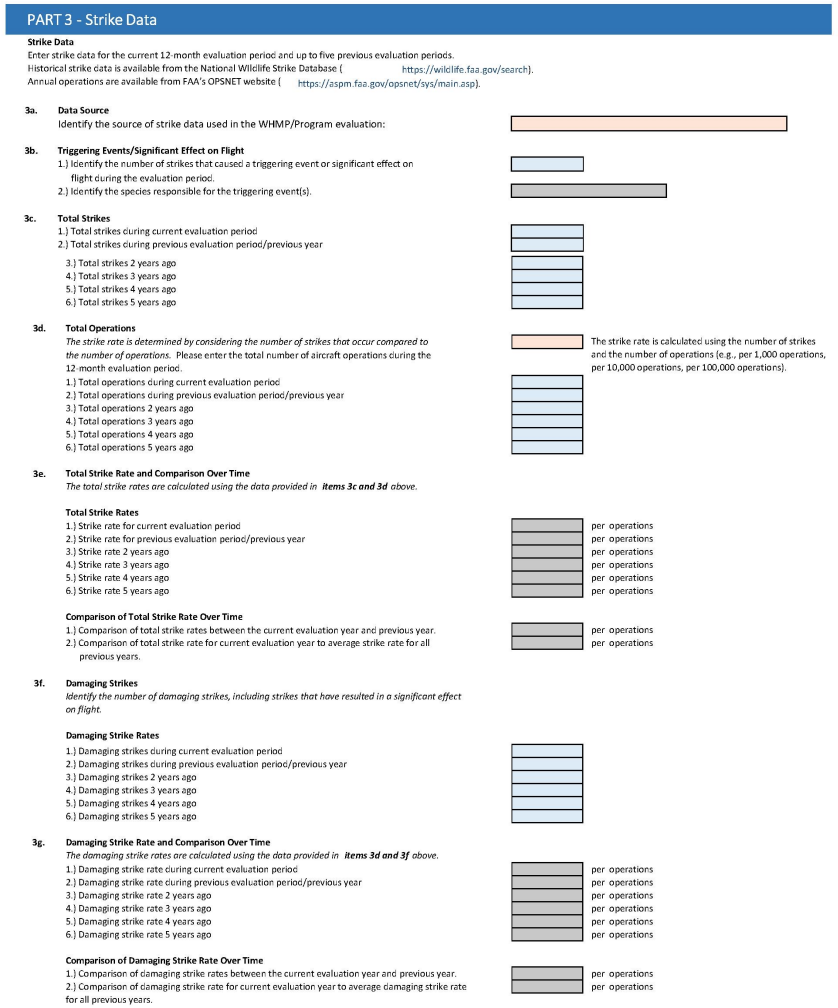
Strike Data Evaluation

- Multiple Data Sources (NWSD/Airport/Both)
- Current evaluation period and up to 5 previous evaluation period
- Total strikes and strike rates
- Damaging strikes and strike rates

Challenges

- Strike definitions may vary

  (collision v. “effect on flight”)



PART 3 - Strike Data

Strike Data
Enter strike data for the current 12-month evaluation period and up to five previous evaluation periods.
Historical strike data is available from the National Wildlife Strike Database (https://wildlife.faa.gov/search).
Annual operations are available from FAA's OPSNET website (https://aspm.faa.gov/opsnet/sys/main.asp).

3a. Data Source
Identify the source of strike data used in the WHMP/Program evaluation:

3b. Triggering Events/Significant Effect on Flight
1.) Identify the number of strikes that caused a triggering event or significant effect on flight during the evaluation period.
2.) Identify the species responsible for the triggering event(s).

3c. Total Strikes
1.) Total strikes during current evaluation period
2.) Total strikes during previous evaluation period/previous year
3.) Total strikes 2 years ago
4.) Total strikes 3 years ago
5.) Total strikes 4 years ago
6.) Total strikes 5 years ago

3d. Total Operations
The strike rate is determined by considering the number of strikes that occur compared to the number of operations. Please enter the total number of aircraft operations during the 12-month evaluation period.
The strike rate is calculated using the number of strikes and the number of operations (e.g., per 1,000 operations, per 10,000 operations, per 100,000 operations).
1.) Total operations during current evaluation period
2.) Total operations during previous evaluation period/previous year
3.) Total operations 2 years ago
4.) Total operations 3 years ago
5.) Total operations 4 years ago
6.) Total operations 5 years ago

3e. Total Strike Rate and Comparison Over Time
*The total strike rates are calculated using the data provided in **items 3c and 3d** above.*

Total Strike Rates
1.) Strike rate for current evaluation period per operations
2.) Strike rate for previous evaluation period/previous year per operations
3.) Strike rate 2 years ago per operations
4.) Strike rate 3 years ago per operations
5.) Strike rate 4 years ago per operations
6.) Strike rate 5 years ago per operations

Comparison of Total Strike Rate Over Time
1.) Comparison of total strike rates between the current evaluation year and previous year. per operations
2.) Comparison of total strike rate for current evaluation year to average strike rate for all previous years. per operations

3f. Damaging Strikes
Identify the number of damaging strikes, including strikes that have resulted in a significant effect on flight.

Damaging Strike Rates
1.) Damaging strikes during current evaluation period
2.) Damaging strikes during previous evaluation period/previous year
3.) Damaging strikes 2 years ago
4.) Damaging strikes 3 years ago
5.) Damaging strikes 4 years ago
6.) Damaging strikes 5 years ago

3g. Damaging Strike Rate and Comparison Over Time
*The damaging strike rates are calculated using the data provided in **items 3d and 3f** above.*
1.) Damaging strike rate during current evaluation period per operations
2.) Damaging strike rate during previous evaluation period/previous year per operations
3.) Damaging strike rate 2 years ago per operations
4.) Damaging strike rate 3 years ago per operations
5.) Damaging strike rate 4 years ago per operations
6.) Damaging strike rate 5 years ago per operations

Comparison of Damaging Strike Rate Over Time
1.) Comparison of damaging strike rates between the current evaluation year and previous year. per operations
2.) Comparison of damaging strike rate for current evaluation year to average damaging strike rate for all previous years. per operations

Evaluation of Strike Data Over Time

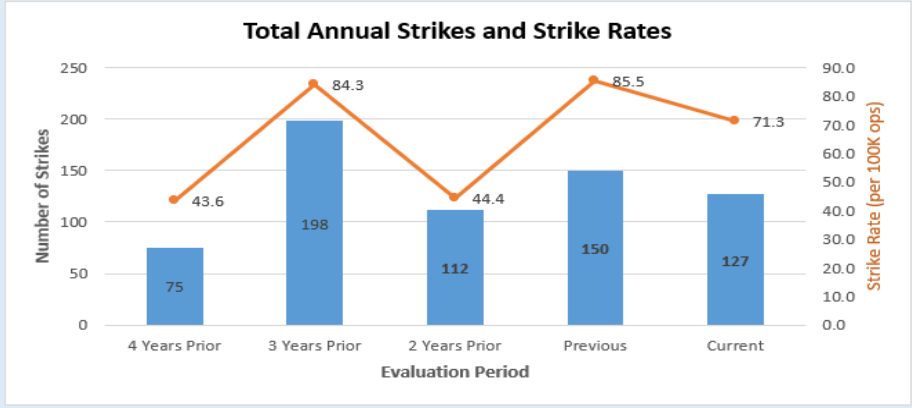
Strike Data Evaluation - Output

- Multi-metric graphic display
- Display varies according to available data (two or more years)
- Identifies and compares Total Strikes/Rates to Damaging Strikes/Rates
- Compares current evaluation period to average for previous evaluation periods
- Identifies source of the strike data

Opportunity for sharing and educating stakeholders!

Wildlife Strike Data

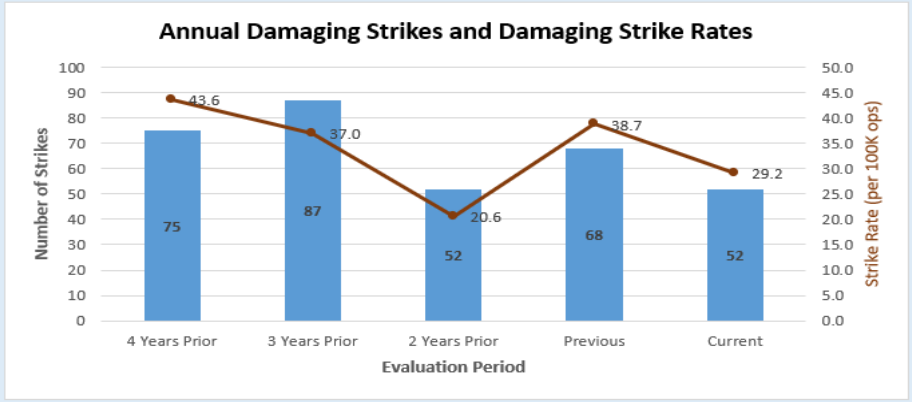
Total Strikes	Annual Strikes Rate	Comparison to
127	71.3/100,000	↑ 6.9
		4-year Average of 64.4



Source: NWSD and Airport-specific data

Damaging Wildlife Strike Data

Damaging Strikes: 52	Annual Strikes Rate	Comparison to
Effect on Flight: 1	29.2/100,000	↓ (5.8)
		4-year Average of 35

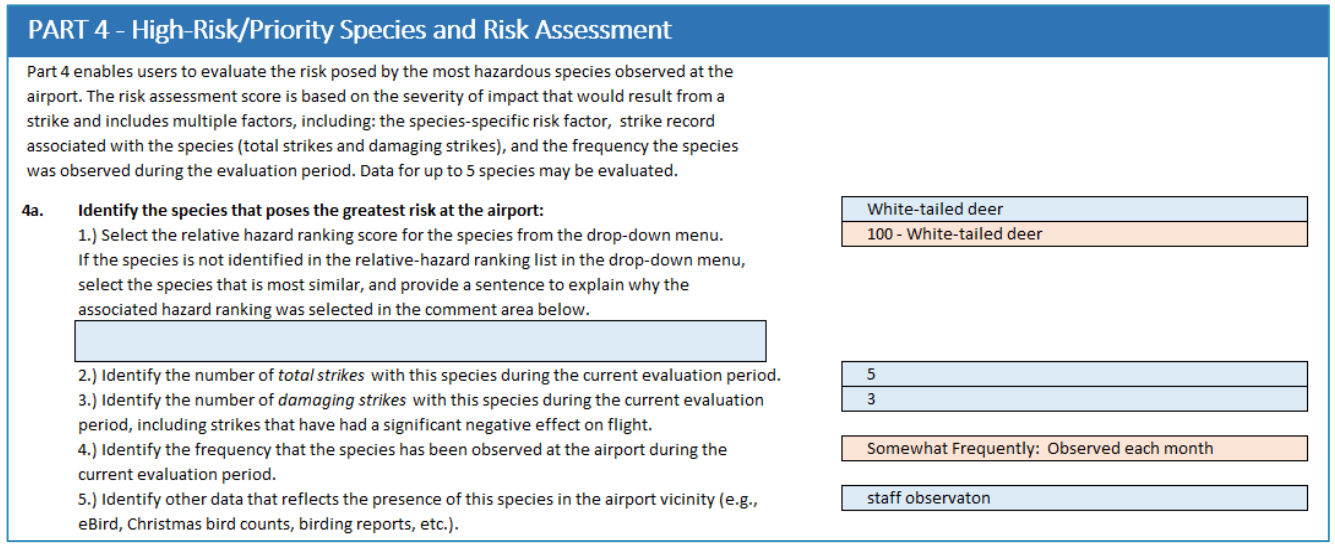


High-Risk/Priority Species and Risk Assessment

High-Risk Priority Species and Risk Assessment

Considers multiple factors

- Severity using published relative hazard scores (drop down)
- Total Strikes and Damaging strikes
- Frequency observed during evaluation period
- Data source (observation, birding reports)
- Up to five priority species



PART 4 - High-Risk/Priority Species and Risk Assessment

Part 4 enables users to evaluate the risk posed by the most hazardous species observed at the airport. The risk assessment score is based on the severity of impact that would result from a strike and includes multiple factors, including: the species-specific risk factor, strike record associated with the species (total strikes and damaging strikes), and the frequency the species was observed during the evaluation period. Data for up to 5 species may be evaluated.

4a.	**Identify the species that poses the greatest risk at the airport:**	White-tailed deer
	1.) Select the relative hazard ranking score for the species from the drop-down menu. If the species is not identified in the relative-hazard ranking list in the drop-down menu, select the species that is most similar, and provide a sentence to explain why the associated hazard ranking was selected in the comment area below.	100 - White-tailed deer
	2.) Identify the number of *total strikes* with this species during the current evaluation period.	5
	3.) Identify the number of *damaging strikes* with this species during the current evaluation period, including strikes that have had a significant negative effect on flight.	3
	4.) Identify the frequency that the species has been observed at the airport during the current evaluation period.	Somewhat Frequently: Observed each month
	5.) Identify other data that reflects the presence of this species in the airport vicinity (e.g., eBird, Christmas bird counts, birding reports, etc.).	staff observaton

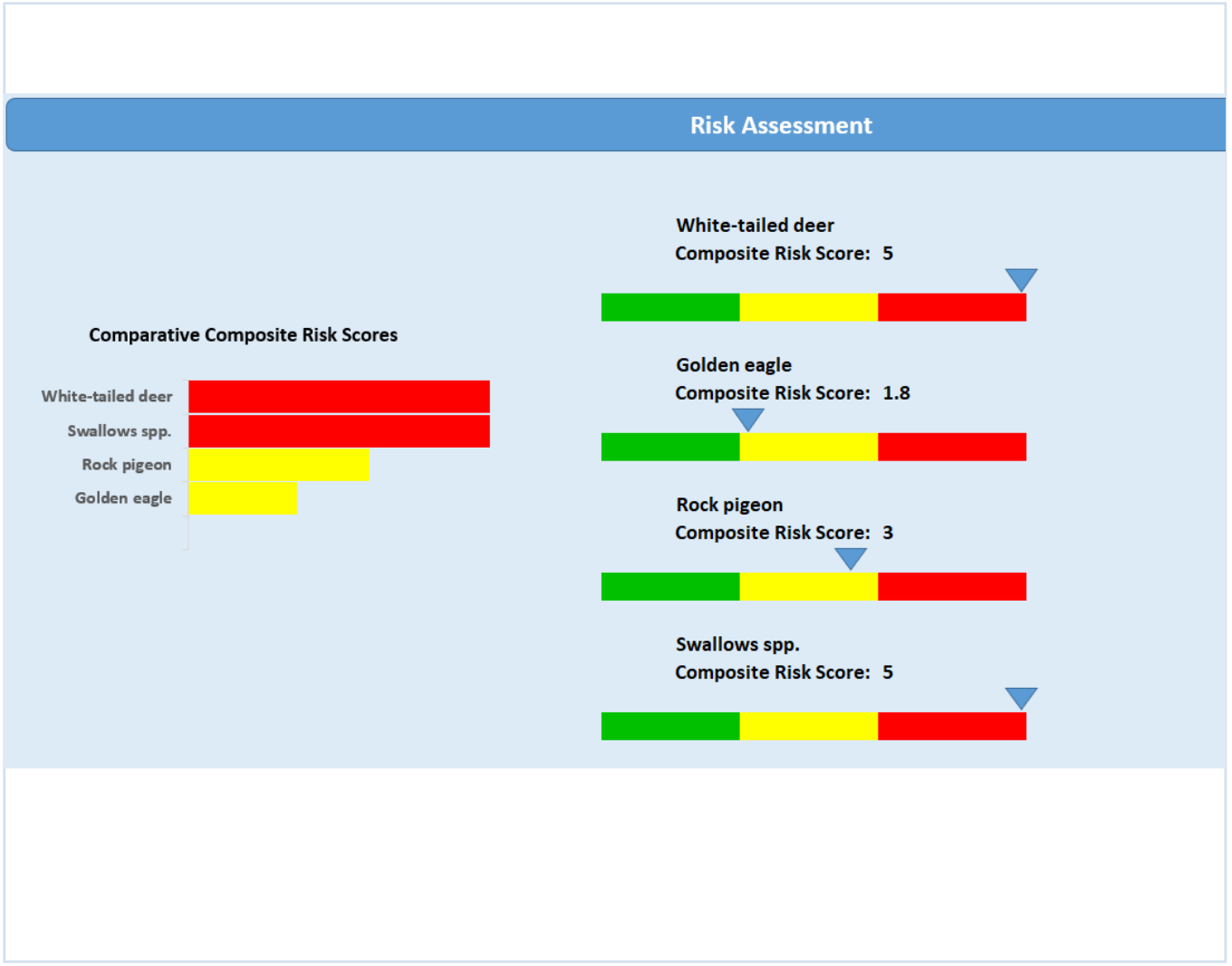
High-Risk/Priority Species and Risk Assessment

Data Output

- Composite Risk Score for each species
- Comparison among high-risk species

Opportunities

- Enables managers to determine whether high-priority species have changed since WHMP/Program competition.
- Comparison among species enables wildlife coordinators/managers to allocate limited resources to most persistent species.



Equipment and Resources

Equipment and Resource Considerations

- Identifies whether sufficient resources are available to implement the WHMP/Program.
- Considers multiple resource types (0perational equipment, capital improvements, and human resources).

Opportunities

- KPI can be shared with airport management and finance staff.
- Keeps long-term projects in mind.

PART 5 - Equipment and Resources

5a.	**Equipment.** Do airport staff have the supplies identified in the WHMP to implement the WHMP/Program?		
5b.	**Additional Resources.** What type of additional resources are necessary for ongoing implementation of the program?		Operational equipment or supplies
			Long-term projects/capital improvements
			Additional staff (Airport staff or contract services)

Equipment and Resources
(Availability of resources necessary for WHMP/Program Implementation)

Staff Training

Staff Training Evaluation and Considerations

- Acknowledges need for/ tracks recommended training
- Considers current and historical training record (current and last three evaluation years)

Opportunity

- Provides KPI to share with airport management and administration to demonstrate training needs.

PART 6 - Staff Training

6a.	Was wildlife hazard management training conducted at the airport in the last 12 months? *This response reflects the response provided in* ***Item 1i.***	
6b.	Have airport personnel involved in WHMP/Program activities obtained additional WHMP training in the past 12 months (e.g., attended a conference focused on wildlife hazard management or a course on wildlife identification, etc.)?	
6c.	Has training been provided to staff involved in WHMP/Program activities at any time during the last three years?	

Managing Off-site Wildlife Attractants

Off-site Management Evaluation and Considerations

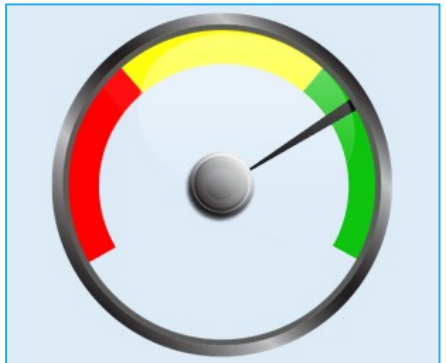
- Focus on awareness and effort (i.e., risk management approach)
- Identification of nearby attractants
- Identifies potential outreach options to agencies and stakeholders

Opportunities

- Considers an often overlooked but important item
- Questions can enhance understanding/outreach options for wildlife coordinators

PART 7 - Managing Off-site Wildlife Attractants

7a.	Have off-site features or land uses within the airport vicinity been evaluated to identify potential hazardous wildlife attractants?	
7b.	Were any off-site attractants identified?	
7c.	For the potential hazardous wildlife attractants identified in **Item 7b,** has the Airport conducted outreach to landowners, managers, or agencies responsible for the property or facilities identified?	
7d.	To prevent the development of potential wildlife attractants, have airport staff worked with local jurisdictions and/or regulatory agencies to address hazardous wildlife attractants that may be associated with proposed land use changes or new development in the airport vicinity?	



Managing Off-site Wildlife Attractants
(Identify and consult with owners/managers of off-site wildlife attractants)

Outreach and Education

Outreach and Education Evaluation and Considerations

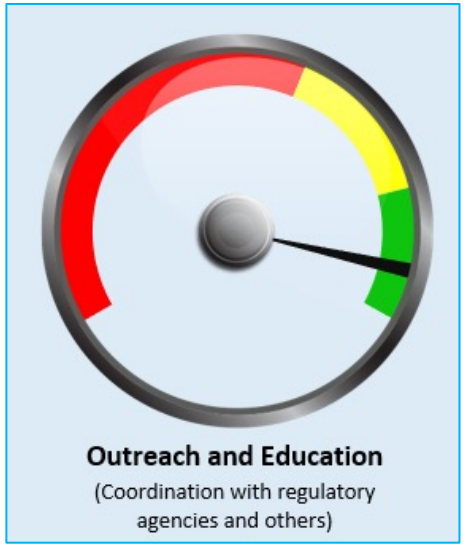
- Identifies potential stakeholders for outreach and education:
  - ✓ Elected officials and decision makers
  - ✓ Airport users/stakeholders
  - ✓ Resource management agencies, public and non-government agencies

Learning Opportunities

- Provides wildlife coordinators with enhanced understanding about outreach.

PART 8 - Outreach and Education

8a.	Do airport staff provide outreach and education to elected officials, airport management boards/authorities, and decision makers?	
8b.	Do airport staff provide outreach and education to airport stakeholders and users (other airport departments, tenants, neighbors, etc.)?	
8c.	Does the WHMP/Program include the preparation of education and outreach materials for the media or include the preparation of media releases?	
8d.	Do airport staff coordinate with resource management agencies (e.g., state departments of natural resources, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and applicable regional/local agencies)?	
8e.	Do airport staff provide outreach to the public and special-interest groups/non-government organizations (e.g., the Audubon society, state or local conservation groups, etc.)?	
8f.	Was a Wildlife Hazard Working Group (WHWG) established? *This response reflects your response from Airport Information,* ***Item h.***	

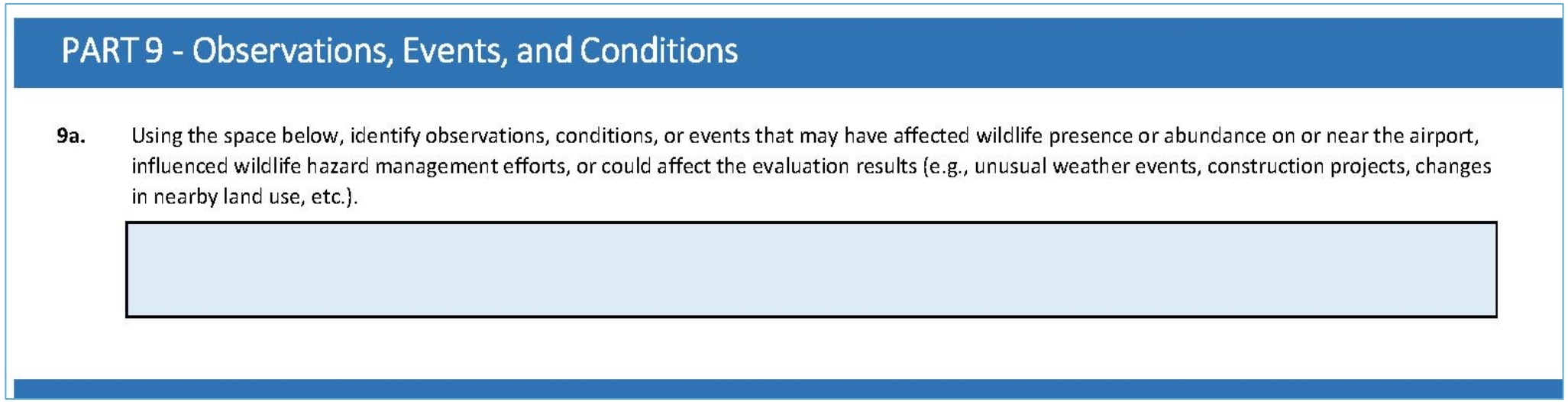


Additional Factors: Observations, Events, and Conditions

Reporting on Additional Factors

Provides wildlife managers with an opportunity to identify unusual or mitigating conditions:

- Unusual conditions (unusual/extreme weather, pandemic-related effects on management)
- Effect of on-site or nearby activities (construction, creation of nearby wildlife attractants during the evaluation period.
- Need to focus on long-term improvements



PERC Dashboard (Page 1)

Wildlife Hazard Management Plan/Program Evaluation Overview

Reviewed by: Clark Kent Evaluation Date: 05/01/2021

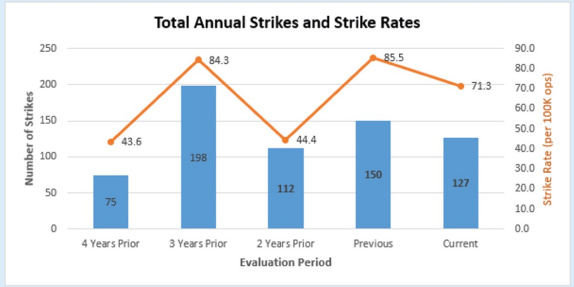
Metropolis International	SPR	04/01/2020 to 04/15/2021

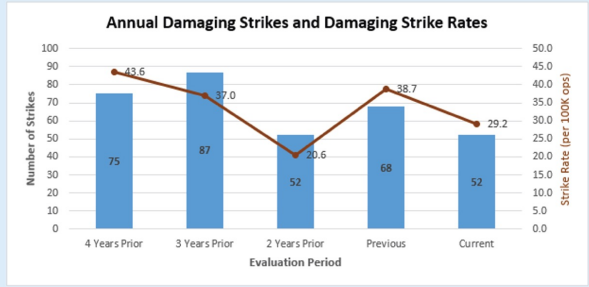
Wildlife Strike Data

Total Strikes 127	Annual Strikes Rate 71.3/100,000	Comparison to 4-year Average of ↑ 6.9 64.4

Damaging Wildlife Strike Data

Damaging Strikes: 52 Effect on Flight: 1	Annual Strikes Rate 29.2/100,000	Comparison to 4-year Average of ↓ (5.8) 35





Source: NWSD and Airport-specific data

Program Element Evaluation

The following KPIs indicate three levels of achievement: Good (green/right), Improvement Needed (yellow/middle), or Poor/Substantial Improvement Needed (red/left).

Non Part-139 Airport BMPs
(WHMP/Program includes necessary components)

Composite Score Recommendations/Measures
(Average score for all recommendations/measures)

Equipment and Resources
(Availability of resources necessary for WHMP/Program Implementation)

Staff Training
(Staff receive necessary training)

Managing Off-site Wildlife Attractants
(Identify and consult with owners/managers of off-site wildlife attractants)

Outreach and Education
(Coordination with regulatory agencies and others)

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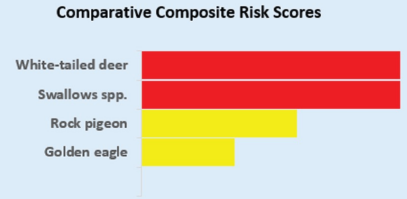
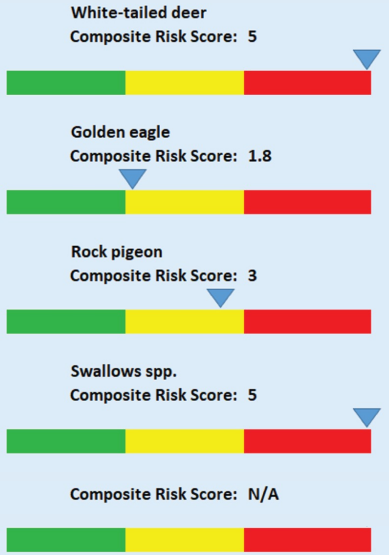
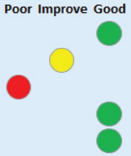
PERC Dashboard (Page 2)

Risk Assessment





Individual Recommendations/Measures



1. Conduct daily runway inspections
2. Maintain vegetation at heights of 6 to 12 inches
3. Install a perimeter fence
4. Disperse worms from pavements after rain events
5. Disperse waterfowl from infield basins

Observations, events, and conditions affecting wildlife presence/management

Unusual and prolonged summer storms overwhelmed drainage facilities and attracted waterfowl and gulls in greater numbers than observed in previous years.

Summary

Improvement is needed in the following areas:

- Maintain vegetation at heights of 6 to 12 inches
- Disperse waterfowl from infield basins
- Management of Golden eagle
- Management of Rock pigeon
- Staff Training

Significant Improvement is needed in the following areas:

- Install a perimeter fence
- Management of White-tailed deer
- Management of Swallows spp.

Tool Successes and Challenges (Pre-Release)

Successes

- Tremendous interest during project!
- Free of charge
- Quick and easy to use
- Transparent, shareable output to educate the airport community
- Provides education/assistance to GA and small airports
- Supplements and reinforces annual reports developed to support evaluations in accordance with AC 1505/5200-38

Challenges

- Some wildlife coordinators are unfamiliar with KPIs
- Less useful for large certificated airports with sophisticated WHMPs/Programs

Discussion/Questions

Thank you.

For questions and follow-up:

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