

# *Regional Assessments and Life-history Investigations of Problematic Birds on Military Airfields*

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# **NMFWA BASH Working Group**

## ***Regional Assessments and Life-history Investigations of Problematic Birds on Military Airfields***

- ***NMFWA BASH WG discussions on grass height waivers led to establishment of Sub-WG in 2013***
- ***Sub-WG initial focus was on gathering grass height and related BASH literature***
- ***Interest in exploring vegetation height relative to local, regional, and national problematic species***
- ***Presentation at NMFWA (2016) spawned Navy vegetation height investigation initiated in 2017***

# BASH Veg Management Origins

“Long Grass Management” first advised in Great Britain in 1949  
Royal Air Force implemented a “Long Grass Policy” in 1960’s with  
“success”

Grass to be maintained between 15-20 cm (6-8 inches)

Adopted as a UK RAF designed maintenance regime in 1974, and later  
at UK Civilian airfields

Problematic species: Northern Lapwing, Common Gull, and Black-  
headed Gull

Long Grass Management adopted by military and civilian airfields in US  
– typically with a 7-14 inch grass height recommendation



# Current Vegetation Management

1. While maintaining the vegetation height at 7-14 inches, make sure faster growing weeds are cut before they go to seed to discourage seed eating birds from using the air-field.
2. Vegetation between 7-14 inches discourages flocking species from foraging on the airfield because reduced visibility disrupts inter-flock communication and flock integrity by reducing the ability to detect predators.
3. Vegetation exceeding 14 inches (36 cm) will attract some bird species and rodents, which in turn attracts raptors.



**U.S. AIR FORCE**



# Current Vegetation Management

1. **Vegetation management strategies may change with the seasons and the wildlife populations they encourage.**
2. **There is no vegetation height management standard that fits all installations.**
3. **Vegetation management is installation specific and must be based on the best wildlife information available. Vegetation height should be actively managed to control birds and mammals including deer**
4. **Due to the wide variety of animals and grass species at Navy installations, a Wildlife Hazard Assessment should be conducted to determine the most appropriate vegetation height and management scheme.**



An aerial photograph of a coastal area, likely a military airfield. The image shows a runway, taxiway, and various buildings and structures. The foreground is dominated by the ocean with white surf breaking on the shore. The sky is blue with some light clouds.

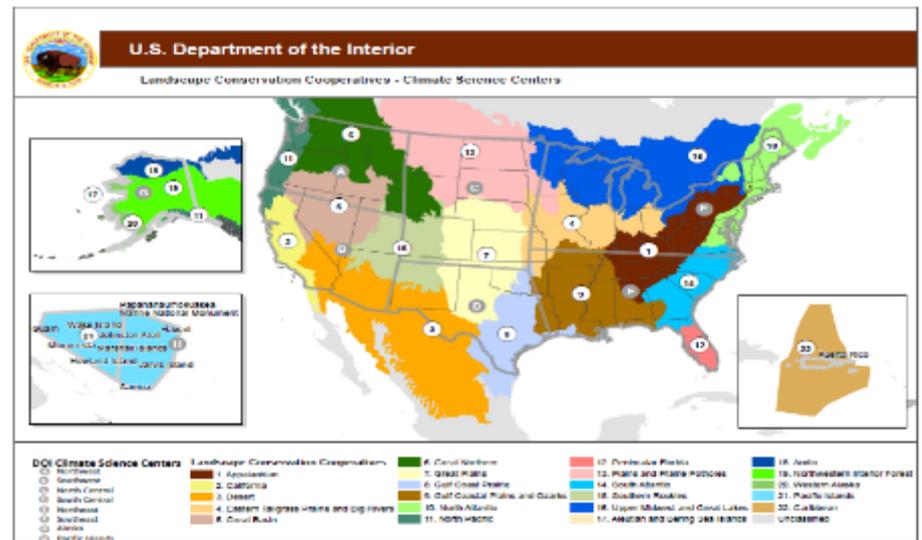
## ***Regional Assessments and Life-history Investigations of Problematic Birds on Military Airfields***

- ***Overarching Goal***

- ***Provide improved science that can better inform installation managers and reduce probability of strike occurrences, regionally, by problematic birds.***

# Objectives:

- 1) Examine the top ranking species groups and individual priority BASH species within each Landscape Conservation Cooperative (LCC) and classify each according to general life history and habitat use as either preferring short (< 7”) or tall (>14”) grass habitats
- 2) Provide vegetation height recommendations for each LCC, Navy Region and installation according to the best available science associated with bird/aircraft collisions on military airfields, and life-history
- 3) Indicate which species are most likely to be impacted by varying vegetation management scenarios according to life history accounts



# Methods

- BASH Data Acquisition
  - USAF Safety Center (Mr. Dan Sullivan, AFSC)
  - US Navy WESS (Mr. Jay Higgins, CNIC N32)
- Data QA/QC using only records of strikes associated with airfields
  - <500 AGL
  - On-base
  - Identified to species
- Combined total strikes with species-specific hazard scores by LCC, Navy Region, and individual airfields
- Determined which species had highest weighted scores (hazard score x # of strikes) within LCC

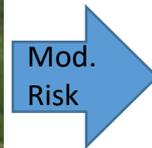
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Hazard Score Criteria from Devault, T.L., J. L. Belant, B. F. Blackwell, and T. W. Seamans. 2011. Interspecific variation in wildlife hazards to aircraft: Implications for airport wildlife management. *Wildlife Society Bulletin* 35:394-402

- 1) Any level of damage to the aircraft
- 2) Substantial damage to aircraft that adversely affected structural strength, performance, or flight characteristic
- 3) Strikes that resulted in an effect on flight such as aborted take-off or emergency landing

## Relative Hazard Scores

- 77 Species-groups
- Scaled to 100 and ranked from most to least hazardous



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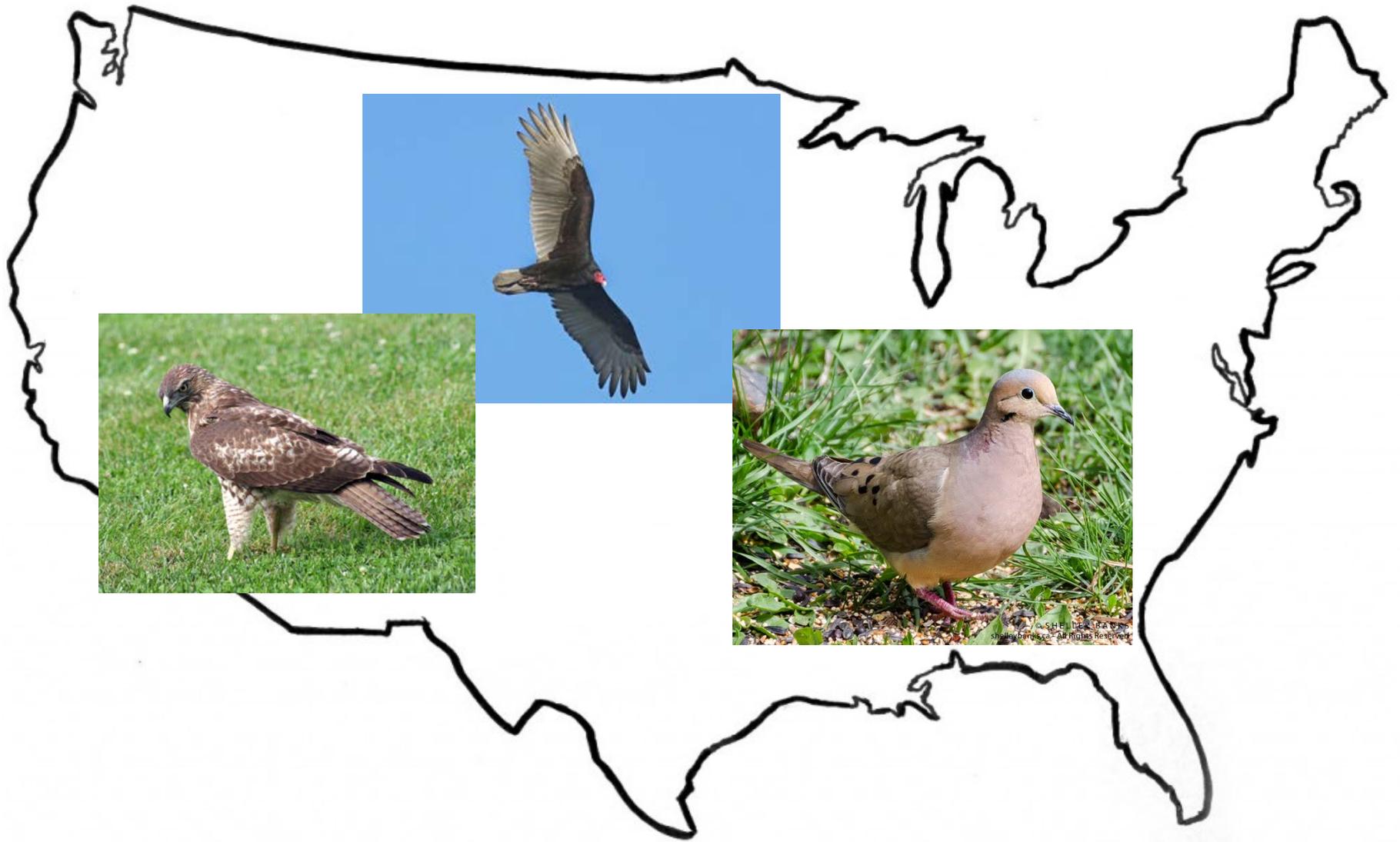
We evaluated bird species that pose the highest BASH risks on airfields among Landscape Conservation Cooperative (LCC) and U.S. Navy regions by investigating strike records from:

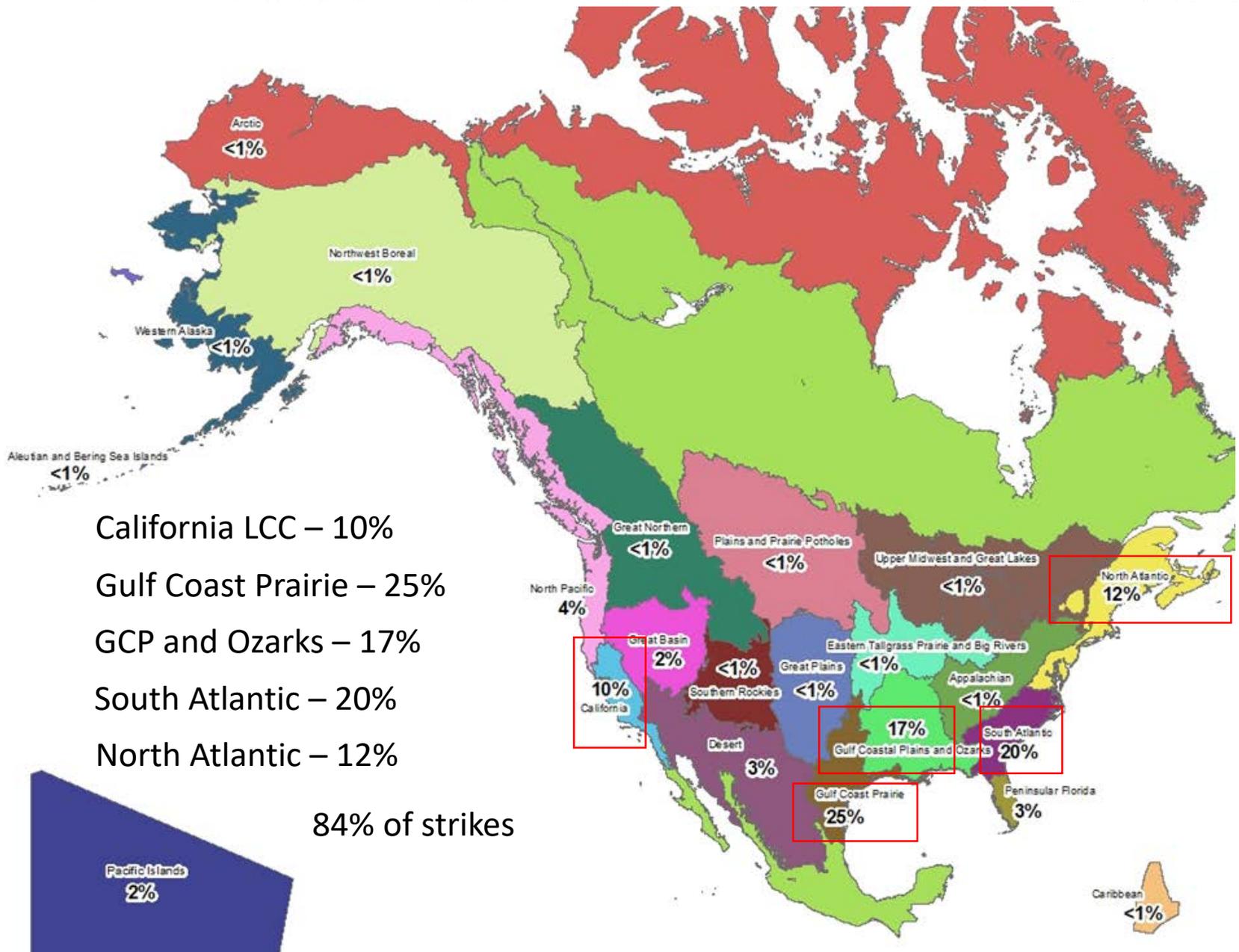
- |   |                |
|---|----------------|
| 1. U.S. Air Force Strike Data (1995-2016) | 97,064 Records |
| 2. U.S. Navy Strike Data (2009-2016)      | 7,320 Records  |

*Premise: The 7-14" grass height recommendation does not work equally well among all regions of the U.S. for problematic species*

## Gulf Coast Prairie LCC

Species	# of Strikes	Hazard Score	Weighted Score
Mourning Dove	130	10	1300
White-winged Dove	62	10	620
Turkey Vulture	12	44	528
Rock Pigeon	16	20	320
Barn Swallow	118	2	236
Killdeer	27	7	189
White-tailed Deer	2	88	176
Eastern Meadowlark	29	5	145
American Kestrel	22	6	132
Red-tailed Hawk	5	25	125





California LCC – 10%

Gulf Coast Prairie – 25%

GCP and Ozarks – 17%

South Atlantic – 20%

North Atlantic – 12%



13 LCC's  
MR: Tall Grass



11 LCC's  
MR: Tall Grass



10 LCC's  
MR: Tall Grass



5 LCC's  
MR: Tall Grass



9 LCC's  
MR: ?



8 LCC's  
MR: Tall Grass



8 LCC's  
MR: Short/Tall Grass?



3 LCC's  
MR: ?



10 LCC's  
MR: Tall Grass



10 LCC's  
MR: Short/Tall Grass?



# Recommendations

- Despite the widespread use of the 7-14” vegetation paradigm, both the military and civil aviation communities continue to experience high numbers of bird strikes. Therefore, continued investigations into tools and techniques to reduce BASH, including vegetation management, is warranted.
- Our analyses suggest tall vegetation management (i.e., >14 in) is preferable for many LCC regions according to species and their life history.
- Change in vegetation height regimes should include intensive monitoring of avian communities during all seasons (Coordination with USDA). Any subsequent shifts in bird communities should carefully be assessed to insure that BASH risks do not actually increase as a result of the altered landscape (e.g., raptors).

# Recommendations

- While BASH assessments based on bird strikes within individual LCCs provides important information and insight into problematic bird species at the regional level, locally abundant bird species should be considered as part of airfield-scale BASH assessments.
- Changes to mowing regimes should be developed and approved by the installation BASH working group, documented in the wildlife hazard management plan, and incorporated properly into the installations INRMP.



# Where do we go from here?

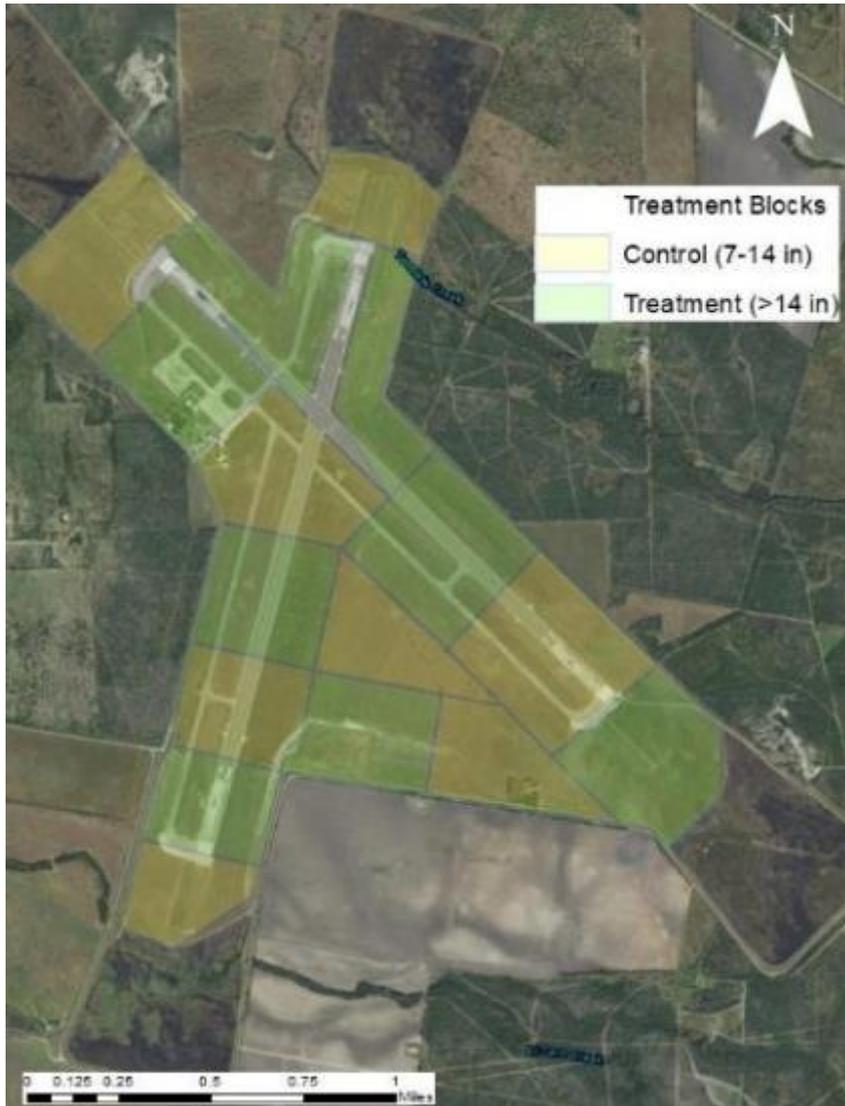
- We seek to field-test our research hypothesis that taller grass management on DoD airfields across CONUS LCC's, as measured at the regional or even individual airfield level, will reduce abundance (and assumed risk) of problematic BASH species identified for each region.

# Implementation of Vegetation Regimes to Reduce Wildlife Strikes to Aircraft at DoD Military Airfields

- Hypothesis: Tall grass (>14") will reduce abundance of problematic avian BASH species compared to current 7-14" grass height
  - Treatment: Tall Grass to be mowed once each year during late winter/early spring, then remain uncut through growing season
  - Control: Maintain 7-14" height
- Vegetation Assessment:
  - Density
  - Height
  - Composition
- Monitoring:
  - Avian Point Counts (Spring, Summer, Fall)
  - Avian Line Transects (Winter)
  - Motion-sensor Cameras (Mammals)
  - Arthropod Community
  - Small mammals

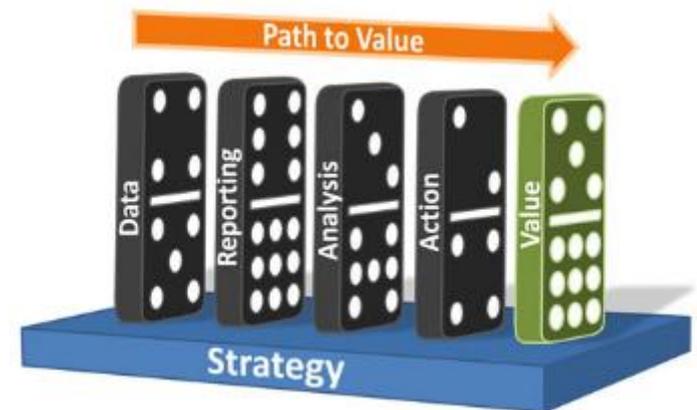


# Treatment Design Options on DoD Airfields



# Broad-scale Reporting Issues

- 43,205 of 104,384 (41%) strike records identified as unknown species
- 7,617 records report some level of damage, 89,447 report \$0, and 7,320 do not report any value.
- 60,052 (58%) records at an altitude of “0”
- 137 records of birds/bats at altitudes greater than 15000 feet.
- 1,848 of 60,052 (3%) of records report some distance off-base with altitude still 0
- Filtering records quickly reduces sample size- 5,814 of 104,384 records (<6%) usable if < 500 AGL, on-base, and identified to species



# BASH Reporting

Fiscal Year	Impact Point	Month	Day	Year	Mishap Time	Total Mishap Cost	On/Off Base	Miles from Nearest Base	Nearest Airfield	Altitude	General MDS Grouping	Order (common name)	Species (common name)	One-liner
2012	No Data	5	9	2012	800	0	On Base	0	WRIGHT PATTERSON AFB	0		Perching Birds	Acadian Flycatcher	BIRD REMAINS FOUND ON RUNWAY DURING INSPECTION; NO CREW REPORTS OF BIRDSTRIKE
2012	Outside Engine NO. 3	9	5	2012	1450	0	Not On Base		Unknown	0	C-135	Perching Birds	Cliff Swallow	BIRD STRIKE DURING FLT; OUTSIDE # 3 ENG; NO DAMAGE; RTB OK
2010	Windshield / Canopy	12	10	2009	1020	0	Not On Base	150	HUNTSVILLE INTL CARL T JONES FLD	0	T-1	Perching Birds	Horned Lark	T-1 BIRDSTRIKE; NO DAMAGE; PILOTS AWARE; REMAINS FOUND ON POST FLIGHT
2007	Inside Engine NO. 3	5	7	2007	2315	0	Not On Base		MC CONNELL AFB	22000	C-135	Perching Birds	LincolnS Sparrow	BIRD STRIKE, NO DAMAGE.
2007	Inside Engine NO. 3	5	7	2007	2315	0	Not On Base		MC CONNELL AFB	22000	C-135	Perching Birds	GrayCheeked Thrush	BIRD STRIKE, NO DAMAGE.
1997	No Data	2	14	1997	2100	0	On Base		CHARLESTON AFB	0	C-141	Shorebirds	Eurasian StoneCurlew	
2016	Wing / Rotor	10	19	2015	Unable to Determine	0	No Data		CHARLESTON AFB	0	C-17	Perching Birds	European Robin/Robin	C-17 HAD NON-DAMAGING BIRD STRIKE DURING OFF STATION SORTIE/CREW UNAWARE
2014	Outside Engine NO. 2	5	5	2014	2220	0	Not On Base	30	LITTLE ROCK AFB	1500	C-130	Cranes, Rails, Bustards, etc.	African Finfoot	MULTIPLE BIRDSTRIKES;07-4639; NO DMG; REMAINS COLLECTED & SENT
2008	Inside Engine NO. 3	8	28	2008	1630	30070	On Base	0	EASTERN WV RGNL SHEPHERD FLD	0	C-5	Pigeons, Doves, and Sandgrouses	Mourning Dove	BIRDSTRIKE DURING TAKEOFF; #3 ENGINE FAN BLADE DAMAGE; RTB OK
2012	Landing Gear	2	17	2012	800	0	On Base	0	HUNTSVILLE INTL CARL T JONES FLD	400	T-38	Perching Birds	Eastern Meadowlark	T-38C BIRDSTRIKE TO MAIN GEAR; NO DAMAGE/INJURIES; LANDING UNEVENTFUL
2013	Inside Engine NO. 1	6	26	2013	1854	22708273	On Base	0	LUKE AFB	100	F-16	Pigeons, Doves, and Sandgrouses	Mourning Dove	F-16D; BIRDSTRIKE; INGEST ENG; ACFT CRASHED; DESTROYED; PILOTS EJECTED SAFELY
2014	Inside Engine NO. 1	3	11	2014	1645	51398	On Base	0	LUKE AFB	100	F-16	Pigeons, Doves, and Sandgrouses	Mourning Dove	F-16D; BIRDSTRIKE DURING CLIMB OFF DEPARTURE, ENGINE VIBE AND DAMAGE; NO INJURY
2005	Inside Engine NO. 2	5	10	2005	1220	123004	On Base	0	WHITEMAN AFB	500	T-38	Hawks, Eagles, Vultures, Falcons, etc.	RedTailed Hawk	BIRDSTRIKE-#2ENG ON SHORT FINAL-DMG COMP SECTION-RTB OK

# Altitude Reporting Issues

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# Proper Reporting

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2013	Inside Engine NO. 1	6	26	2013	1854	22708273	On Base	0	LUKE AFB	100	F-16	Pigeons, Doves, and Sandgrouses	Mourning Dove	F-16D; BIRDSTRIKE; INGEST ENG; ACFT CRASHED; DESTROYED; PILOTS EJECTED SAFELY
2014	Inside Engine NO. 1	3	11	2014	1645	51398	On Base	0	LUKE AFB	100	F-16	Pigeons, Doves, and Sandgrouses	Mourning Dove	F-16D; BIRDSTRIKE DURING CLIMB OFF DEPARTURE, ENGINE VIBE AND DAMAGE; NO INJURY
2005	Inside Engine NO. 2	5	10	2005	1220	123004	On Base	0	WHITEMAN AFB	500	T-38	Hawks, Eagles, Vultures, Falcons, etc.	RedTailed Hawk	BIRDSTRIKE-#2ENG ON SHORT FINAL-DMG COMP SECTION-RTB OK

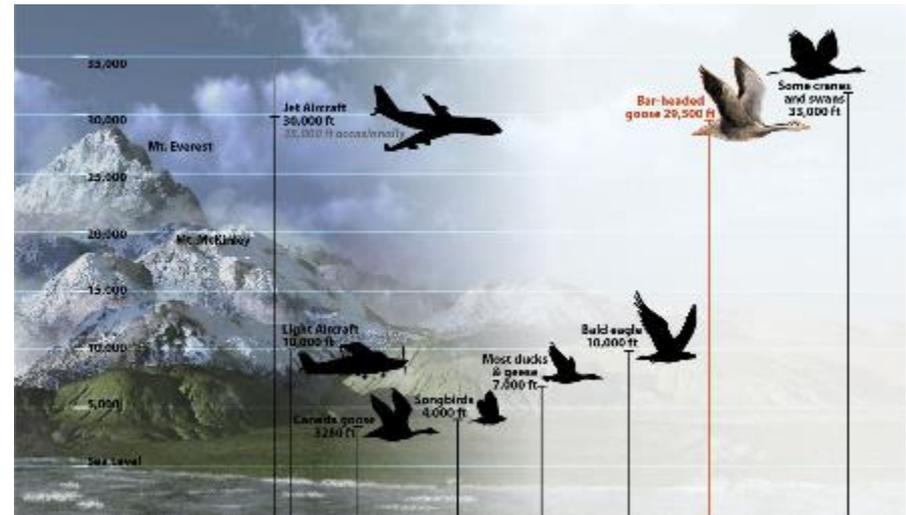
# Recommendations

- Recommendations for Pilot Reporting on BASH Incidences
  - **Column in spreadsheet for strike reported in real-time or post inspection. Basically, was the pilot aware that a strike occurred, if not specify strike was discovered at a later time such as during post-inspection.**
  - If strike is known provide exact coordinates if possible, if not general occurrence (take-off/landing while on runway, immediately before/after the approach/take-off, 100 m from runway, 100-500 m from runway, 500-1000 m of runway, > 1000 m from runway during approach/take-off)



# Recommendations

- Provide accurate estimate of flight altitude, if unknown then specify.
- Do not report a value of “0” for altitude unless strike truly occurred during take-off/landing on runway.
- Damage cost estimates, more detailed the better.
- Link damage/repair costs with initial BASH record



# Recommendations

- Details of flight plan (multi-state training mission, other air stations visited, etc.)
- Provide general habitat below strike location (urban, agriculture, forest, water body, etc.)
- Number of individuals during strike (1, 2-5, 5-10, 20-30, etc). If unknown, specify
- Standardize reporting if possible among military services



# Questions?

**Marine One, Washington, DC.  
22 December 2017**

