

Aerodrome Inspectors Workshop

Wildlife

Location: Trinidad & Tobago, 9-13 JUN 2014

Presenter: Kelly J. Slusarski, FAA ACSI



Federal Aviation
Administration



Wildlife

Objective:

- To provide students with a familiarization of ICAO requirements and US FAA standards
- To discuss wildlife control programs
- To review some of the latest in wildlife control technologies and R&D



Major Bird Strike Event



Boeing E-3 AWACS Aircraft

Remains of Geese on Runway post strike



Wildlife Hazard Mitigation



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The Problem

- **Bird populations in the U.S. are increasing.**
 - Canada Geese increased 7.3% per year from 1980 to 2007.
 - 13 of 14 species over 8 pounds have significantly increased.
- **Birds staying in urban areas.**
- **Commercial aircraft movements are increasing. In the U.S. operations have increased:**
 - 18 million in 1980
 - 28 million in 2008
 - 35 million estimated in 2025
- **Reported strikes in U.S. quadrupled since 1990**
 - 1,759 in 1990
 - 7,516 in 2008

Where are reported strikes occurring?

- **59% below 100 feet (30 m)**
- **92% below 3,000 feet (900 m)**
- **Less than 2% above 10,000 feet (3000 m)**
- **Highest strike: 32,500 feet (10000 m)**



Impacts from strikes in U.S.

- 1990 to 2008
- 9 strikes resulted in 16 fatalities
- 49 aircraft destroyed
- 393,521 hours of aircraft downtime
- \$308 U.S million in losses



Our Goal: Reduce Wildlife Strike Risk to Aircraft



Why should we be worried about wildlife?

- Increasing populations of many bird species hazardous to aviation
- Adaptation of birds to urban settings
- Increasing air traffic
- Faster, quieter 2-engine jet aircraft
- Increased liability issues with bird strikes



Wildlife Strike



Deer Strike



Bird Strike



Bird Strike



Wildlife is attracted to aerodromes because they provide:

- **Food**
- **Water**
- **Habitat- cover**
- **Security**



ICAO Wildlife Control Requirements & recommendations



ICAO Wildlife

- ICAO now has greater focus on the reduction of all wildlife hazards (not just birds)
- US FAA addresses all manner of wildlife
- 14 CFR part 139 includes “triggers” to require a Wildlife Hazard Assessment and a Wildlife Hazard Management Plan (WHMP)



ICAO Wildlife Requirements

Wildlife strike hazard reduction

9.4.1 The wildlife 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 wildlife strikes to aircraft; and
- b) the collection of information from aircraft operators, airport personnel, etc. on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations.
- c) an ongoing evaluation of the wildlife hazard by competent personnel.

ICAO Wildlife Requirements

9.4 Wildlife hazard reduction

- 9.4.2 Wildlife strike reports shall be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database.
- *Note.— The IBIS is designed to collect and disseminate information on wildlife strikes to aircraft. Information on the system is included in the Manual on the ICAO Bird Strike Information System (IBIS) Doc 9332*

ICAO Wildlife Requirements

Wildlife hazard reduction

- 9.4.3 Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.
- *Note.— Guidance on effective measures for establishing whether or not wildlife, 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 (Doc 9137), Part 3*

ICAO Wildlife Requirements

Wildlife hazard reduction

- 9.4.4 The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the appropriate authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

ICAO Wildlife Requirements

9.4 Wildlife hazard reduction

- **9.4.5 Recommendation.**— *States should give due consideration to aviation safety concerns related to land developments in the vicinity of the aerodrome that may attract wildlife.*

ICAO Requirements Summary

- Assess the threat
- Establish national reporting process & IBIS connection
- Evaluation process
- Appropriate response measures
- Prevent attractants
- Recommended: land use controls



FAA Wildlife Requirements



FAA Wildlife Requirements

- 14 CFR Part 139.337 a
- Each certificate holder must take immediate action to alleviate wildlife hazards whenever they are detected.



FAA Wildlife Requirements

- 14 CFR Part 139.337 b
- Each certificate holder must ensure that a wildlife hazard assessment is conducted when any of the following triggering events occur on or near the airport
 - Multiple wildlife strike
 - Substantial damage from striking wildlife
 - Engine ingestion
 - Wildlife observed of size or number capable of causing an event described above.

FAA Wildlife Requirements

- 14 CFR Part 139.337 c
- The Assessment shall contain at least the following:
 - Analysis of event that prompted assessment
 - Identification of species involved, numbers
 - Identification of attractants
 - Description of hazard to air carrier operations
 - Recommended Actions for reduction
 - Must be performed by individual meeting Advisory Circular [150/5200-36](#) (qualifications for wildlife biologist) Requirements

FAA Wildlife Requirements

- 14 CFR Part 139.337d
- The Wildlife Hazard Assessment shall be submitted to the FAA ...
 - For approval and determination whether or not there is a need for a wildlife hazard management plan.
 - The assessment must contain sufficient data to make the determination of the need for a plan.



Wildlife Hazard Assessment

- Identify species, numbers, locations, local movements
- Daily and seasonal occurrences of observed wildlife
- Describe existing wildlife hazards to air carrier operations
- Review strike records
- Identify wildlife attractants on and off airport
- Provide recommendations for reducing wildlife hazards



Wildlife Hazard Assessment

- Currently require certificated airports to do a WHA if experience a triggering event (engine ingestion, multiple strikes)
- Revising regulation to require all certificated airports to do a WHA.
 - In spirit of Safety Management airports should know and understand the risks at their airports.
- Initiating program to do WHAs or site visits at more than 2,000 General Aviation Airports over next ten years.
- FAA will fund WHAs and Wildlife Management Plans with Airport Improvement Program grants.



Wildlife Hazard Management Plan

- Provide measures to alleviate or eliminate wildlife hazards.
- Identify persons who have authority for implementing the plan.
- Priorities for needed habitat modification.
- Identification of resources for the plan.
- Procedures to be followed during air carrier operations.
- Wildlife control measures.
- Plan reviewed and approved by FAA



Managing Wildlife Problems:

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Contact a qualified Wildlife Biologist (“site visit”)

Wildlife Hazard Assessment

(Required with Trigger)

Wildlife Hazard
Management Plan

No need for plan but
procedures added
to Airport Certification Manual

Procedures Added to Airport
Certification Manual

↓

Wildlife Control
Modification to
Environment

What do we look at during the FAA inspection?

- Access points for wildlife
- Birds on and around airport
- Locations for birds to nest or loaf
- Wildlife other than birds
- “Scat” on runways and taxiways
- Attractants
- Wildlife observation logs/sheets
- Compliance with ACM procedures
- Training for Airport Personnel with wildlife control/reporting duties



FAA Advisory Circular Reference

- AC [150/5200-33](#) HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS
- AC [150/5200-36](#) QUALIFICATIONS FOR WILDLIFE BIOLOGIST CONDUCTING WILDLIFE HAZARD ASSESSMENTS AND TRAINING CURRICULUMS FOR AIRPORT PERSONNEL INVOLVED IN CONTROLLING WILDLIFE HAZARDS ON AIRPORTS



Control Methods



Control Methods

Check perimeter fence for gaps or holes, damage, deterioration, vegetation overgrowth, wildlife digging



Wildlife Control Strategies

- Habitat Modification And Exclusion
- Flight Schedule Modification
- Repellent And Harassment Techniques
- Wildlife Removal



Habitat Modification

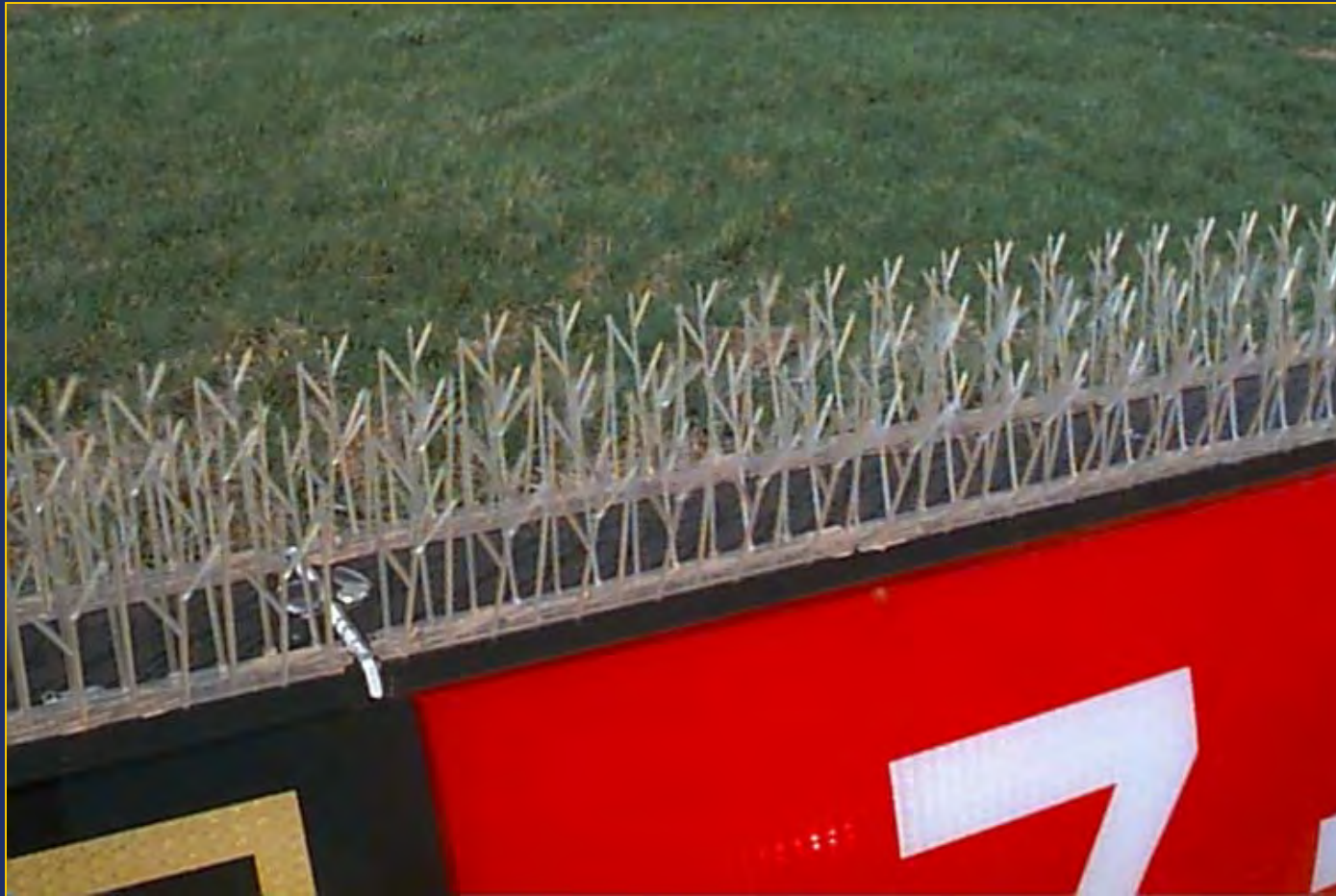
- Food
 - Grass, seed, agricultural operation, rodents,
- Cover
 - Grass height, trees, brush, holes, culverts, buildings
- Water
 - Ponds, streams, water retention devices

Flight Schedule Modification

- Determine Critical Wildlife Times/Seasons
- Document Wildlife Types and Patterns
- Work with Air Carriers to Avoid or Modify Crucial Times

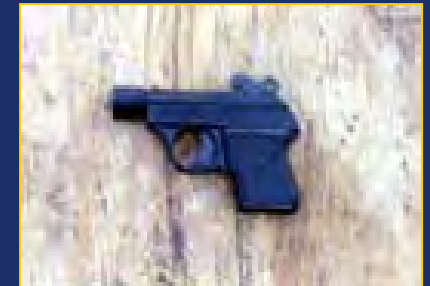


Repellent And Harassment



Repelling and Harassment Techniques

- Chemical
 - “Hot” Foot, lethal
- Audio
 - Distress, Cannons, Bangers
 - Pyrotechnics
- Visual
 - Laser, “Eyes,” Fake Predators



Repelling and Harassment Techniques



Using Dogs for Repellent And Harassment



Critical Factors for Repellants

- No “silver bullets” or “magic”
- No standard protocol
- Repelling is art and science
- Each wildlife species is unique



Wildlife Removal

- Capture
- Live trapping
- Relocating
- Nest & egg removal
- Lethal



Must Integrate All Control Techniques

- Flight Schedule Modification
- Habitat Modification - Exclusion
- Repelling and Harassment
- Wildlife Removal

Wildlife control must also include strike reporting, species identification and data analysis.



Strike reporting

- **In the U.S. bird strike reporting is voluntary.**
- **Recent study showed 39 percent of strikes are reported.**
 - This rate is adequate to develop national policy and determine trends
 - Are doing outreach to encourage strike reporting.

Wildlife Data Collection

- How do we get information on wildlife strikes?
 - <http://wildlife.pr.erau.edu/strikeform/birdstrikeform.html>
 - FAA form 5200-7
- What do we do with the information?
 - National Strike Database
 - http://wildlife-mitigation.tc.faa.gov/public_html/index.html#access
- What more can we do with the information?
 - Develop a proactive approach, Prevent instead of react
 - Develop projects for funding

Bird species identification



Smithsonian Institution
Feather Identification Lab
Washington, DC

Bird Identification

- To assist development of mitigation, we need to know species involved in bird strikes.
- U.S. Smithsonian Institute Feather Identification Lab uses DNA technology to identify strike remains.



FAA Wildlife R&D Elements

Wildlife Mitigation R&D

- Hazardous species control
- Habitat management

- Strike reporting
- Strike database
- Wildlife web site
- Strike remains ID

wildlife.faa.gov

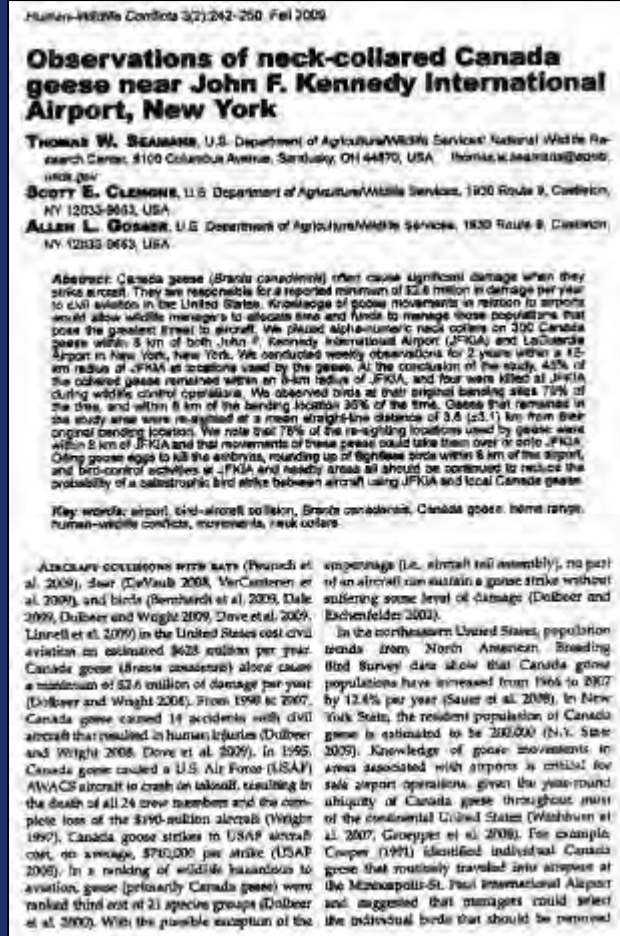
- Commercially available avian radars
- Sensing and alerting technologies

Technology Assessments

USDA - Research Activities

Wildlife Habitat Management and Land-use Studies

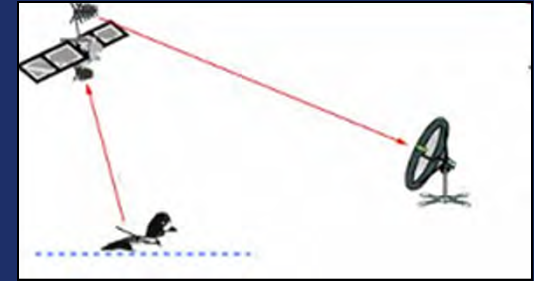
- **New York City collared goose movement**
 - Scientific Manuscript published in journal “Human Wildlife Conflicts” Vol. 3 No. 2 Fall 2009
- **Evaluation of trash-transfer facilities**
 - Final Report published DOT/FAA/AR-09/62
 - Scientific Manuscript for Peer-Reviewed Journal in preparation
- **Evaluation of fully enclosed trash-transfer facilities (FETTS)**
 - Long Term Study of FETTS – Potential NY sites evaluated
- **Tall Fescue Variety Trials on Airfields**
 - Second growth data collected at 9 airports and entered into DB



USDA R&D

Wildlife Habitat Management and Land-use Studies

- **Monitoring goose movements in NYC using satellite telemetry**
 - Location data processing continues
 - Currently no active satellite transmitters remain deployed in NYC area
- **Monitoring goose movements in North Carolina using satellite telemetry**
 - Cooperation with NC State and NC Wildlife Services
 - No active transmitters remain operational



USDA R&D

Wildlife Damage Methods

- **Translocation of bald eagles**
- **Evaluation of wire grids to cover water features**
- **Perching Deterrents**
 - Manuscript being prepared for peer-reviewed journal submission
- **Earthworm control at airports**
 - Chemical and physical barriers are being evaluated at 36 test plots at NASA Plum Brook facility
- **Enhancing Perceived Threat of Predation to Reduce Deer - Use of Anthropogenic Resources**
 - 2010 behavioral data being analyzed

USDA R&D

Wildlife Damage Methods

- **Understanding Avian Response to Object Approach**
 - Behavioral response of Canada Geese to approaching aircraft
 - Processing physiological response of goose retinas
- **Prairie Studies**
 - Data collection on bird and mammal communities at three airports and adjacent tall grass prairies in Ohio.
- **Assessment of Suitability of Biofuel Crops on and near Airports**
 - Cellulose-based Biofuel and forage crops
 - Advantages: perennial, fewer cuttings, growth in marginal soils, and a burgeoning market for these crops.
 - Study plots established in Mississippi.

U.S. Wildlife Website

The screenshot shows a web browser window with the following content:

- Browser Title Bar:** Federal Aviation Administration - Wildlife Hazard Mitigation Home Page - Microsoft Internet Explorer provided by Office of Airp
- Address Bar:** http://wildlife-mitigation.tc.faa.gov/public_html/index.html#manuals
- Navigation Bar:** Back, Forward, Home, Stop, Refresh, Search, Favorites, Links, ASO FAVs, Google, Google Maps, Live Search, VPN.
- Header:** Federal Aviation Administration logo and "Airport Technology R & D Branch".
- Search:** "Search our Web Site:" with a search box and a "Search" button.
- Left Sidebar (Site Sections):**
 - General Information
 - News
 - Meetings
 - Bird Identification**
 - R & D
 - Resources
 - Education
 - Training
 - Jobs Forum**
 - Strike Photos
 - Feedback
- Main Content Area:**
 - REPORT A STRIKE HERE!** (Red text)
 - Buttons: "Access to The National Wildlife Strike Database CLICK HERE", "Locate Strikes on US Map: State Map CLICK HERE", "Register to Receive Items of Interest, Coming Events and Community News... CLICK HERE".
 - Event boxes: "Fall 2009 Wildlife Mgmt Workshop Athens, Greece September 29 - October 1, 2009 CLICK for Info" and "2009 Bird Strike Conference September 14-17, 2009 Victoria, BC Canada CLICK For Details".
 - Airport Wildlife Mitigation Newsletter - Spring 2009**
 - RECENT NEWS ARTICLES/ITEMS OF INTEREST**
 - Section: "Purpose" and "Memorandums".
 - Text: "The purpose of this site is to provide users with information that will allow them to better understand and practice wildlife hazard mitigation at airports through wildlife control." and "Memorandum of Agreement between the Federal Aviation Administration, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of".
- Bottom Sidebar:**
 - Reporting: On-Line Strike Reporting, Report Revisions
 - Strike Database: On-Line Database Access
 - Manuals and Current Reports
- Taskbar:** Windows Start button, taskbar icons for NTSB Fam.ppt, Wildlife Hazard..., Lindawildlife.ppt, 6 wildlife final.ppt, 5509-407-Anne..., 3 Internet Ex..., Document1 - Mi..., Local intranet, 2:52 AM.



<http://wildlife.faa.gov>

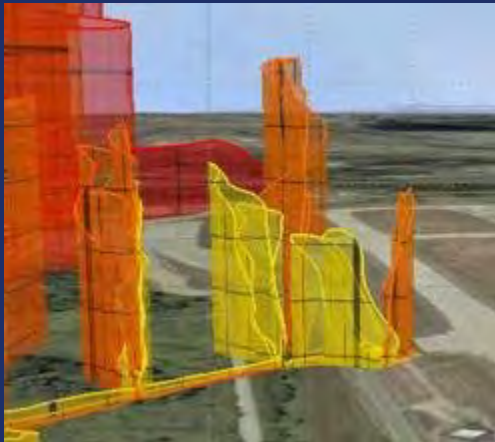
Website Key Elements

- **Full access to the FAA's Wildlife Strike Database**
 - Fully down-loadable database in Microsoft Access format
 - Easy search interface
 - Export results to MS Excel
 - **Online Strike Reporting**
 - Submit a strike report online
 - Edit a previously reported strike
-
- **Wildlife Strike Hazard Information**
 - News stories, photos, links to reports and guidance, FAQs

FAA Bird Detection Technology

Bird Radar Performance Assessment

Use science-based assessment methods to assure the FAA and the public that use of commercial avian radars at airports is justified based on proven performance, does not compromise safety, and is compatible with all aspects of airport operations.



Avian Radar Components

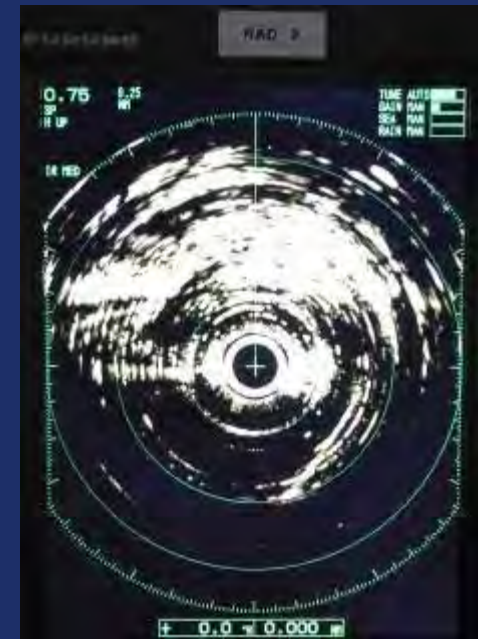
The major components of any avian radar system are a radar unit, an antenna, a digital radar processor and a visual display.



Antenna



Processor



Display

Avian Radar

Examples of Commercial Systems



Wildlife



Bird Strike



Points to Remember

- **Be proactive**
- **Continuously look for evidence of wildlife**
- **Expect the unexpected**
- **Conduct frequent patrols**
- **There is no silver-bullet response**
- **Requires a regional/national response**
- **Complacency kills**



Points to Remember

- **Habitat modification**
- **Repelling and harassment**
- **Removal**
- **Wildlife alerting system**
 - Portable radar
 - GIS integration
- **Species Identification**
- **Strike database**
- **Assessments and management plans**
- **Land use controls**
- **All integrated into a national program**

Questions???

