ACC GEOBASE BENEFITS AIR FORCE PILOTS AND PROTECTS WILDLIFE

Apr 07 — Langley AFB VA – Why would Air Combat Command (ACC) and the 1 Fighter Wing (FW) track osprey flight patterns? The US Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Wildlife Services is working with ACC GeoBase to track the nesting and migration patterns of osprey in military aircraft operation areas along the U. S. eastern seaboard.

Environmental engineers at Langley Air Force Base, Virginia, teamed with the Wildlife Services Division of the USDA's APHIS to help manage the installation's Bird Aircraft Strike Hazard (BASH) issues. Osprey is one of the largest birds of prey in North America. With a wingspan of 4 to 6 feet, the three to four pound osprey is definitely a hazard to ACC fighter aircraft. In 2000, a Langley F-15 collided with an osprey, which caused over $750,000 in engine damage and forced the pilot to terminate the mission and conduct an emergency landing.

APHIS Wildlife Services biologist Mr. Thomas Olexa gathered information on the birds' population around the base including their nesting sites. Then Mr. Olexa and his team fit eight birds with global positioning systems (GPS) transmitters. The osprey movements were captured, flight patterns recorded and placed in a computer program for analysis. ACC GeoBase plotted and published the map service indicating osprey flight patterns around Langley and migration patterns to South America.

The ACC effort benefited Ohio, Indiana, Maryland and New York; all had experienced a decline in the numbers of osprey. In addition, the Air Force decreased the probability of aircraft/bird collisions. The ACC osprey/BASH map service gives pilots information to help avoid bird collisions, displays bird flight paths and major migration tracks during the year. ACC GeoBase creates an opportunity for other flight-related information to be added to the osprey data including specialized air space, military training and air refueling routes. Pilots can then view where osprey may enter other military air space along the east coast.

Ohio and Indiana no longer require osprey shipments, one measurement of success of the Langley bird relocation program. Additionally, Langley natural resource managers are looking for new localities needing to repopulate osprey and minimize bird/aircraft strike hazards for the U.S. Air Force.

This effort is part of the DoD Legacy Resource Management Program. The grant was awarded to evaluate and identify bird-strike risks of migrating and breeding osprey in the mid-Atlantic Chesapeake Bay Region using advanced satellite tracking and geospatial technologies through the 1FW at Langley AFB, VA.

More GeoBase information is available at https://my.af.mil/accgeoprod/, telephone DSN 574-4184, commercial 757-764-4184, or email: accgio@langley.af.mil. For more information on the Osprey BASH project, contact Mr. Thomas Olexa at 757-764-5357.

Photo courtesy of Brian Washburn

Reducing risk of osprey collisions with aircraft

By
DR. BRIAN WASHBURN,

A true conservation success story, osprey (Pandion haliaetus) populations in North America have staged a dramatic recovery during the past few decades. Expanding osprey populations are the direct result of the banning of harmful pesticides (most notably DDT), conservation efforts that provided suitable nesting structures, and the implementation of successful translocation and hacking programs. However, with conservation success comes new challenges, as Dr. Brian Washburn explains.

Osprey exhibit a remarkable tolerance to humans and adapt well to urban environments. Yet, breeding populations of osprey adjacent to civil airports and military airbases increase the risk of collisions between osprey and aircraft. As North American osprey migrate to their wintering areas in central and South America, they traverse numerous civil and military airspace use areas. The risks to human safety and damage to aircraft associated with osprey-aircraft collisions are a serious flight safety concern, highlighting the need for research and management efforts designed to mitigate such risk.

Supported by the U. S. Department of Defense's Legacy Natural Resources Management Program, a collaborative multi-agency research effort was initiated in 2006. The goal of this research project is to incorporate satellite telemetry technologies and geo-spatial referencing to quantify bird-strike risk of migrating and breeding osprey from the Mid-Atlantic Chesapeake Bay Region.

MONITORING OSPREY BY SATELLITE

The study area is located in the Back River of the Chesapeake Bay adjacent to Langley Air Force Base (AFB) in Virginia. During the 2006 and 2007 nesting seasons, we captured 13 adult Osprey (including 5 males and 8 females) using carpet-noose traps at their nests. Amongst this group, we successfully captured and satellite-tagged three breeding pairs (i.e., both the male and female).

Each osprey was fitted with unique color and U.S. Fish and Wildlife Service leg bands, tagged with a GPS-capable solar-powered satellite transmitter, and released at the nest site. The satellite tags were 30-gram Argos/GPS PTT-100 platform transmitter terminals (PTTs) from Microwave Telemetry Inc. (Columbia, MD). We attached the transmitters in a backpack configuration using a Teflon tape harness. The satellite transmitters were programmed to collect location and movement information 10 times each day (at 2-hour intervals). The data is transmitted from the PTT to the Argos satellite network and then relayed to the researchers through the Argos system.

An F-15 Eagle at Langley Airforce Base. Photo courtesy of Brian Washburn

BREEDING SEASON ECOLOGY

Using the location and movement information provided by the satellite-tagged osprey, we are gaining new insights into osprey breeding ecology. This information will provide us with a better understanding of the movements, activity patterns, and habitat use of male and female adult osprey during their breeding season. We have learned that adult osprey are active relatively equally throughout during daylight hours. In addition, we are gaining an understanding of osprey space use and selection of resources within their breeding territories.

DOCUMENTING MIGRATION PATTERNS

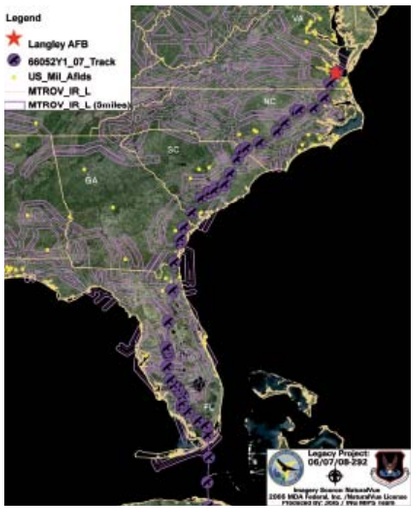
Recent advances in satellite tracking technologies allow for an unprecedented level of understanding and study of birds that migrate long distances. We found that female Osprey that breed in Virginia began their fall migrations in August, whereas males typically began migrating in September. Breeding pairs of osprey do not migrate or winter together. Osprey migrated during daylight hours and roosted at night, potentially foraging on fish during the morning or evening hours. Seven osprey completed their fall migration to their wintering grounds in the Caribbean or in South America, traveling an average distance of 4,600 km.

We lost contact with six osprey during their fall migration; the fate of these birds in unknown. All 13 adult osprey utilized similar migration routes along the eastern coast of the United States and traveled from Florida to Cuba. Future analyses of collected osprey location and movement data will help identify stopover habitats important to migrating osprey. With a better understanding of osprey migration patterns, conservation and management efforts for this species can be enhanced.

SAFER FLYING ENVIRONMENTS

Using data provided by the satellite-tagged ospreys during the breeding season, we are constructing spatial and temporal models of how breeding Osprey utilize areas within their nesting territories. These models will be analyzed to determine whether predictive relationships exist among osprey movement patterns, the occurrence of ospreys on Langley AFB, and the critical airspaces used by military aircraft during flight operations. In addition, movement and activity patterns of breeding Osprey will be used to identify locations where nesting Osprey present the greatest risk to aircraft operations.

Spatially and temporally patterns of osprey migration, including specific migratory routes, will be mapped and summarized using information provided by the satellite-tagged osprey. Flight characteristics and geographic routes of migrating osprey will be compared with U.S. Department of Defense airfields and military flight operations areas along the Atlantic seaboard to determine periods of increased risk of osprey-military aircraft collisions. Ultimately, using information provided by this research effort, the timing and routing of military training flights might be scheduled to reduce the risk of osprey-aircraft collisions.



Fall migration route of M52, an adult male osprey, from Langley Air Force Base, Virginia through the southeastern United States in 2007. On his journey he passed by several military airfield (represented by yellow dots) and through numerous military training routes (presented by lines and 5-mile buffers).

An adult female osprey with her 30-gram Argos/GPS PTT-100 platform transmitter terminals (PTTs) from Microwave Telemetry Inc.


Photo courtesy of Brian Washburn

DR. BRIAN WASHBURN

Dr. Brian Washburn is a research wildlife biologist with the United States Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center in Sandusky, Ohio and is an adjunct assistant professor with Michigan State University, North Carolina State University, and the University of Missouri. His research program involves finding science-based solutions to wildlife-aviation conflicts, stress and reproductive physiology of wildlife, and habitat management of grassland ecosystems.

In addition to the work presented here, Dr. Washburn and his colleagues are using satellite telemetry to track resident Canada geese in urban areas and bald eagles translocated from airport environments to reduce the risk of bird-aircraft collisions by these species.

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Assessing Bird-Aircraft Strike Hazard (BASH) Risk Associated with Breeding and Migrating Osprey

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The osprey (*Pandion haliaetus*) is one of the most widely distributed and well studied bird species of the Northern Hemisphere; however, little is known about their potential impacts to military flight operations. A Department of Defense, Legacy Natural Resources Program-funded multi-agency research project examining the strike-risk posed by breeding and migrating Osprey was initiated in 2006. During the 2006 and 2007 nesting seasons, a total of 13 adult Osprey were live-captured, fitted with GPS-capable satellite transmitters, and released from selected nest locations near Langley Air Force Base, Virginia, in the Mid-Atlantic Chesapeake Bay Region. We monitored satellite-tagged Osprey movement and activity patterns by tracking them during the breeding, migration, and wintering periods. Movement information collected from breeding Osprey was cross referenced to Langley Air Force Base flying operations to assess the risk breeding Osprey pose to military aircraft near the airfield. During the breeding season, adult Osprey flew at an average altitude of 63 m above the ground and were flying relatively equally throughout daylight hours. In addition, migratory patterns of Osprey were evaluated to assess the risk migrating Osprey to military aircraft operations along the Eastern seaboard. All adult Osprey utilized similar migration routes along the eastern coast of the United States. Female Osprey began their fall migrations (August), prior to males (September). Adult Osprey migrated (moved) during daylight hours and roosted at night. During migration, females flew at an average altitude of 377 m and males flew at an average altitude of 324 m. Incorporation and integration of

Abstract of poster presentation at Bird Strike Committee USA/Canada Meeting, Lake Mary and Sanford, Florida, August 18–21, 2008.

Osprey movement information (e.g., timing, travel routes, altitude) into military flight mission planning systems will increase pilot awareness of potential Osprey-aircraft strikes during critical time periods and will allow for military flight operations to occur at times and locations that minimize the risk of Osprey-aircraft collisions.

Abstract of poster presentation at Bird Strike Committee USA/Canada Meeting, Lake Mary and Sanford, Florida, August 18–21, 2008.

Bird Strike Avoidance– High Tech Risk Mitigation

Employing satellite tracking and the most advanced Department of Defense (DoD) imagery exploitation software, the 36th Intelligence Squadron has added high tech bird watching to its current mission of producing Combat Identification, Geospatial, and Targeting materials. The birds they watch are called Osprey, and the Osprey poses a significant risk to flight operations along the Atlantic coast.

The Osprey *(Pandion haliaetus)*, sometimes known as the sea hawk, is a fish-eating bird of prey. Categorized as a large raptor, it normally reaches 24 inches in length with a 6 foot wingspan. Along with being one of the largest birds of prey in North America, the Osprey is also one of the most widespread birds in the world. It can be found on all continents except Antarctica. This large, widely dispersed bird poses a significant bird strike hazard to all aircraft.

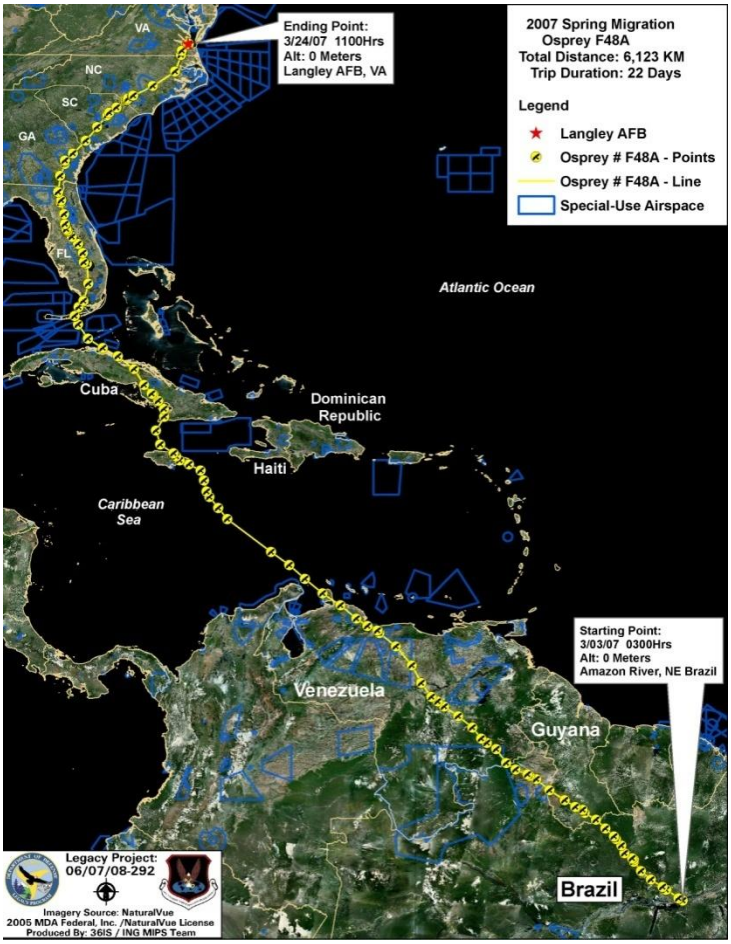
Twenty-five Osprey bird strikes have been documented at Langley and other military bases throughout the country resulting in approximately $1.3 million in aircraft damages. In 2008, the 36th Intelligence Squadron, part of ACC's Combat Targeting and Intelligence Group, joined a collaborative research project sponsored by the Department of Defense Legacy Resource Management Program to evaluate bird-strike risks from breeding Ospreys at Langley Air Force Base. The multi-agency research effort includes cooperative partnerships with the Air Force Bird Aircraft Strike Hazard (BASH) Team, DoD Partners in Flight, United States Department of Agriculture National Wildlife Research Center (NWRC), 1st Fighter Wing Flight Safety, Indiana Department Natural Resources, and the Virginia Wildlife Services program.

The project began in 2006, when NWRC wildlife biologists captured eight female, six male and four fledgling Ospreys nesting near Langley Air Force Base, and outfitted them with new, light-weight satellite tracking transmitters. Over the next two years, NWRC collected data on the Ospreys' altitude, speed, course and position, and passed the information to Imagery Analysts at the 36th Intelligence Squadron.

The 36th Intelligence Squadron's Geospatial Intelligence Flight is comprised of active duty Air Force Imagery Analysts, Science Applications International Corporation (SAIC) contractors and representatives from the National Geospatial-Intelligence Agency (NGA). The project team lead, Mary Kate Downs points out, "This project allows the perfect opportunity to assist Air Force pilots by providing them data that will aid in reducing the risk of aircraft-bird strike incidents, while at the same time providing valuable environmental and wildlife research data to the scientific community."

Merging mapping and imagery technology, SrA James Bevilacqua and A1C Corey Willis analyze and geo-reference Osprey behavior within military airspace along the Ospreys' Atlantic migratory route in order to identify bird strike threat areas. Other 36th IS Imagery Analysts like SSgt Michael Holladay are involved in creating tailored mapping products that visually represent the Osprey migration data using three-dimensional animated products. These Osprey bird strike risk datasets will be integrated into the Air Force's Bird Avoidance Model and Air Combat Command Geobase Safety Portal to aid in training and flight operations.

Dr. Brian Washburn with the NWRC, Sandusky, Ohio field station emphasizes, "We're going to develop a risk model by tracking the birds' local, migratory, and wintering movements and then compare them to the Air Force's flight activities." Developing an understanding of Osprey behavior is a key first step in the process. The geospatial technical analysis and data presentation capabilities provided by the 36th IS enabled construction of the model which will lead to improved risk management tools for mission planners.



Example BASH imagery produced by the 36th IS.
Product plots the 2007 Osprey Spring migration flight path

Teaming intelligence professionals with safety experts and wildlife biologist, the 36th Intelligence Squadron has successfully assisted in taking bird strike avoidance to the next level. Combining high tech intelligence capabilities with Osprey migratory data has produced clearly defined models to assist in the development of flight profiles, ultimately reducing the risk of Osprey-aircraft collisions. The unique first-ever partnership brought together many different technical experts to tackle the bird-strike risk mitigation challenge; the team is on time and on target to making the skies safer for both Air Force flight operations and the Osprey.