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**SOME SIGNIFICANT WILDLIFE STRIKES TO CIVIL AIRCRAFT
IN THE UNITED STATES, JANUARY 2005 –MARCH 2006**

4 April 2006

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The U.S. Department of Agriculture, through an interagency agreement with the Federal Aviation Administration, compiles a database of all reported wildlife strikes to U.S. civil aircraft and to foreign carriers experiencing strikes in the USA. We have compiled over 66,000 strike reports from 1,565 airports, 1990-December 2005 (over 7,100 strikes in 2005), but estimate that this represents only about 20% of the strikes that have occurred. The following examples from the database since January 2005 are presented to show the serious impacts that strikes by birds or other wildlife can have on aircraft. These examples, from throughout the USA, demonstrate the widespread and diverse nature of the problem. The examples are not intended to highlight or criticize individual airports because strikes have occurred on almost every airport in the USA. Many of the strike examples reported here occurred off airport property during approach or departure. For more information on wildlife strikes or to report a strike, visit www.birdstrike.org. or <http://wildlife-mitigation.tc.faa.gov>.

Date:	07 January 2005
Aircraft:	Hawker 1000
Airport:	Bowerman (WA)
Phase of Flight:	Climb
Effect on Flight:	Precautionary landing
Damage:	Engine #1 and #2
Wildlife Species:	Dunlin
Comments from Report:	Area is a wildlife refuge with known hazards but no specific warning was issued. Pilot pulled up to avoid birds. Core ingestion in both engines. Aircraft was not flyable. Company had to rent two engines while the damaged ones were being torn down for inspection and repair. The landing gear was covered with small birds. Airport personnel believes the birds were dunlins.

Date: 12 January 2005

Aircraft: B-747
Airport: Tokyo Intl.
Phase of Flight: Take off
Effect on Flight: Aborted take-off
Damage: Engine, wing
Wildlife Species: Hooded crow
Comments from Report: Flight crew saw 2 birds on centerline. They also saw a large crane-like bird pass under the nose and a crow passing off to the left. They heard a loud bang and the aircraft yawed left. They aborted take-off. Two fan blades broke though the cowl, others were damaged. All fan blades were replaced. A leading edge flap panel was damaged by broken fan blades. ID by Smithsonian, Division of Birds. (U.S. carrier)

Date: 02 February 2005

Aircraft: PA-28
Airport: Brandywine (PA)
Phase of Flight: Climb
Effect on Flight: Precautionary landing
Damage: Propeller, wing
Wildlife Species: Canada goose
Comments from Report: Significant damage to the wing at the point where it attaches to the fuselage. Although there was minor propeller damage, the engine had to be torn down for inspection. Time out of service was 1 month. Cost of repairs, \$15,000.

Date: 18 February 2005

Aircraft: MD-10
Airport: Oakland (CA)
Phase of Flight: Climb (1,500' AGL)
Effect on Flight: Precautionary landing
Damage: Engine
Wildlife Species: Unknown bird
Comments from Report: Bird was ingested in the #2 engine which caused a major vibration to the tail. After landing, discovered the inlet fan had lost 2 blades, 1 exited from the side, punching a hole in the acoustic panel. Fan blades were replaced and panel was repaired. Time out of service was 2 weeks. Cost of repairs, \$59,000 and other costs totaled \$105,000.

Date: 20 February 2005

Aircraft: Cessna Citation Ultra
Airport: Miami Intl. (FL)
Phase of Flight: Climb
Effect on Flight: None
Damage: Tail
Wildlife Species: Turkey vulture
Comments from Report: Hit a turkey vulture after departure. Impact did not appear to be that hard. No indications on the controls of any major damage. Reduced speed as a preventive measure. After landing, found a hole about 1 foot in diameter in the tail. The tail was replaced. ID by Smithsonian, Division of Birds. Time out of service was 2.5 months. Cost of repairs estimated to be \$25,000.

Date: 27 February 2005

Aircraft: B-737-300
Airport: Orlando Intl. (FL)
Phase of Flight: Take off
Effect on Flight: None
Damage: Engine
Wildlife Species: Gull
Comments from Report: Strike had no effect on engine operation. After landing, they found several N1 stage blades dented. Eight pairs of blades were replaced. Cost \$160,000.

Date: 4 March 2005

Aircraft: B-757-200
Airport: Mineta San Jose Intl. (CA)
Phase of Flight: Climb (5' AGL)
Effect on Flight: Engine shut down, precautionary landing
Damage: Engine
Wildlife Species: Gull
Comments from Report: A flock of gulls and other small birds landed on the runway as the aircraft was rotating for take-off. The left engine ingested at least 1. The aircraft returned to the airport on the right engine while emergency vehicles stood by. The plane taxied to the gate. Several fan blades were bent. No major engine parameter variations reported. Remains were not saved for ID.

Date: 30 March 2005

Aircraft: SA 227
Airport: Dade-Collier Training and Transportation Airport (FL)
Phase of Flight: Landing roll
Effect on Flight: Not reported
Damage: Propeller, fuselage
Wildlife Species: White-tailed deer
Comments from Report: During landing, while engines were in reverse, last deer in a group of 8, hit the prop causing it to detach and puncture the fuselage. Also damaged were the nose wheel steering and right engine nacelle. Aircraft was a write-off due to cost of repairs \$580,000 being close to the plane's value of \$650,000.

Date: 1 April 2005

Aircraft: B-757-200
Airport: Oakland Intl. (CA)
Phase of Flight: Climb (600' AGL)
Effect on Flight: Precautionary landing
Damage: Engine
Wildlife Species: Common loon
Comments from Report: Common loon was ingested into the engine core during climb-out. An emergency was declared and the aircraft diverted to SFO. Aircraft landed safely. Engine was not shut down. Vibration and burning smell reported by flight attendant. Bent fan blades and damaged nose cowl. Engine was replaced. ID by Smithsonian, Division of Birds. Costs reported at over \$1.5 million.

Date: 9 April 2005

Aircraft: B-737-300
Airport: Chicago O' Hare Intl. (IL)
Phase of Flight: Climb (1,500' AGL)
Effect on Flight: Precautionary landing
Damage: Radome, horizontal stabilizer, engine
Wildlife Species: Unknown bird
Comments from Report: Hit several birds. core ingestion on #2 engine. Engine was removed for repair. Also damaged were radome, left wing, vertical fin and pitot static probe. Aircraft was ferried out for repairs. Time out of service was 15 days. Cost of engine repairs \$40,000.

Date: 17 April 2005

Aircraft: Bell 407
Airport: near Brentford (SD)
Phase of Flight: En Route (1,000' AGL)
Effect on Flight: Emergency landing
Damage: Windshield
Wildlife Species: Blue-winged teal
Comments from Report: On the way to the scene of an auto accident at night, a helicopter was hit by 3 ducks. The windshield shattered and blood from the ducks temporarily blinded the pilot. His crew helped direct him to a safe landing spot on a road. The helicopter was then moved to a nearby farm. Time out of service was 8 hours. Cost of repairs \$1,440.

Date: 20 April 2005

Aircraft: B-777
Airport: Unknown (DEN-SFO)
Phase of Flight: En Route
Effect on Flight: None
Damage: Engine
Wildlife Species: Unknown bird
Comments from Report: Engine was replaced due to blade damage found in three stages. Time out of service was 9 days. Cost of repairs at least \$2 million.

Date: 24 April 2005

Aircraft: B-747
Airport: John F. Kennedy Intl. (NY)
Phase of Flight: Take off
Effect on Flight: Engine shut down, precautionary landing
Damage: Engine
Wildlife Species: Great black-backed and herring gulls
Comments from Report: The aircraft hit several gulls at rotation and shut down the #2 engine due to vibration. Aircraft returned to land after dumping 18,700 pounds of fuel. Several fan blades had to be replaced, others repaired. Passengers were delayed about 3 hours. Several great black-backed gulls were found on the runway and the Smithsonian identified the remains sent by the engine manufacturer as a herring gull.

Date: 9 May 2005

Aircraft: Rockwell NA 265
Airport: Brownwood Regional (TX)
Phase of Flight: Take off
Effect on Flight: Aborted take-off, overran runway
Damage: Engine
Wildlife Species: Unknown bird
Comments from Report: A loud bang was heard followed by plane swerving left as aircraft was about to take-off. Captain aborted take-off due to rapidly losing directional control. Plane overran runway, hit a fence and trees, crossed a road and came to rest in a plowed field. Fuel was leaking from left wing. Evidence of bird residue was found in the left engine. No serious injuries to those on board. NTSB report was source for this strike. Expert on birds in engines suggested that is would be unusual to find remains in the hot section of an engine and not find any on the 1st stage blades.

Date: 31 May 2005

Aircraft: B-757
Airport: Lihue Intl. (HI)
Phase of Flight: Take off
Effect on Flight: Engine shut down, precautionary landing
Damage: Engine
Wildlife Species: Barn owl
Comments from Report: Pilots saw bird go by right side of aircraft then felt a vibration in right engine. A precautionary landing was made at a nearby airport. Found damage to acoustic liner, several fan blades and LPC and HPC. Engine was removed for repairs. ID by Smithsonian, Division of Birds. Time out of service was 4 days; cost was over \$1 million.

Date: 10 June 2005

Aircraft: DC-9-30
Airport: Kansas City Intl. (MO)
Phase of Flight: Climb (10' AGL)
Effect on Flight: Emergency landing
Damage: Engine
Wildlife Species: American kestrel
Comments from Report: First officer saw small bird fly in front of the aircraft and disappear to the left. At rotation, the aircraft began to vibrate, yawed to the left and made several loud banging noises as the compressor stalled in the left engine. Pilot notified the tower and made an emergency landing that was uneventful. The engine was run at idle until after landing. Several fan blades were damaged along with the fan case. The flight was cancelled. ID by Smithsonian, Division of Birds. Cost of repairs estimated at \$800,000.

Date: 24 June 2005

Aircraft: A-310
Airport: Subic Bay (Philippines)
Phase of Flight: Take-off
Effect on Flight: Aborted take-off
Damage: Engine, cowling, wing
Wildlife Species: Philippine duck
Comments from Report: Engine had multiple birdstrikes on take-off roll. A loud bang was heard followed by vibration and pull to right. Fan blades badly damaged. Large section of nose cowl was torn from nacelle. Fan cowling was damaged. #3 flap fairing was damaged by engine shrapnel. Engine and cowling were replaced. ID by Smithsonian, Division of Birds. Time out of service was 4 days. Cost of repairs estimated at \$9,456,000 (U.S. carrier).

Date: 4 August 2005

Aircraft: C-421
Airport: Rooke Field (TX)
Phase of Flight: Landing roll
Effect on Flight: Separated nose gear
Damage: Nose landing gear, propellers
Wildlife Species: White-tailed deer
Comments from Report: Aircraft hit a deer while landing which caused the nose gear to collapse. Both propellers were damaged. Cost of repairs estimated at \$100,000.

Date: 17 August 2005

Aircraft: C-421
Airport: Merritt Island (FL)
Phase of Flight: Descent (2,000' AGL)
Effect on Flight: Emergency landing
Damage: Wing, tip tank, electronics
Wildlife Species: Black vulture
Comments from Report: Collision with a black vulture ripped the wing and punctured the fuel tank causing fuel to spray out. The strike also damaged the light that confirmed the landing gear was down. Pilot not sure if gear was down and called for an emergency landing. State Secretary of Transportation was on board along with other dignitaries. Bird ID by Smithsonian, Division of Birds.

Date: 23 August 2005

Aircraft: MD 520
Airport: near Phoenix (AZ)
Phase of Flight: En Route (400' AGL)
Effect on Flight: Emergency landing
Damage: Windshield, rotor blades
Wildlife Species: American coot
Comments from Report: Bird hit windshield and shattered left side injuring the pilot. A precautionary landing was made at the Coliseum. Rotor blades were scratched and will be replaced. Time out of service estimated at 3-4 weeks. Cost for windshield was \$30,000. Bird ID by Smithsonian, Division of Birds.

Date: 1 September 2005

Aircraft: Falcon 20
Airport: Lorain County (OH)
Phase of Flight: Climb (15' AGL)
Effect on Flight: Overran runway
Damage: Engines, tail, wings, fuselage, landing gear
Wildlife Species: Mourning dove
Comments from Report: Shortly after rotation, aircraft hit a flock of birds causing the #1 engine to flame out. As the gear was retracted, they hit another flock which caused the #2 engine RPM to roll-back. The pilot was not able to sustain airspeed or altitude and crash-landed, sliding through a ditch and airport perimeter fence, crossing a road and ending in a corn field. Aircraft sustained major structural damage beyond economical repairs. Both pilots were taken to hospital. Only the copilot sustained minor injuries. The NTSB investigated. Costs totaled \$1.4 million.

Date: 3 September 2005

Aircraft: B-757
Airport: Cleveland Hopkins Intl. (OH)
Phase of Flight: Climb (100' AGL)
Effect on Flight: Avoidance maneuver
Damage: Engines
Wildlife Species: European starling
Comments from Report: Pilots saw large flock of starlings just after rotation. First officer pulled up trying to avoid major part of the flock. They heard birds hit and immediately a foul smell entered cockpit. Engine instruments remained normal and flight continued to ORD. Both engines sustained damage. Approximately 50 starlings were found on the runway 3 hrs after the strike. Time out of service was approximately 2 days and cost was estimated at \$425,000.

Date: 12 September 2005

Aircraft: Piper Aztec
Airport: Anoka County (MN)
Phase of Flight: Landing roll
Effect on Flight: Not reported
Damage: Engine, prop, wing, landing gear
Wildlife Species: White-tailed deer
Comments from Report: Deer was cut in two by propeller. Photos show significant damage to landing gear. Time out of service was 3 days and cost totaled \$50,000.

Date: 13 September 2005

Aircraft: DC-10
Airport: Forth Worth Meacham Intl. (TX)
Phase of Flight: Landing roll
Effect on Flight: Engine shut down
Damage: Engine
Wildlife Species: Rock pigeon
Comments from Report: Ingested about 15-20 pigeons in the #3 engine on landing. Engine change required. ID by Smithsonian, Division of Birds. Aircraft was out of service for 1 week. Cost estimated at \$1.5 - \$2 million.

Date: 30 September 2005

Aircraft: DC-10-10
Airport: Unknown
Phase of Flight: Unknown
Effect on Flight: None
Damage: Engine
Wildlife Species: Wood duck
Comments from Report: During maintenance inspection evidence of strike was found on the #1 engine. Spinner had a large dent and some fan blades were bent. Engine was borescoped. Complete set of fan blades was replaced. ID by Smithsonian, Division of Birds. Cost of repairs was \$40,000. Aircraft was out of service for 2 days.

Date: 16 October 2005

Aircraft: BE-1900
Airport: Ogdensburg Intl. (NY)
Phase of Flight: Take off
Effect on Flight: Nose gear collapsed
Damage: Engine #1 and #2, propellers, landing gear, nose, fuselage
Wildlife Species: Coyote
Comments from Report: Aircraft struck a coyote during take-off run. The nose gear collapsed causing the plane to skid to a stop on the runway. Propeller blades went through the skin of the aircraft. Insurance declared aircraft a total loss. Cost of repairs would have been \$1.5 million.

Date: 17 October 2005

Aircraft: BE-400
Airport: Nut Tree (CA)
Phase of Flight: Landing roll
Effect on Flight: None
Damage: Engine, landing gear, fuselage, pitot tube
Wildlife Species: Wild turkey
Comments from Report: Aircraft struck approximately 20 wild turkeys on landing rollout. One engine had to be replaced after a bird was ingested. The other engine had evidence of a strike and was borescoped. A tire had a 1" strip of tread missing and the right wing stall strip was dented. Pitot tube was replaced. Aircraft was out of service for 4 days and costs totaled over \$76,000.

Date: 1 November 2005

Aircraft: A-300
Airport: Joe Foss Field (SD)
Phase of Flight: Climb (6,000' MSL)
Effect on Flight: Precautionary landing
Damage: Engine
Wildlife Species: Mallard
Comments from Report: While climbing through 6,000 ft the #2 engine sustained a bird strike from a single large bird. Flight crew reported engine vibrations and considerable noise. They kept the engine running at idle, declared an emergency and returned to the airport, landing uneventfully. Several fan blades were damaged along with the acoustic liner and inlet guide vanes. Flight was delayed about 3 hrs. Aircraft was substituted and engine and inlet cowl were replaced. ID by Smithsonian, Division of Birds. Cost was \$518,000.

Date: 30 November 2005

Aircraft: B-747
Airport: Denver Intl. (CO)
Phase of Flight: Approach (1,200' AGL)
Effect on Flight: Precautionary landing
Damage: Engine, wing
Wildlife Species: Canada goose
Comments from Report: On approach, both the number 1 and 2 engines were struck by geese. No abnormal engine parameters were noted. The #1 engine was shut down after landing. Two fan blades on the #1 engine and 9 fan blades on the #2 engine were damaged. Inspection found core ingestion in both engines. Number 3 and 4 engines had no evidence of any strikes. The left outboard mid-flap had a 6 inch hole. The right outboard flap inboard canoe was also penetrated. A leg with webbed foot was protruding from the hole. ID by Smithsonian, Division of Birds. Cost \$194,000.

Date: 13 December 2005

Aircraft: Embraer 145
Airport: Harrisburg Intl. (PA)
Phase of Flight: Approach (5,000' AGL)
Effect on Flight: Compressor stalls
Damage: Engine
Wildlife Species: Canada goose
Comments from Report: During approach crew saw a streak out the left window followed by a jolt. A smell was immediately detected. Crew turned off the LH pack and reduced power to idle to slow the plane. Engine experienced violent compressor stalls when power was increased. ID by Smithsonian, Division of Birds.

Date: 28 December 2005

Aircraft: B-737-300
Airport: Chicago Midway Intl. (IL)
Phase of Flight: Climb (300' AGL)
Effect on Flight: Precautionary landing, flight diverted to ORD
Damage: Engine
Wildlife Species: Snowy owl
Comments from Report: One large bird was ingested into the #2 engine. A precautionary landing was made at Chicago O'Hare. One engine was destroyed. Passengers were put on other flights. ID by Smithsonian, Division of Birds. Aircraft was out of service at least 24 hours.

Date: 28 December 2005

Aircraft: B-737-500
Airport: Sacramento Intl. (CA)
Phase of Flight: Climb (800' AGL)
Effect on Flight: Precautionary landing
Damage: Engine
Wildlife Species: Unknown bird
Comments from Report: Pilot saw a large white bird fly by left and heard a loud pop and the left engine began vibrating. Aircraft returned to the airport. All fan blades were replaced. Passengers were put on other flights. Cost of repairs was \$210,400.

Date: 30 December 2005

Aircraft: Bell 206
Airport: Near Washington, LA
Phase of Flight: En Route (500' AGL)
Effect on Flight: Precautionary landing
Damage: Aircraft destroyed
Wildlife Species: Vulture

Comments from Report: Pilot looked up from instruments to see a large vulture crashing into the windshield. He was temporarily blinded by blood and wind. After regaining control, the pilot tried to land in a bean field nearby but blood was hampering his vision and the left skid hit the ground first causing the aircraft to tip on its side. Pilot was taken to the hospital and had several surgeries to repair his face, teeth and eye. Cost of repairs was \$1.5 million.

Date: 7 January 2006

Aircraft: B-757
Airport: Portland Intl. (OR)
Phase of Flight: Take off run
Effect on Flight: Precautionary landing
Damage: Engine
Wildlife Species: Great blue heron

Comments from Report: Bird was ingested during take-off. Engine was shut down and a one-engine landing was made. Fan section of the engine was replaced. ID by Smithsonian, Division of Birds. Time out of service was 15 hours. Cost was \$244,000.

Date: 21 January 2006

Aircraft: C-210
Airport: Orlando Executive (FL)
Phase of Flight: Approach (2,000' AGL)
Effect on Flight: Precautionary landing
Damage: Windshield
Wildlife Species: Black vulture

Comments from Report: Bird crashed through the windshield. The instructor was cut by Plexiglas on head and face. Aircraft landed safely. Time out of service was 24 hours. Cost was \$3,500.

Date: 1 February 2006

Aircraft: Bombardier de Havilland Dash 8
Airport: Boise Air Terminal (ID)
Phase of Flight: Approach (1,500' AGL)
Effect on Flight: None
Damage: Tail
Wildlife Species: Bald eagle

Comments from Report: Birdstrike took out the leading edge of the tail. Aircraft was ferried out for repairs. ID by Smithsonian, Division of Birds.

Date:	28 February 2006
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Aircraft:	C-172
Airport:	near Titusville, FL
Phase of Flight:	En Route
Effect on Flight:	Emergency landing off airport
Damage:	Windshield
Wildlife Species:	Ring-billed gull
Comments from Report:	While on traffic enforcement detail, the windshield was shattered by a gull. The pilot was forced to make an emergency landing in a cow pasture. During the landing, the aircraft clipped a fence. Pilot was taken to the hospital, treated and released. ID by Smithsonian, Division of Birds from photograph.

Date:	2 March 2006
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Aircraft:	SA-227 Metroliner
Airport:	Salt Lake City Intl. (UT)
Phase of Flight:	Climb (600' AGL)
Effect on Flight:	Emergency landing at airport
Damage:	Wing
Wildlife Species:	Common goldeneye
Comments from Report:	Right wing of aircraft was penetrated and badly dented. Pilot declared an emergency, returned to airfield and landed without incident. Aircraft needed extensive repair. ID by Smithsonian, Division of Birds.