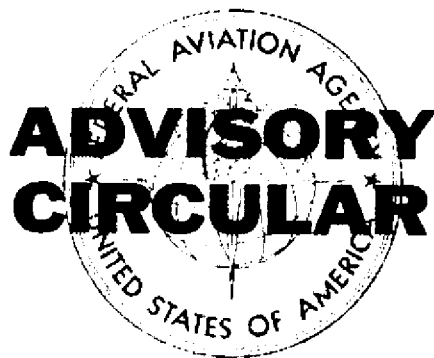


Cancelled

5200-3A

Federal Aviation Agency



AC NO : AC 150/5200-3

AIRPORTS

EFFECTIVE :

10/7/66

SUBJECT : BIRD HAZARDS TO AIRCRAFT

1. **PURPOSE.** This Advisory Circular transmits to the aviation public the latest published information concerning the reduction of bird strike hazards to aircraft in flight and in the vicinity of airports.
2. **REFERENCES.** Items "a through g" of the following listed publications may be obtained free of charge from the FAA Distribution Unit, HQ-438, Federal Aviation Agency, 800 Independence Avenue, S.W., Washington, D.C. 20553:
 - a. Advisory Circular, AC 150/5200-1, Bird Hazards to Aviation.
 - b. Advisory Circular, AC 150/5200-2, Bird Strike/Incident Report Form 11-27-65.
 - c. FAA Form 3830, Bird Strike/Incident Report 10-65.
 - d. Advisory Circular AC 33-1, Turbine - Engine Foreign Object Ingestion and Rotor Blade Containment Type Certification Procedures, dated 6/24/65.
 - e. Advisory Circular AC 20-49, Analysis of Bird Strike Reports and Transport Category Airplanes operating in Continental limits of the United States 7/27/66.
 - f. FAA-ADS-58, Investigation of Turbojet Engine Characteristics during Bird Ingestion, Technical Report for 1966.
 - g. FAA-ADS-60, Stability Structure following Bird Strike-Technical Report for March 1966.
 - h. Bird vs Aircraft, publication HQ-5. This publication may be obtained free of charge from the Department of the Interior Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, U.S. Post Office and Courthouse, Boston, Massachusetts 02109.

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- i. SRDS Report HO-66-8, Biological Control of Birds in Airports Environment, January 1966. Cost \$4.00 from Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.

3. TECHNICAL CONSULTATION.

- a. Bird control consultation may be obtained from regional offices of the Bureau of Sport Fisheries and Wildlife. These are listed below:
 - (1) Region 1 (Cal., Idaho, Mont., Nev., Ore., Wash., Hawaii, Alaska); Interior Bldg. 1002 N.E. Holladay St., Portland, Ore., 97208 (Telephone 503 234-3361).
 - (2) Region 2 (Ariz., Colo, Kans., N.M., Okla., Tex., Utah, Wyo.); Federal Office Bldg., 517 Gold Ave., S.W. Box 1306, Albuquerque, N.M., 87103 (Telephone 505-247-0311).
 - (3) Region 3 (Ill., Ind., Iowa, Mich., Minn., Mo., Nebr., N.D., Ohio, S.D., Wis.); 1006 W. Lake St., Minneapolis 8, Minn., 55408 (Telephone 612 334-2846).
 - (4) Region 4 (Ala., Ark., Fla., Ga., Ky., La., Md., Miss., N.C., S.C., Tenn., Va.); 809 Peachtree-7th Bldg., Atlanta, Ga., 30323 (Telephone 617 Capitol 3-2961).

4. BACKGROUND.

- a. Bird Strike/Incident Report, FAA Form 3830 (BOB 04-R136) was issued for the U.S. aviation public's use as of January 1, 1966. To date experience with the form has indicated that the FAA is now receiving more than twice the number of bird strike reports than in the past. However, the reports are lacking in adequate information on damage to aircraft such as description and extent of damage, cost or estimated cost to repair, aircraft out-of-service time, and estimated loss of revenue, etc.
- b. The Federal Aviation Agency is seriously concerned with the increasing problem of bird strikes to aircraft and the costly and occasionally fatal consequences to pilots and passengers resulting from these strikes.
- c. From 1961 to the present time, the FAA has spent over \$500,000 for research on bird habitats, migration, and preventative and corrective measures to reduce bird strike hazards to aircraft in the vicinity of airports and in airways operations. Formal reports collected on bird strikes indicate that structural and engine repairs cost millions of dollars each year in the United States.

- d. The FAA has conducted tests with respect to bird impact damage on windshields, on typical aircraft empennage structures and tests with respect to turbine engine bird ingestion problems. These tests are still in progress and data are being collected.
- e. The FAA has established new turbine engine certification test guidelines which provide greater engine tolerance to bird ingestion effects. It is possible that detailed design of engines and air inlets can be further improved.
- f. Many species of birds frequenting airports are protected by laws. Their status should be determined before any lethal controls are attempted. Some laws contain provisions for destroying birds which are causing depredations or are injurious to society.

5. MIGRATORY BIRDS.

- a. Migratory birds, particularly waterfowl, are a serious hazard to aircraft due to their size and weight. In recognition of this potential hazard, Federal Aviation Agency Air Traffic Control and Flight Service Station facilities issue advisory information on bird activities, when they are reported or when they have knowledge of such activities. Information given to pilots includes the position, and if known species or size of birds, their course and altitude.
- b. Federal Aviation Agency Air Traffic Control and Flight Service Station facilities coordinate with airport management for either appropriate alerting action by a Notice to Airmen when flocks of birds are noted to remain in the airport vicinity or for possible closing by a Notice to Airmen when flocks roost on runways.
- c. The FAA Airman's Information Manual carries a chapter on bird hazards. This chapter deals with the migratory patterns of certain bird species and gives the locations and dates of the spring and fall migratory periods.

6. MIGRATORY PATTERNS.

- a. Generally speaking the heaviest spring migration period is from March through April and the heaviest fall migration period from October through November.
- b. The birds considered of greatest potential hazard to aircraft because of large size, abundance, or habit of flying in dense flocks are the Whistling Swans, Canada Geese, Blue Geese, White-fronted Geese, Mallards, Pintails, Gulls, Vultures, Starlings, and Black Birds. Birds of these species are considered particularly hazardous during spring and fall migrations and when they are concentrated in wintering areas. Swans make nonstop flights of several hundred miles

(Chesapeake Bay to Lake Erie) at altitudes up to 6,000 feet. At some airports, there are large flocks of Sandpipers, horned larks, black birds, tree swallows, longspurs, white pelicans, sandhill cranes, or other species which could be a problem at certain seasons.

- c. The four major bird flyway routes within the continental United States are known as the:
- (1) Atlantic
 - (2) Mississippi
 - (3) Central
 - (4) Pacific
- d. The heaviest concentration of birds within these flyways occurs during the spring and fall migration. The wintering areas which accommodate the heaviest concentration of birds are as follows:
- (1) Atlantic - Chesapeake Bay, Back Bay area in Virginia, and the Currituck Sound, Lake Mattamuskeet area in North Carolina.
 - (2) Mississippi - The Mississippi Valley and the South Louisiana Marshes along the Gulf of Mexico.
 - (3) Central - Along the Missouri River and Gulf Coast of Texas.
 - (4) Pacific - In the general area of Lake Tahoe and the Sacramento Valley area California.
- e. Whistling Swans are our largest common migratory waterfowl, and during the migration, concentrate in a narrow and fairly well-defined path passing close to the airports of Duluth, Milwaukee, Detroit, Toledo, Cleveland, Buffalo, Pittsburgh, Harrisburg, Baltimore, and Washington, D. C.
- f. In the spring, swans migrate over Chesapeake Bay, the lower Susquehanna River, then overland to Lake Erie through Michigan, Wisconsin, North Dakota, Manitoba and Saskatchewan to the Canadian Arctic. Some birds wintering on Great Salt Lake migrate northwest to the Pacific Coast, then up the coast to Alaska, others migrate northeast through Montana, Alberta and Saskatchewan to reach the breeding grounds. The fall flights are made over approximately the same routes.
- g. Geese are considered the greatest hazard to aircraft because of their abundance, large size, occurrence in large flocks, relatively slow flight and high altitude of flight. Of the 400,000 to 500,000

Canada Geese that migrate between Hudson and James Bays and the Mississippi Valley, over 100,000 pass through Horicon Marsh in Wisconsin. In migrating between Horicon Marsh and southern Illinois, the bulk of these geese pass about 25 miles west of Milwaukee's municipal airport and 50 miles west of O'Hare Airport, Chicago. At times stray flocks pass over or very close to these airports.

- h. Canada geese migrate over several broad fronts. Atlantic Coast birds migrate up Chesapeake Bay, cross to Lake Erie and then fly north. Another flight goes up the Mississippi River and over the Great Lakes north to their breeding grounds. Birds wintering on the Great Salt Lake disperse to breed in the northwestern states and the southern parts of the western Canadian provinces. West coast geese migrate north along the coast to their breeding grounds in Alaska. The fall flights are over the same routes.
- i. Snow geese and blue geese in numbers totaling 400,000 to 500,000 move down the Mississippi Valley on such a broad front in fall that they are likely to pass over or near most of the airports in the Valley. They concentrate at several places along the Illinois, Mississippi and Missouri Rivers, but seldom in numbers over 25,000. When they leave their gulf coast wintering grounds in March, the bulk of the population moves in masses gradually moving up the Missouri River Valley and southwest Iowa. The movement of several hundred thousand birds to the Missouri River Valley north of St. Joseph, Missouri, and their gradual movement up this valley creates conditions hazardous to aircraft in the vicinity of airports at Kansas City, Omaha, Sioux City and Sioux Falls.
- j. Lesser snow geese migrate over a broad front through the Mississippi River Valley with the center of the spring flight passing over Louisiana, Arkansas, Missouri, Iowa, Minnesota, South Dakota, and North Dakota. The full flight spreads further east, reaching into Michigan, Ohio, and Indiana. Birds that winter in the Central Valley of California migrate through Tule Lake in northern California, Malheur Lake in Oregon and along the coast of British Columbia.
- k. Greater snow geese migrate almost nonstop from wintering grounds to breeding grounds. They migrate northward along the Atlantic Coast and then inland up the Hudson and Connecticut Rivers to a stopover on the St. Lawrence, at Cap. Tourmente, Quebec.
- l. Lesser snow geese fly at an estimate altitude of 3,000 feet. Greater snow geese have been reported between 800 and 1,500 feet and probably go much higher.
- m. Mallard and Pintail are the most common North American duck, but more specifically they concentrate in very large numbers in the

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Mississippi Valley and in the Central Valley of California. Each migration season about 7,000,000 to 15,000,000 ducks pass through the Mississippi Valley; 3,000,000 to 6,000,000 in the Central Valley of California, and 2,000,000 to 3,000,000 migrate through the Atlantic Coastal States.

- n. More ducks pass in the vicinity of Lambert Field, St. Louis, than any other major air terminal east of the Rocky Mountains.
- o. Mallard ducks migrate over a broad front, covering most of the Western States. The heaviest concentrations are through the Mississippi and Missouri Valleys. There is also a flight along the West Coast.
- p. Pintail ducks migrate over a broad front, covering most of the Western States. In the spring and fall in the east, there are flights between Chesapeake Bay and the Great Lakes and also along the Atlantic Coast and St. Lawrence River.
- q. The double-crested cormorant is a large, dark water bird similar in size and shape to a goose, but with very different habits. Cormorants usually migrate in flocks of 20 to 200 following the coastline closely and generally staying below 1,000 feet. They are of concern primarily to airports in the immediate vicinity of the Atlantic Coast. An exception to the Coastal route which the cormorant normally takes is the overland route in the fall from Boston Bay, southward across Massachusetts to Coastal Rhode Island. Cormorants have been known to fly as high as 3,000 feet.

7. ACTION.

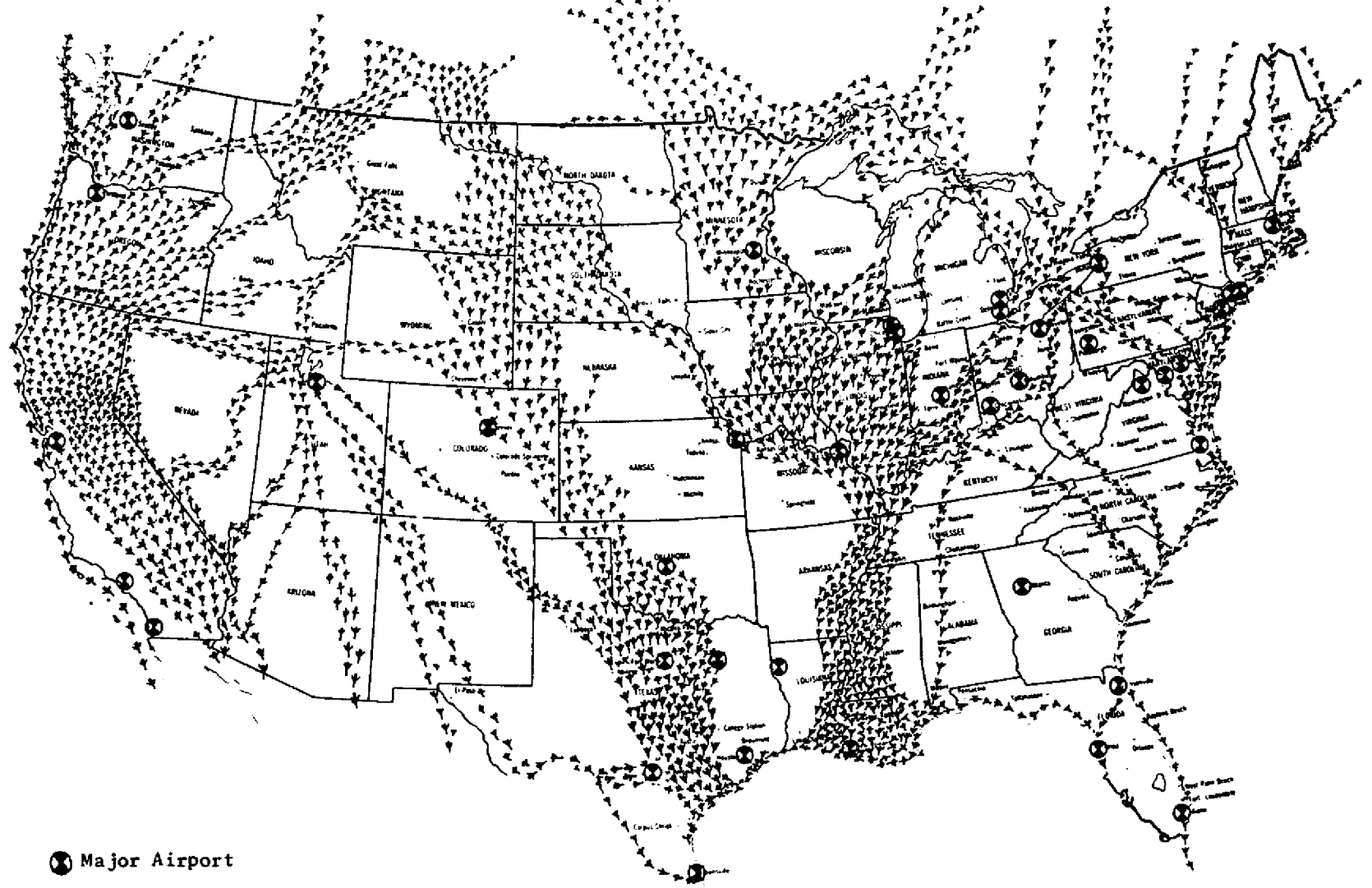
- a. Municipal attention should be taken to fill, level, and clear airports and adjacent land which create bird refuges and increase bird hazards by providing feeding, bathing, loafing, and nesting places. Birds are attracted to: garbage dumps, food and fish processing wastes, feed pens and piggeries, ponds, sloughs, swamps, man-made lakes and reflecting ponds, sewage lagoons and outfalls, seed and fruit producing plants and trees, tall grasses, reeds, and shrubbery.
- b. To establish research and test programs to improve present aircraft and engine airworthiness standards, it is essential that the FAA have adequate information on what bird strikes are costing the

aviation public. All segments of civil and military aviation are urged to furnish the FAA with all bird strike information requested on FAA Form 3830 and to place special emphasis on completing the damage and cost items. Where available photographs should also be submitted. The FAA Form 3830 is available at most FAA facilities.

Edward C Hodson

ACTING Director
Flight Standards Service

MIGRATORY BIRDS FLIGHT PATTERNS



● Major Airport

FEDERAL AVIATION AGENCY BIRD STRIKE/INCIDENT REPORT				Form Approved Budget Bureau No. 04-R136			
1. NAME OF OPERATOR			14. KIND OF BIRD (<i>Gull, robin, etc. Bird remains (a feather or more) should be gathered and preserved by freezing or drying and submitted for identification to the U.S. National Museum, Room 414, 10th and Constitution Avenue, N. W., Washington, D.C. 20560, together with a copy of this report form. If a leg band is recovered, it should also be sent to the same address. These species data are extremely important.</i>)				
2. AIRCRAFT TYPE (<i>Make and model</i>)							
3. POWERPLANT TYPE (<i>Make and model</i>)							
4. AIRCRAFT NATIONALITY AND REGISTRATION MARK N		15. SIZE OF BIRD		16. NUMBER OF BIRDS			
5. DATE OCCURRED		6. TIME (GMT) OCCURRED				SMALL (<i>Sparrow</i>)	
				MEDIUM (<i>Gull</i>)		SINGLE BIRD	
7. LOCATION OF INCIDENT		17. PERSONAL INJURY		18. PART OF AIRCRAFT STRUCK			
<input type="checkbox"/> ON AIRPORT NAME OF AIRPORT RUNWAY NO. <input type="checkbox"/> CRUISING LATITUDE LONGITUDE		<input type="checkbox"/> NO <input type="checkbox"/> YES (<i>Indicate extent of injury to either aircrew or passengers</i>)					
8. ALTITUDE		9. AIRSPEED (<i>In knots</i>)		19. DAMAGE TO AIRCRAFT <input type="checkbox"/> NO <input type="checkbox"/> YES			
10. FLIGHT PHASE AT TIME OF OCCURRENCE (<i>Check one</i>)		20. DESCRIPTION AND EXTENT OF DAMAGE (<i>Give details about airframe and engine damage</i>)					
TAXIWAY		CRUISE				APPROACH	
TAKEOFF		HOLDING				LANDING	
CLIMB		LETDOWN		UNKNOWN			
11. FLIGHT CONDITIONS (<i>Check appropriate categories</i>)		21. COST OR ESTIMATED COST TO REPAIR		22. AIRCRAFT OUT-OF-SERVICE TIME			
IFR		VMC				BELOW CLOUDS	
VFR		ABOVE CLOUDS				BETWEEN CLOUD LAYERS	
IMC		IN CLOUDS		ICING CONDITIONS			
12. WEATHER CONDITIONS		23. EST. LOSS OF REVENUE		24. WAS A BIRD STRIKE/INCIDENT REPORT FORM PREVIOUSLY SUBMITTED; IF SO, WHEN			
CLEAR		RAIN				NIGHT	
PARTLY CLOUDY		SNOW				DAWN	
OVERCAST		DAY		DUSK			
OTHER (<i>Explain</i>)		25. EXPLAIN ALL "YES" ANSWERS		YES			
13. DID STRIKE/INCIDENT OR DAMAGE CAUSE REVISED FLIGHT PLAN <input type="checkbox"/> NO <input type="checkbox"/> YES (<i>Give details</i>)		A. WAS BIRD(S) SEEN PRIOR TO STRIKE		NO			
		B. WAS EVASIVE ACTION TAKEN					
		C. HAD THE PILOT BEEN ALERTED TO THE PRESENCE OF BIRDS					
EXPLANATION		REPORTED BY					
TITLE							
DATE							