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Office of Airport Safety and Standards
Airport Safety and Compliance Branch**

**U. S. Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services
National Wildlife Research Center**

Wildlife Hazard Management At Airports

**A manual for airport personnel
prepared by**

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9.2.a. Flight Schedule Modification

Although not generally practical for regularly scheduled commercial traffic on larger airports, there may be various situations when flight schedules of some aircraft can be adjusted to minimize the chance of a strike with a wildlife species that has a predictable pattern of movement. For example, pilots could be advised not to depart during a 30-minute period at sunrise or sunset during winter when large flocks of blackbirds cross an airport going to and from an off-airport roosting site. In situations such as at Midway Atoll where albatrosses and other seabirds are abundant during parts of the year, scheduling nighttime arrivals and departures, when birds are not flying, may be the only means of avoiding strikes. Finally, air traffic controllers on occasion may need to temporarily close a runway with unusually high bird activity or a large mammal (e.g., deer) incursion until wildlife control personnel can disperse the animals.

9.2.b. Habitat Modification and Exclusion

Habitat modification means changing the environment to make it less attractive or inaccessible to the problem wildlife. All wildlife need food, cover and water to survive. Any action that reduces, eliminates or excludes one or more of these elements will result in a proportional reduction in the wildlife population at the airport.

Initially, management actions to reduce food, cover, and water on an airport may be expensive. However, when costs are amortized over several years, these actions may be the least expensive approach to reduce wildlife populations on the airport. Once a habitat modification is done correctly, it is generally not necessary to go back and do it again. Also, these control methods are generally well accepted by the public and minimize the need to harass or kill wildlife on the airport.

9.2.b.i. Food

Some of the more common urban food sources for birds on and near airports include handouts from people in taxi stands and parks, grain elevators, sewage treatment plants and improperly stored food waste around restaurants and catering services. Rural food sources attractive to birds include sanitary landfills, feedlots, certain agricultural crops (especially cereal grains and sunflower), and spilled grain along road and rail rights-of-way.

Airport operators should be aware of these food attractants for birds that exist



Artificial feeding of waterfowl promotes unnaturally high bird concentrations. This can adversely affect aircraft safety. Feeding wildlife should be prohibited at airports and discouraged in areas near airports. (Photo by E. C. Cleary, FAA)

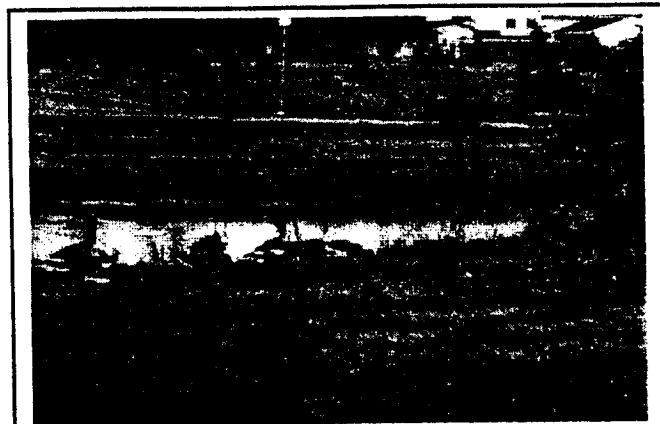
on and in close proximity to the airport. On the airport, operators should require bird-proof storage of food waste, prohibit bird feeding, and promote good sanitation and litter control programs. Agricultural crops attractive to birds, such as cereal grains and sunflower, should be prohibited on airport lands leased for farming within the separation criteria identified in AC 150/5200-33 (see Chapter 5 and Appendix C). For nearby off-airport areas, airport operators should work closely with local governmental entities and landowners to discourage land-use practices and activities that provide food sources for problem bird species.

Trees and other landscaping plants selected for the street side of airports should not produce fruits or seeds attractive to birds. On airside areas, the large expanses of grass and forbs can sometimes provide ideal habitat for rodent and insect populations that attract raptors, gulls, other bird species, and mammalian predators such as coyotes. In addition, grasses allowed to produce seed heads can provide a desirable food source for doves, blackbirds and other species. The management of airside vegetation to minimize rodents, insects and seeds may be complex, requiring insecticide, herbicide and rodenticide applications, changes in vegetation cover, and adjustments in mowing schedules (e.g., mowing at night to minimize bird feeding on insects exposed by the mowing). Such management plans will need to be developed in conjunction with professional wildlife biologists and horticulturists knowledgeable with the local wildlife populations, vegetation and growing conditions (see below).

9.2.b.ii. Cover

All wildlife need cover for loafing, roosting, escape, and reproduction. Pigeons, house sparrows, and European starlings use building ledges, abandoned buildings, open girders and bridge work, and dense vegetation for cover. Blackbirds use marsh vegetation such as cattails for nesting and roosting. Many bird problems can be solved by eliminating availability of such areas either through removal or by exclusion.

Care should be taken when selecting and spacing plants for airport landscaping, not only to avoid production of fruits and seeds desired by birds as discussed above, but also to avoid the creation of areas of dense cover for roosting and nesting. Bird roosts that do form in trees on airports can generally be eliminated by thinning the canopy of trees and perhaps selectively removing trees to increase their spacing.



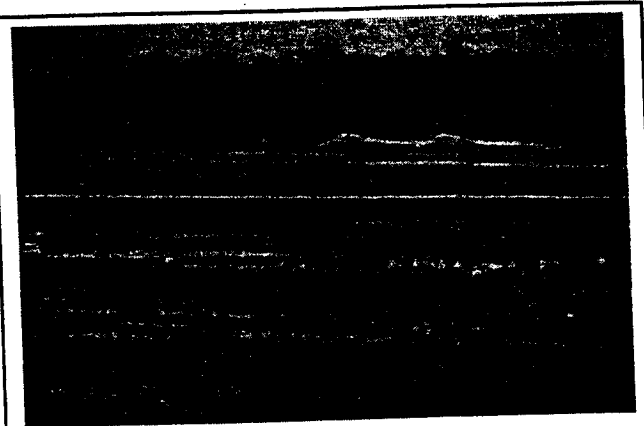
Giant Canada geese, left undisturbed, will establish territories on urban lakes and ponds. In just a few years a pair of geese can easily increase to a flock of 100 or more. (Photo by E. C. Cleary, FAA)

The management of airport airside vegetation to minimize bird activity is a controversial subject in North America. The general recommendation, based on studies in England in the 1960s and 1970s, has been to maintain a monoculture of grass at a height of 6-10 inches (Transport Canada) or 7-14 inches (U.S. Air Force). Tall grass, by interfering with visibility and ground movements, is thought to discourage many species of birds from loafing and feeding. However, the limited studies conducted in North America have not provided a consensus of opinion on the utility of tall-grass management for airports. For example, Canada geese do not appear to be discouraged by tall grass. In addition, maintenance of tall grass may result in increased rodent populations, a food source for raptors. Finally, maintenance of uniform stands of tall grass is difficult on many airports because of varying soil conditions. Arid regions in the western United States cannot maintain tall grass without irrigation.

Regardless of the grass height on the rest of the airport, the grass within the runway and taxiway safety areas should be maintained at a height of 3-4 inches. This will allow airport personnel and Airport Certification Safety Inspectors to visually inspect these areas for ruts, humps, depressions or other surface irregularities.

Until more research is completed, no general guidelines on grass height or vegetation type for airside areas of airports will be made. Airport operators should consult with professional wildlife biologists and horticulturists to develop a vegetation type and mowing schedule that is appropriate for the growing conditions and wildlife at the location. The main principles to follow are to use a vegetation cover and mowing regime that do not result in a build-up of rodent numbers or the production of seeds, forage or insects desired by birds.

Finally, dense stands of trees and undergrowth on airport property can provide excellent cover for deer, coyotes, geese, raptors, roosting blackbirds, rodents, and other wildlife. In general, these habitats should be cleared or at least sufficiently thinned to eliminate the desired cover and to allow easy visual and physical access by wildlife control personnel. All unnecessary posts, fences and other structures that can be used as perches by raptors and other birds should be removed from airside areas. Piles of construction debris and discarded equipment, unmowed fence rows, and other unmanaged areas often provide excellent cover for commensal rodents (rats and house mice). Such areas should be eliminated from airports.



All areas of standing water on the airport operating area should be drained to discourage bird use. (Photo courtesy USAF)

9.2.b.iii. Water

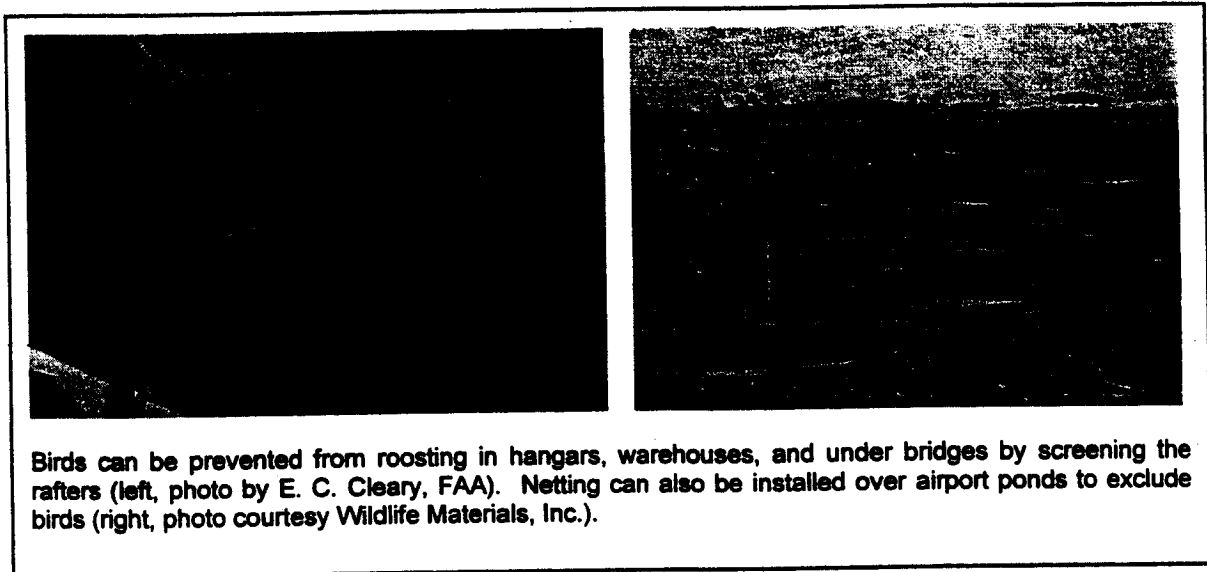
Water acts as a magnet for birds; therefore, all standing water on airports should be eliminated to the greatest extent possible. Depressions in paved and vegetated areas and disturbed areas at construction sites that accumulate standing water after rain should be filled or modified to allow rapid drainage. This is particularly important at coastal airports where fresh water is highly attractive to birds for drinking and bathing. Retention ponds, open drainage ditches, outdoor fountains and other wetland sites should not be established on or adjacent to airports.

9.2.b.iv. Exclusion Techniques

If food, water, or cover can not be eliminated by habitat modification, then actions can sometimes be taken to exclude the wildlife from the desired resource. Exclusion involves the use of physical barriers to deny wildlife access to a particular area. As with habitat modification, exclusion techniques, such as installing a covered drainage ditch as opposed to an open ditch, can initially be costly. However, exclusion provides a permanent solution that is not only environmentally friendly, but when amortized over many years, may actually be the least expensive solution.

9.2.b.iv.a. Exclusion of Birds

Access to rafter and girded areas in hangars, warehouses, and under bridges can be



eliminated with netting. Curtains made of heavy-duty plastic sheeting, cut into 12-inch strips, and hung in warehouse or hangar doorways, can discourage birds from entering these openings. Porcupine wire can be installed on ledges, roof peaks, rafters, signs, posts, and other roosting and perching areas, to keep birds from using them. Changing the angle of building ledges to 45 degrees or more will deter birds from perching.

Gull and waterfowl use of retention ponds and drainage ditches can be reduced with over-head wire systems. A system of wires spaced 10 feet apart or in a 10- x 10-foot grid will discourage most gulls and waterfowl from landing. Similar wire systems have been successfully used to keep gulls off roofs and out of landfills, and to exclude crows from electrical substations. When it is desirable to eliminate all bird use, netting can be installed over small ponds and similar areas. However, birds are sometimes tangled in the netting, and maintenance problems arise with high winds and freezing weather. Complete coverage of ponds with plastic, 3-inch diameter "bird balls" will completely exclude birds and yet allow evaporation of water. Designing ponds with steep slopes will discourage wading birds such as herons. Use of culverts to totally cover water in drainage ditches is recommended whenever possible.

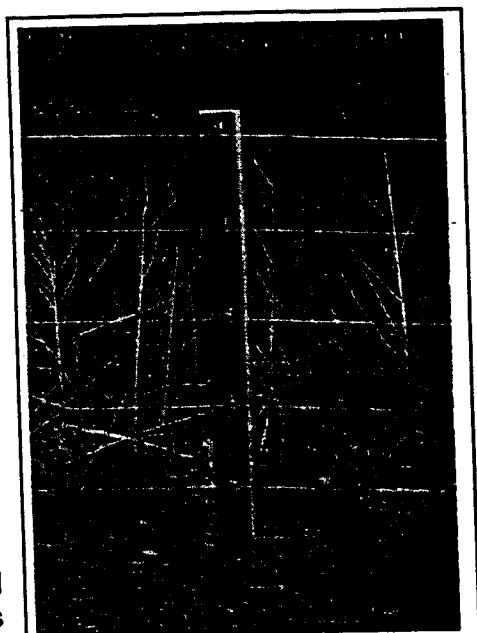
9.2.b.iv.b. Exclusion of Mammals

Airports should have a "zero tolerance" policy for deer, livestock and other large mammals in the aircraft operating area because of their severe threat to aviation safety (see Table 7-1). The best, albeit most costly, procedure for excluding these animals is a permanent, 10-foot high chain-link fence with barbed-wire outriggers that is inspected regularly to fix any holes, wash-out areas or other breaches. This fence also serves as an excellent security barrier for the airport. There are also numerous electric-fence designs for excluding deer, discussed in Hygnstrom et al. (1994), that are not as costly as permanent fencing but have drawbacks in safety and maintenance.

Cattle Guards are widely used to prevent hooved livestock from traversing across fenced areas through permanent openings maintained for vehicular access. These devices, if at least 15 feet in length perpendicular to fence, will prevent deer from entering through gated areas on airports.

9.2.c. Repellent Techniques

Repellent and harassment techniques are designed to make the area or resource desired by wildlife unattractive, or to make the wildlife uncomfortable or fearful. Long term, the cost-effectiveness of repelling wildlife usually does not compare favorably with habitat modification or exclusion techniques. No matter how many times wildlife are driven from an area that attracts them, they or other individuals of their species will return as long as the attractant is accessible. However, habitat modifications and exclusion techniques will never completely rid an airport of problem wildlife; therefore, repellent techniques are a key component of any wildlife hazard management plan.



This 5-strand electric fence is one of many designs that can be used to discourage deer and other large mammals from entering selected areas. (Photo by E. C. Cleary, FAA)