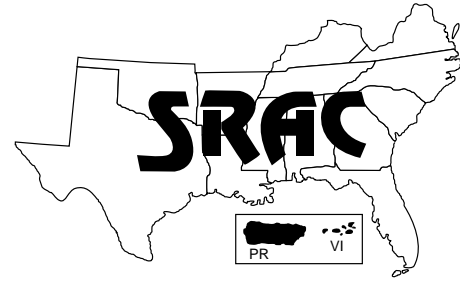


## Southern Regional Aquaculture Center



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# Controlling Bird Predation at Aquaculture Facilities: Frightening Techniques

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Fish-eating birds forage at aquaculture facilities throughout the United States, and each species causes a different type and level of damage. Birds may eat only diseased or weakened fish, or they may forage heavily on cultured fish. Birds can spread disease pathogens and parasites.

Double-crested Cormorants (*Phalacrocorax auritus*), American White Pelicans (*Pelecanus erythrorhynchos*), Great Blue Herons (*Ardea herodias*) and Great Egrets (*Ardea alba*) are common predators, although not all of these species cause economic damage in all production systems. Producers, wildlife managers and researchers have developed tools and techniques for frightening birds away to prevent or lessen the damage they cause. Using appropriate tools in an aggressive bird management system can be effective, although new technologies and strategies are needed.

## Status of fish-eating birds

All fish-eating birds are protected by the Migratory Bird Treaty Act. These birds may not be killed in

the U.S. without a depredation permit or depredation order. Regulatory authority for managing migratory birds rests with the U.S. Fish and Wildlife Service (USFWS). If fish-eating birds are damaging an aquaculture facility, the USFWS may issue a depredation permit that allows the producer to kill a limited number of most species to reinforce the effects of nonlethal techniques.

Some fish-eating birds also are protected by the Endangered Species Act. Wood Storks (*Mycteria Americana*) found east of the Mississippi/Alabama state line receive this protection. No lethal or nonlethal control activities can be used to control any bird species using aquaculture facilities in this region if Wood Storks are nearby. The Bald and Golden Eagle Protection Act further protects eagles and prohibits all hazing activities near Bald (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*), except with special permission from the USFWS.

## On-farm management

Producers are best able to manage bird damage because they know their own farms intimately and can watch the patterns of bird use

and damage day and night, throughout the year. Different bird species pose different hazards, so dispersal activities should be tailored to the birds using the farm.

White Pelicans can consume up to 2 pounds of fish per day and can shed thousands of eggs of the *Bolbophorus* catfish trematode during a single visit to ponds. This bird can have a disastrous effect on catfish production, so producers should try to keep all pelicans off their farms.

Cormorants eat about half as much as pelicans, but they are much more plentiful and sometimes visit ponds in large flocks, causing extensive damage. Cormorants move often among ponds and farms. They feed by diving, so they can use an entire pond. They respond only to persistent management with lethal and nonlethal techniques.

Herons and egrets feed primarily by wading around pond banks and in shallow water. The greatest threat they pose is at feeding, when fish are near the water's surface and within reach of these wading birds. Dispersal techniques should be used before, during and immediately after feeding, while the fish remain at the surface of the water.

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## Propane exploders

Propane exploders are noise-makers that use a mechanical igniter to burn propane gas and cause an explosion that sounds like a firearm. One exploder should be used for every 3 to 5 acres. They should be aimed at the area to be protected (i.e., pond or roost). Designs include rotating cannons that fire in different directions, timers that vary the frequency of explosions, and remote-controlled systems that allow one operator to detonate several cannons. This device is most effective when the location, timing and pattern of bursts is varied daily. Birds adapt easily, and using the device in a way that causes it to be predictable will reduce its effectiveness.

## Pyrotechnics

The three types of pyrotechnics most commonly used to disperse birds are bangers, screamers and cracker shells.

Screamers and bangers are 15-mm pyrotechnics fired from specially designed .22-caliber pyrotechnic launchers. The pyrotechnics are ignited by a .22-caliber blank, and launchers are available for single- and multi-shot use. Screamers emit a shrill screaming sound to frighten birds. Bangers explode with the force of a strong firecracker.

Shell crackers are pyrotechnics housed within a shotgun cartridge. They are usually fired from an inexpensive, single-shot shotgun. Shell crackers are best fired from an open cylinder shotgun, but the cartridges often foul the barrel, which must be cleaned often to extend the life of the shotgun. The effect of shell crackers is similar to that of bangers.

Rope firecrackers are another type of noise-making device, but they are seldom used.

Pyrotechnics should be aimed in the general vicinity of the birds being dispersed. The types of pyrotechnics used should be alternated, and firing should continue until the birds are dispersed.

All pyrotechnics can cause fires if not used carefully. In some states and localities there may be special



Figure 1. Propane exploders are more effective if they are moved often and if the timing of explosions varies.



Figure 2. Pyrotechnics are an important nonlethal component of bird hazing programs.

regulations for their use, transport and storage.

## Effigies

An effigy is a model of a person or object that may frighten birds. Types of human effigies used near aquaculture ponds include scarecrows, mannequins, plywood silhouettes and inflatable effigies such as the scarey-man device. These have varying degrees of effectiveness.

The scarey-man device was evaluated extensively in Mississippi, where it dramatically reduced the number of cormorants at catfish facilities when used with harassment patrols. These devices were temporarily effective when placed along pond banks, one per 34 acres of surface water, and set to inflate once every 5 to 12 minutes. Each display lasts 15 to 30 seconds. Human effigies are most effective where birds are aggressively hazed

and have reason to fear the appearance of a human form. Birds can become accustomed to effigies, however, so they are most effective when moved at least every 3 days and used with other techniques, especially lethal control.

There are also effigies of predators, such as plastic alligator heads and raptor silhouettes. The effectiveness of these tools has not been formally evaluated and there is little information about their effect on bird depredation. Effigies of dead or injured birds scare birds in other situations, but it is not known whether they will repelling fish-eating birds from aquaculture ponds.

### Other tools and devices

Dogs may be used to scare birds and other wildlife at small facilities or near populated areas where other techniques cannot be used. It is not known whether dogs effectively disperse fish-eating birds.

Sonic devices such as electronic guards designed for livestock protection, sirens, recorded distress or alarm calls, and high-intensity sound devices may be effective, but have not been scientifically studied as tools for preventing fish loss.

Spot lights, strobe lights and lasers can be used to locate and disperse birds that feed at night, including pelicans and night herons, and to disperse cormorants in roosts. A laser should be aimed directly at the birds and moved from side to side. To disperse a roost, the beam should be moved from one side of the roost to the other, and aimed at individual birds if possible. Lasers are less effective where there is a lot of ambient light, as in suburban areas or on well-lit farms. Hand-held red lasers are available from vendors who sell other bird dispersal devices.

### Harassment patrols

Many of the tools for dispersing birds from aquaculture facilities are used in harassment patrols. During these patrols, bird chasers drive along the pond levees using a route that enables them to observe all of the open-water areas of the facility. When they see birds, the chasers use one or a combination of techniques to scare them from the



Figure 3. Lasers effectively disperse some types of fish-eating birds from their roosts at night.

pond. Harassment patrols should be conducted continuously in areas with many birds and their frequency varied according to the number of birds present.

Some bird chasers use live ammunition along with pyrotechnics and other devices because small-caliber ammunition and shotgun shells may be less expensive than pyrotechnics. Using live ammunition can be hazardous to human safety. With live ammunition, bird chasers also may accidentally kill or wound birds, which is illegal unless the species concerned is covered by a standing depredation order or a USFWS permit for the facility. When using live ammunition to harass or shoot birds, chasers must follow all appropriate firearms safety precautions. They also should have completed a firearms safety course. Only steel shot or other nontoxic shot should be used in shotguns.

### Near-farm management

Most fish-eating birds center their daily activities around an important site such as a night roost, a daytime roost or a loafing area, and can damage aquaculture facilities within easy flight distance. Double-crested Cormorants usually feed within 15 miles of the roost they

used the previous night. Therefore, dispersing their roosts in lakes or wetlands near aquaculture facilities may be extremely effective at reducing the number of cormorants using the farms. Pelicans also may forage near their daytime loafing areas, but their daily migration distances are much greater than those of cormorants.

Dispersing fish-eating birds from roosting and loafing areas may require teams of several chasers using nonlethal tools such as pyrotechnic screamers and bangers, along with lasers after dark. Using a combination of tools works best. The teams should enter the roost area at least 2 hours before sunset and fire pyrotechnics at the cormorants as they enter the roost to prevent them from settling. Dispersal teams may also try dispersing birds after they have settled in the roost, but ambient light and weather conditions can affect how readily the cormorants will leave the roost. Roosts should be dispersed on at least two and sometimes three successive nights. If there are several roosts in the immediate vicinity of a farm where damage is occurring, all the roosts should be dispersed simultaneously to ensure that cormorants are moved from the area.

When they aren't foraging, American White Pelicans use levees and shallow water areas such as rice fields, waterfowl impoundments, flooded fields and abandoned catfish ponds as resting or loafing areas. To make such areas less attractive, managers should remove standing water if possible. Wetlands, however, are essential habitats for many other species of wildlife and are protected by many state and federal laws. The management of wetland habitats should not be attempted without the appropriate regulatory approvals. Areas near aquaculture facilities that serve as pelican loafing sites should be patrolled several times daily and the birds hazed to ensure that they are dispersed.

### Integrated bird management

The most effective approach to managing bird predation in aquaculture is to integrate all of the tools and techniques available into a comprehensive program. Both hazing and lethal techniques may be needed. Lethal control should be used to reinforce nonlethal methods and to remove or retrain birds that have lost their fear of the bird management program. Each day, employees responsible for harassment patrols should help move and alter the pattern of devices such as propane exploders and effigies.

Farm managers should work with wildlife damage management biologists to keep birds from feeding or resting on the farm. Farm managers also should work with wildlife biologists to identify off-site loafing or roosting areas of cormorants and

pelicans. Together, biologists and producers should devise a plan for dispersing fish-eating birds from these locations during the periods of greatest risk. In the southeastern U.S., populations of fish-eating birds are largest in winter. However, non-breeding pelicans and southern breeding populations of cormorants and wading birds may be a year-round threat for some producers.

### Technical Assistance

For assistance with managing fish-eating birds, contact your USDA Wildlife Services State Director at [www.aphis.usda.gov/ws](http://www.aphis.usda.gov/ws), or operational support staff at (301) 734-7921. For more information on reducing predation, see SRAC Publication 402.

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