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MANAGEMENT OF BLACKBIRD
AND STARLING WINTER ROOST
PROBLEMS IN KENTUCKY AND
TENNESSEE

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ABSTRACT: Blackbirds and starlings in winter roosts create conflict problems in five major categories: 1) Public Health, 2) Agricultural Crop, 3) Wildlife Competition, 4) Structural, 5) Safety. After identification of problems created by an individual roost and roost site, problems are solved by one or a combination of seven methods: 1) No Action, 2) Move the Roost, 3) Alteration of Agricultural Practices, 4) Bird Proofing, 5) Move Birds from Feeding or Loafing Site, 6) Population Reduction at Feedlots, 7) Population Reduction of Roosts.

The Service has long recognized the need to manage problems created by winter roosts of starlings and blackbirds and fellow travelers such as robins. Public demand for solutions to these problems has increased steadily over the past two decades. All indications are that overall demands will increase with increases in the overall human population and resulting land uses changes and increased conflict interface, whether or not there are any increases in the bird population. Recent demands for problem solving have focused on population reduction. Actual use or proposed use of reductional methods has sparked counterdemands for non-reductional methods, particularly by some segments of the public not located in the wintering areas.

Congress has recognized the need for more and better information by adding on a special appropriation in 1977 primarily for intensified research into relationships between agriculture and the birds, and better means of solving resulting conflict problems. Unfortunately, non-agricultural aspects of the total problem, particularly the urban and industrial segment, are not receiving as much attention. Also, management and information funding at the Federal level for all types of animal damage control has not kept pace in the Southeast and has actually been reduced both directly and by inflation.

There are five main species of birds found in the roosts in the primary wintering area; the starling (*Sturnis vulgaris*), the Common Grackle (*Quiscalus quiscula*), the Red-winged Blackbird (*Agelaius phoeniceus*), the Rusty Blackbird (*Euphagus carolinus*), and the Brown-headed Cowbird (*Molothrus ater*). The Robin (*Turdus migratorius*) and particularly the Brewer's Blackbird (*Euphagus cyanocephalus*) are less commonly found in the roosts. The major wintering area can be described as roughly the area from Texas to the Atlantic and from the Ohio River to the Gulf. The winter roosting season occurs from approximately mid-November to mid-March in the Southeast although this can vary by two or three weeks.

A wide variety of songbirds, game birds, and raptors are usually found in and around the roosts during hours of light but disappear during the actual roosting period. Grain in the droppings and the prospects of so many easy meals seem to be the attractants.

PROBLEM IDENTIFICATION AND EVALUATION

The major problems created by the winter roosts can be divided into five major areas:

1) Public Health.--Public health impacts fall into two categories which obviously overlap: Organic diseases and emotional or mental. Organic diseases include those vectored by the birds and soil fungi particularly *Histoplasma capsulatum*, whose growth is enhanced by the presence of the birds. The birds can probably also act as a mechanical vector for the latter.

Some people are disturbed or upset by the presence of blackbirds or starlings, even relatively small numbers feeding on insect larvae in the lawn, occasionally to the point of neurosis.

Most people in the vicinity of roosts dislike the odor, the noise, and the deposits of droppings on themselves and elements of their property and surroundings.

2) Agricultural Crops.--Losses occur to grain crops planted, maturing, or left standing in the field; to livestock feedlots by consumption of rations and stored feed, contamination of feed, and transmission of disease; to conifers at roost sites; and to germinating nursery seeds. The nature and extent of agricultural losses have been and are the subject of a number of Service research projects.

3) Wildlife Competition.--Current information indicates more relationship between the winter roosts and resident starling populations than other species that are components of the roosts. Nesting competition between the starling and cavity nesters can be severe. Feeding competition can range from the total exclusion of other bird species at the back-yard bird feeder to the not yet well-measured impact on mammals and other bird species from feeding on mast and other natural foods, wildlife food plots and waste crop grains.

4) Structural.--This aspect of the problem has received little attention in recent years. The starling is the primary offender and has caused electrical substation outages from roosting and loafing in electrical components; defacing of property; and corrosion of metals including aircraft.

5) Safety.--One of the most serious and easily discernible overall problems have been and are the aircraft-bird strike situations created by feeding and loafing groups or by roost flight lines. Another less common situation occurs where larger roosts are located next to major thoroughfares and motorists become distracted by flightlines and the roost proper.

On receipt of a complaint involving a winter roost, the requesting entity is required to furnish information on the nature and extent of the problems and to detail the exact roost location including general vegetative types on a map. A handout sheet (Appendix 1) is utilized to describe information needed.

You will note no information on structural problems is requested as such situations are rarely the basis for a general request, except for defacing of property which is usually included under the nuisance category. Requests involving most structural problems are ordinarily highly specialized and requests are very specific.

After the required information is received an on-site evaluation is made of the roost, roost site and adjacent area. The size and species composition of the bird population and roost site size is measured, size and type of vegetation estimated, water locations and drainage patterns examined and surrounding physical and structural features noted. Following the evaluation, recommendations are made to solve the problems of the specific roost in conformance with the data gained from the evaluation. All of the above information is entered on a field evaluation sheet (Appendix 2).

PROBLEM SOLVING

Recommendations to resolve problems for a specific roost may involve one or a combination of the following:

1) No Action.--Biological or physical aspects of the roost or the problem situation may preclude any action.

2) Move the Roost.--The roost may be moved by two methods, habitat alterations, or use of harassment techniques. Habitat alteration usually involves dispersed removal of two-thirds of the roosting vegetation or structural modification in a structural roost. Harassment requires the use of amplified recordings of distress calls and/or aerial firecrackers. Both techniques are described in a Regional Service leaflet on starlings (Appendix 3). An updated leaflet on roost moving is under preparation by the Denver Wildlife Research Center of the Service.

3) Alteration of Agriculture Practices.--Planting and harvesting dates, feeding times and methods, crop varieties used, location of fields, can occasionally be altered to reduce or eliminate damage.

4) Bird Proofing.--Structural modification to feeding areas, stored grains or urban or industrial sites can often be effective in reducing or eliminating the problem. In the latter case, this may be the only option available.

5) Move Birds from Feeding or Loafing Sites.--The chemical repellent, Avitrol, used in accordance with labeling or mechanical repellents such as aerial firecrackers, rope firecrackers, recorded distress calls, mechanical exploders, and shooting have been effective singly and in combination for varying time periods.

6) Population Reduction at Feedlots.--Starlicide is heavily used in the states of Kentucky and Tennessee and is subsidized to an extent by some counties in Tennessee and by the Kentucky Department of Agriculture in Kentucky. The overall effectiveness of starlicide in the warmer and wetter areas of the Southeast as compared to other regions has not been well measured. Studies are underway to do this.

7) Population Reduction of Roosts.--PA-14, Avian Stressing Agent, has been used as a management tool in Kentucky and Tennessee since it was registered for use in 1974. It has not been utilized anywhere else, although a roost in Missouri and one in Illinois was approved for treatment in Federal fiscal year 1977. The first registered use was at Fort Campbell, Kentucky in 1974. The first successful field test was also in Kentucky at Fort Knox in 1966.

PA-14 was used in 1974 and 1975 at Fort Campbell under guidelines set out in a Department of Defense environmental impact statement. It was also used cooperatively in other locations by the Service and local communities under normal Service guidelines used in all animal damage control activities. Use in 1976 was a cooperative venture by Kentucky Department of Agriculture and the Service under a temporary Congressional Act. This Act exempted the use of PA-14 from the International Migratory Bird Treaty, the National Pesticide Act, the National Environmental Policy Act, and the National Endangered Species Act. Since that time, PA-14 has been used in the Kentucky-Tennessee District under the guidelines of the U.S. Department of the Interior, environmental impact statement on PA-14 use at winter roosts as a cooperative project between the Service, Kentucky Department of Agriculture, and Tennessee Department of Agriculture.

The state agencies conduct the operational aspects of the roost treatment while the Service furnishes the pre- and post-treatment biological evaluation (see Appendix 4) and on-site technical assistance. The two agriculture departments are not directly involved in any other aspect of bird control except that Kentucky does furnish up to 500 pounds of Starlicide per county on request. Tennessee Wildlife Resources Agency handles all temporary roost problems in cooperation with the

Service. Local agencies share some of the direct costs of the PA-14 operation and may furnish personnel and equipment for access control, construction of runoff control ditches and dams, landing site lighting, and facilities for storing and mixing the treatment material.

Current costs are approximately \$400 per acre which includes contract costs of a helicopter, pilot, contract and State members of mixing and loading crew, State members of roost lighting crew, PA-14, and alcohol. After PA-14 is recommended and local authorities wish to exercise this option preliminary approval is given for them to resolve cost-sharing and individual responsibilities, obtain landowner releases, request a water quality study, and in Tennessee, obtain a permit from the Tennessee Wildlife Resources Agency.

As nearly all roosts are associated with water, preventing the entry of the treatment mixture into water systems has been a major problem in the actual operation and in giving final approval to recommended treatments.

Before final approval is given, input is solicited from the State Water Quality divisions where needed. To date, efforts to prevent damage to aquatic systems have been successful.

The major problem in conducting a successful operation is, of course, predicting the weather. Suitable conditions of temperature and precipitation occur only five or six times on the average during the wintering season. Best results are obtained with temperatures between 30 and 40 and one-half inch or better of rain.

Other problems in actual operations have focused on flight safety hazards from obstructions and bird flushing; equipment breakdown and freezeup, delineating actual roosting area for a given night, locating a suitable landing site in close proximity to the roost, and access control.

The actual effectiveness of this technique in reducing roost populations has varied considerably. The effectiveness of the method in reducing problems created by roosts has not been adequately studied. Results of sprayings since 1974 are listed in Table 1.

Table 1. PA-14 applications in Kentucky and Tennessee.

<u>Roost</u>	<u>Pre-treatment Pop.</u>	<u>Date</u>	<u>% Reduction</u>
Ft. Campbell, Ky	1,000,000	3/10/74	.1
Ft. Campbell, Ky	2,000,000	2/19/75	26
Greenbrier, Tn	3,000,000	2/13/75	83
Liberty, Ky	400,000	3/08/75	80
Madisonville, Ky	1,000,000	2/27/75	50
Paducah, Ky	1,000,000	2/15/75	23
Bloody Ridge, Ky	1,500,000	3/25/75	.2
Russellville, Ky	6,000,000	2/05/76	.1
Bowling Green, Ky	1,500,000	2/22/76	26
Bowling Green, Ky	9,000,000	3/15/76	22
Glasgow, Ky	1,400,000	3/05/76	99
Grafenburg, Ky	1,000,000	3/13/76	.1
Bloody Ridge, Ky	1,000,000	3/15/76	.1
Russellville, Ky	4,000,000	1/13/77	95
Franklin, Ky	2,000,000	2/02/77	0
Munfordville, Ky	3,000,000	2/11/77	17
Flintville, Tn	2,000,000	1/05/77	55
Flintville, Tn	626,000	1/23/77	85
Milan, Tn	1,200,000	1/13/77	96
Flintville, Tn	525,000	12/29/77	93
Lawrenceburg, Tn	1,855,000	1/12/78	0
Lawrenceburg, Tn	1,250,000	1/16/78	74
McMinnville, Tn	5,200,000	1/19/78	19
McMinnville, Tn	4,200,000	1/24/78	97
Somerville, Tn	3,400,000	2/12/78	3

Roosts have not reformed within county boundaries, after successful treatments, in six cases: Liberty, 1975; Greenbrier, 1975; Glasgow, 1976; Flintville, December, 1977; Russellville, 1977; and McMinnville, 1978. A roost reformed at the Flintville site after the second January treatment and near the Milan site in 1977 within a few weeks. The roosts at Russellville, Kentucky, and Flintville did reform in late 1977, but in a different location and with greatly reduced numbers.

Other roost treatments were not considered successful, based on the standard of 80 percent or better reduction to be termed successful.

Obviously this technique with its stringent weather requirements has only limited application. It is suggested that a more flexible reductional method, usable in a wider variety of conditions and over a wider area of problem roosts where generalized population reduction is the tool of choice would allow better excess population management in addition to simplifying measurements of problem-solving effectiveness.

Appendix 1. Criteria for Roost Control.

Information required to determine need and type of control for any specific winter starling-blackbird roost problem. An individual situation may not encompass all of the listed problem areas.

1) Public Health.--Certification by County or State Medical Officer, M.D. on County Board of Health or County Board, on health hazard. Certification should include available data on extent of health problem and medical opinions on the seriousness of the given situation.

2) Nuisance.--Statement by City and County Government or group of private individuals concerning exact nature and extent of this facet of problem.

3) Agriculture Crop and Feedlot Damage.--Outline specific damage, season, extent of damage, background data such as acres of crops subject to damage in area (30 mile radius of roost), number of feedlots by type (hog, beef cattle, dairy cattle), and any economic loss information available.

4) Domestic Animal Disease.--Certification by public or private veterinarian on specific losses directly attributable to wintering birds. Back-up data will be required.

5) Wildlife Competition.--Statement by state wildlife agency on specific problem.

6) Safety Hazard.--Statement by individual, group or agency knowledgeable and competent in safety evaluation on extent and nature of hazard.

Appendix 2. Roost Evaluation Form

Investigator: _____ Date: _____

Location: (Attach map if needed)

Description: (Include vegetation, drainage, problems, nearby structures, other special problems or pertinent features)

Acreage: _____

Population: (Total Population) _____

Species: Red-winged Blackbird _____% Rusty Blackbird _____% Brewer's Blackbird _____%
Common Grackle _____% Brown-headed Cowbird _____% Unidentified Blackbird _____%
Starling _____% Non-target _____% List any non-target: _____

Requesting Entity: _____

Problem(s) caused by roost:

Control Recommendations:

On-Site Supervisor: _____

PA-14: _____

Preliminary Approval Date

Final Approval Date

Amount Ordered

Date

Appendix 3. Starlings.

Wildlife Services, Region IV, Leaflet 4, July 1972.

The introduction of the European Starling (*Sturnis vulgaris*) into North America is generally accredited to Eugene Scheiffin, who on March 16, 1890, released 80 in Central Park in the city of New York. Adult starlings in breeding plumage are identified by their glossy purple-back feathers, yellow or olive bill color, "swept-back" wings, and short tail. With the approach of winter, small buffy white spots appear in the plumage, which remain throughout the winter. These birds are the "bob-tailed blackbirds" seen in flocks on farms and in towns.

ECONOMIC IMPORTANCE

Starlings conflict with man's agricultural and horticultural endeavors. They and their rural and urban roosts are a nuisance and a source of human and livestock disease. They compete with desirable species for food and nesting spaces and have been responsible for loss of human life and property due to ingestion into jet aircraft engines.

LIFE HISTORY

Mated pairs of adult starlings begin nesting in cavities such as tree hollows, woodpecker holes, bird houses, or building crevices by at least mid-April. In cities several pairs may nest as a small colony in eaves and roofs of houses and other structures. Adult starlings nest earlier than most native birds.

The nest is constructed of a stiff, fibrous material lined with fine grass and any soft material the birds can find. The female lays from three to eight pale greenish-blue eggs. The eggs hatch in about twelve days and the young remain in the nest for two to three weeks. Once off the nest, family groups of young birds join together in flocks of gradually increasing size. The adults, however, usually reneest and produce another brood in late May and June. A third brood may be produced in the fall.

With the approach of winter, adults and young gather in large flocks that forage widely and often associate with blackbirds, especially in the large night roosts. These roosts generally are maintained throughout the winter but begin to break up with the spring mating season. The late-hatched young remain in flocks longest.

Starlings eat almost anything and are highly adaptive in their food selection.

CONTROL METHODS

Important Note.--The starling is not protected by Federal regulations. State or local regulations may prohibit their control, limit the methods to be used, or require a permit. Consult these regulations before applying any control measure.

Control in Tree Roosts.--Starlings can be dispersed from vegetative roosts by altering the roosting habitat or harassing the birds with frightening devices. In most instances the roost reforms in another location.

The permanent solution is to alter the habitat by removing the majority of the understory roosting vegetation (small trees, vines, and shrubs). Before working on a roost site, recommendations of the State Health Department should be followed to minimize histoplasmosis infections.

Frightening devices generally fall into two categories--visual and sonic. Visual devices include rotating lights, imitation hawks and owls, and suspended objects (metal pie pans, streamers, whirling objects). Sonic devices include shotguns, aerial firecrackers, firecrackers, sirens, automatic exploders, sound recordings, and similar items. Frightening techniques employing a mixture of some of the above-mentioned devices are the most effective. Bird scaring should be started as soon as a roost is being formed. It is far easier to disperse a roost before the birds become habituated to a roosting site.

The following procedures are suggested as a guideline for moving large winter roosts. Smaller roosts can be dispersed by using distress call recordings only.

- 1) Personnel should be stationed around the roost at 300- to 400- foot intervals to fire aerial firecrackers in front of bird flocks as they approach the roost each evening. The firecrackers must be fired in an open bore 12-gauge shotgun unless they are the shorter range special pistol type. Approximately 100 to 150 rounds per person will be needed for the first two evenings with lesser amounts for subsequent evenings. Shooting should begin as the first flocks try to enter the roost, but ammunition should be saved for the more persistent efforts that will be made by the birds closer to sundown. Special safety precautions such as wearing safety glasses should be observed in the use of fireworks.

- 2) Recordings of starling and blackbird distress calls amplified (25 watts or better) through speakers should be placed around the roost. If one or two units with relatively powerful amplifiers and multiple speakers are available, these should be placed within the roost at localities of heaviest bird concentrations. The more distress call systems used, the easier birds are moved.

- 3) Use one mobile distress call unit and one mobile gunner to disperse flocks that may try to land in individual trees or clumps of trees on the periphery of the roost.

- 4) The combined frightening devices must be used for as many evenings (usually three to five) as necessary to move the birds. It has been found useful to use the distress calls briefly at night and before birds leave the roost at sunrise to assist in dispersing the roost.

- 5) Birds may return to the roost later in the season making it necessary to repeat the process.

A local electronics shop can assist with the distress call systems. Sources of supply for aerial bombs and distress calls are available from Division of Wildlife Services offices.

Control on Buildings.--Some of the visual and sonic frightening devices previously mentioned have been used to disperse starlings and other birds from the ledges of buildings. As with tree-type roosts, the most permanent method of preventing starlings from roosting on or in buildings is to alter the roosting site. Ledges, projections, cavities, signs, etc., all offer attractive roosting areas for birds. New buildings should be designed without these projections and holes to prevent roosting. On existing buildings, ledges can be covered with slanting boards, sheet metal, or mortar placed at a 45 degree angle or greater. Cavities can be screened or filled. Sticky "bird glues" are available, as are sharp metal upright spines. Electrically charged wires have been permanently installed on roosting sites by some firms.

Perch toxicants useful in some situations are available through commercial pest control businesses.

Control of Crop Damage.--Starling depredations upon fruits, vegetables, berries, and grain crops can be minimized by using a combination of the frightening device previously discussed. Netting material which is impervious to birds is available to cover high-value crops. Several manufacturers offer sophisticated electronic systems for sale or lease to growers. In some instances trapping helps reduce resident populations which are often the source of damage. Plans for a portable decoy-type trap are available from Division of Wildlife Services offices.

Control at Cattle, Hog, and Poultry Feedlots.--In states where allowed by law, a pelletized bait selective for starlings and blackbirds may be used to reduce depredating flocks around feedlots. This technique is particularly effective when the ground is frozen. Information on the source and cost of this bait material may be obtained from the Wildlife Services office or county agent. Label directions should be followed carefully.

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Appendix 4. PA-14 Treatment Evaluation.

Roost: _____

Population:

Pre-treatment Date _____	Observer _____
AM-PM	Number % Number %
Starlings _____	Unknown Blackbird _____
Grackles _____	Other _____
Total Population _____	
List Other _____	

Post-treatment Date _____	Observer _____
AM	Number % Number %
Starlings _____	Unknown Blackbird _____
Grackles _____	Other _____
Total Population _____	
List Other _____	

PM	Number % Number %
Starlings _____	Unknown Blackbird _____
Grackles _____	Other _____
Total Population _____	
List Other _____	

Weather Conditions: _____

(Date & Amount of Rainfall) (High-Low Temperature)

On-Ground Mortality

Number % Number %	
Male Red-Winged Blackbird _____	Rusty Blackbird _____
Female Red-Winged Blackbird _____	Brewer's Blackbird _____
Male Brown-Headed Cowbird _____	Common Grackle _____
Female Brown-Headed Cowbird _____	Starling _____
Non-Target by Species _____	

Success Assessment

Number % Number %	
Visual Reduction _____	Amount of PA-14 Used _____
On-Ground Reduction _____	Formula _____