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ABSTRACT: Breeding populations of nuisance bird species were related to various types, designs, and quality of building construction in Columbia, Maryland. Since there were differences in the various parts of this new, planned city in types, builders, and architectural designs, it affords an excellent opportunity to study the effect these factors have on bird populations. Breeding starlings (Sturnus vulgaris), house sparrows (Passer domesticus), and pigeons (Columba livia) were unevenly distributed throughout the city, being concentrated in those specific areas with buildings having design or quality features that were favorable to these species. Specific examples of building designs and/or flaws in construction that created nuisance bird problems are described. Nuisance bird problems in newly constructed urban areas can be avoided by not using building designs that favor these birds and by preventing construction flaws that afford nuisance bird habitat.

The construction of the planned community of Columbia, Maryland (between Washington and Baltimore), which began in 1965, afforded an excellent opportunity to monitor the effects of urbanization on bird populations. One of the general effects of this development was a decline in species such as mourning doves (Zenaida macroura), bobwhite quail (Colinus virginianus), redwinged blackbirds (Agelaius phoeniceus), meadowlarks (Sturnella magna), and grasshopper sparrows (Ammodramus savannarum),that are normally associated with crop land and fields. Some other species, including mockingbirds (Mimus polyglottos), chipping sparrows (Spizella passerina), and song sparrows (Melospiza melodia), which are desirable additions to the urban scene, showed dramatic increases. There also was a striking increase in starlings, house sparrows, and pigeons. The general effect of Columbia's development on bird populations is reported in detail elsewhere (Geis, 1974).

During the initial phases of this study, we found that areas having generally similar building types often had strikingly different starling and house sparrow populations. This prompted a more detailed investigation in 1974 and 1975 to define the reasons for these differences. Field work was carried out by Messrs. Mark Larson and John Myers, biologists employed by the Urban Wildlife Research Center under a contract from the U.S. Fish and Wildlife Service. The Rouse Company, developer of Columbia, was helpful by providing maps and information, and in other ways.

A methodical search of apartments (both garden and medium-rise), townhouses, and detached homes of various types throughout a major portion of Columbia provided information on 445 starling, house sparrow, and pigeon nests during the two summers. The geographic location, type of cavity, and the perceived factors responsible for presence of each nest were recorded. The presence of the nest could be attributed either to a particular building design feature or poor construction in virtually all instances. When locations of these nests were plotted on maps, it became obvious that they were very strongly clustered. Each of these concentrations of nesting nuisance birds was usually associated with a single building design or construction problem that was responsible for the heavy bird use.

Detached homes and townhouses in some areas had widely louvered circular or semicircular vents that provided nest sites for sparrows. The external circular or semicircular shape of the vent was due to a facade that partially covered a louvered 48-inch square hole. Although the vents were screened at the back to keep birds out of the attic, the protected cavities in each corner afforded excellent nesting sites for house sparrows. In some neighborhoods, these vents provided almost all of the nesting sites for house sparrows. If it weren't for these vents, the populations of house sparrows in these areas would have been nearly zero. Recent construction in Columbia has used a similar-appearing louvered vent that was actually round on the inside to avoid this problem.

Several problems were associated with unboxed eaves. In some townhouse areas, a ledge was created between the roof and the top of the brick wall. House sparrows wedged their nests into the space above these ledges. Also, unboxed eaves were associated with more construction errors than boxed eaves. Unboxed eaves also often had small (1-1/2 inch) round vent holes in the blocking panels. These holes were usually screened with light wire when installed, but this screen was frequently pushed aside by starlings to gain access to

the interior of buildings. The managers of apartment complexes and individual homeowners often paid to have stronger screening placed over these openings, work that cost many thousands of dollars in the apartments alone. Ironically, the job done on the air vent holes in the apartments didn't cover construction flaws that were exploited by the birds. The failure of this effort was documented by surveys carried out before (1972) and after (1974) the attempt at bird-proofing. There were 8.2 birds per sample unit in 1972, and the number increased to 10.8 after bird-proofing!

Two widely separated garden apartment sections of Columbia showed a classic example of design feature problems. In almost every corner of each apartment module, starlings and/or house sparrows nested in a cavity that must have been shown on the blueprints for the building because it occurred so regularly.

Vents for kitchen exhaust fans, clothes dryers, and bathrooms also were commonly used for nesting by house sparrows and starlings. Round vents, in some instances, were installed in square holes, providing nesting cavities along the edge of the vents. Other vent doors either lodged open or were pryed open by the birds and nest material was actually taken inside the ducts. Starlings were observed flipping open the gravity-actuated vent doors with their bills to gain access to the air ducts.

The back section of the buildings in several garden apartment complexes had air conditioners camouflaged by a heavy lattice work of 2×4's and plywood. Crevices and ledges, which could have been prevented, provided nest sites for starlings, house sparrows, and pigeons.

Commercial buildings constructed with exposed I-beams were often used by nesting pigeons.

In addition to the design features emphasized thus far, construction flaws accounted for 45% of the nests found in Columbia. Since these flaws were concentrated in certain specific areas, they reflected the activities of a specific builder at a particular time and, therefore, were probably avoidable. An outstanding example is an apartment and town-house area where great numbers of house sparrows were afforded nesting cavities by the manner in which gutters were fastened to the roof. A gap of two to three inches was often left, permitting birds to gain access to the attic. A resident of this community complained that nestlings had fallen between the wall and rotted, forcing the man to have them removed and his home fumigated by an exterminator. Townhouses in two areas had back windows enclosed in attractive plywood projections extending from the brick veneer wall. Poor installation of siding provided a number of gaps and holes through which birds could enter the wall and nest. In one group of buildings, nearly every corner of these extensions contained a starling nest. Those areas had an average of 1.9 starling and house sparrow nests per dwelling unit!

Areas having concentrations of breeding starlings, house sparrows, and pigeons were also heavily utilized at other times of the year. Nesting cavities were used for shelter and roosting sites.

It should be emphasized that the design and construction problems causing nuisance bird problems mentioned in this paper are not confined to Columbia, Maryland. They have been observed in many other locations. The design of the planned city, however, made the problems more evident.

The types of building design and building quality features observed to be utilized by the various nuisance species may be characterized as follows:

1.) House sparrows frequently used design features that left nooks and crannies into which nest material could be lodged.

2.) Starlings typically exploited holes provided by either construction flaws or by removing a light screen from small air vent holes.

3.) Pigeons used ledges that were provided in garden apartments by porches having air conditioning units camouflaged by heavy lattice work or in commercial buildings by exposed I-beams.

County building inspectors seemed delighted to learn that they could readily detect flaws in construction in spring and early summer by merely noting the activity of starlings and house sparrows.

During the course of the study, we heard numerous complaints of residents about the noise, dirt, droppings and smells that were caused by the nuisance birds that gained access to their homes because of design features and/or faulty construction. Nest material rained down from exhausts over stoves, nestlings died in walls, and in one instance a nursery school was held in violation by the local health department because of pigeon droppings in the play yard. Problems like these could be almost entirely avoided in areas of new construction if nuisance birds were given consideration in the design and construction of buildings.

LITERATURE CITED

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