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TWENTY-FIVE YEARS OF MANAGING BIRDS ASSOCIATED WITH BUILDINGS AT THE UNIVERSITY OF CALIFORNIA, BERKELEY

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ABSTRACT: Information concerning 19 species of birds associated with 28 buildings on the University of California at Berkeley campus has been collected for 25 years. Sixteen species are included under three minor associations (temporary roosters, building invaders, and species that nest on (or in) buildings in small numbers). Barn owls and ravens have caused intense, though localized problems. Two additional species (cliff swallows and feral pigeons) have caused major problems. Feral pigeons have caused the most difficult problems to resolve. Case histories are used to describe problems associated with these birds, and control strategies for them. Cooper's hawks have nested in central campus locations for the last four years and their contributions to pigeon control, interactions with campus buildings, and adjustments to their presence are discussed.

KEY WORDS: Avitrol[®], birds, buildings, bird control, bird exclusion, chicken mites, Cooper's hawk, pigeon

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INTRODUCTION

The values and popularity of birds are well known and accepted (Booth 1983). Less appreciated are the problems and costs to humans and their activities by birds associated with buildings. Costs to birds (disruption of migration and mortality from collisions with buildings) are important, but not significant on the Berkeley campus and are not discussed in this paper. Based on the amount of resources required to resolve problems, 15 species of birds are of minor importance. Five of these species roost on buildings, four (three currently) are building invaders, and 10 nest on (or in) buildings in small numbers. Workspace outbreaks of chicken mites (*Dermanyssus gallinae*) have been associated with feral pigeon and mourning dove nests. Barn owls (*Tyto alba*) and ravens (*Corvus corax*) and have been sources of severe problems in single locations. Cliff swallows (*Hirunda pyrrhonota*), also a minor problem on some buildings, and feral pigeons (*Columba livia*) are sources of major problems in multiple locations. During the last four years the year round presence of Cooper's hawks in the central campus has eliminated the use of bait for pigeon control.

Species of Minor Importance

Roost on buildings

- Peregrine falcon (*Falco peregrinus*)
- Barn owls (*T. alba*)
- Burrowing owl (*Athene cunicularia*)
- Brewer's blackbirds (*Euphagus cyanocephalus*)
- House sparrows (*Passer domesticus*)

Building Invaders

- Mourning doves (*Zenaid macroura*)
- Hummingbirds (unknown species)
- Brewer's blackbirds (*C. cyanocephalus*)
- Brown towhees (*Pipilo fuscus*)

Nest On (or In) Buildings in Small Numbers, No Complaints

- Kestrels (*Falco sparverius*)
- Barn owls (*T. alba*)
- White-throated swifts (*Hirundapus caudatus*)

- Black phoebes (*Sayornis nigricans*)
- Robins (*Turdus migratorius*)
- Starlings (*Sturnus vulgaris*)

Nest On (or In) Buildings in Small Numbers, Minor Complaints

- Mourning doves (*Z. macroura*)
- Barn swallows (*Hirundo rustica*)
- Cliff swallows (*H. pyrrhonota*)

Complaints and Nesting Sites Eliminated

- House sparrows (*P. domesticus*)
- House finches (*Carpodacus mexicanus*)

METHODS—MINOR PROBLEMS

The five species noted for roosting on buildings are included because of the considerable mess associated with their presence. Nothing was done about the peregrine falcon and the burrowing owl because they are protected species and though extremely messy, especially the falcon's feeding debris, they were in inaccessible locations. Besides, pigeons were a major source of food for the peregrine. Pellets and droppings from the barn owls are now in an out-of-the-way location that is not of concern, except as a source of class study material. The mess created by Brewer's blackbirds is widely dispersed and of noticeable, but minor, importance. House sparrows roosting on decorative brick extensions on the walls of Eshelman Hall create a mess, but less than that of the sticky repellent substances, and every couple of years the walls are power washed to remove the whitewash.

Building invaders can sometimes be removed by opening windows, darkening the room by turning off the lights, and flushed birds will fly out the open windows. Because doves and blackbirds fly to the upper parts of a room, they are not easily flushed out the open windows. They can be flushed and caught with a long-handled net in dim light after dark and released outdoors. Blackbirds are no longer a problem because the café where they roosted on a decorative wooden frame over the entrance, and where they frequently entered through the open doors has been closed. Towhees are easily chased out open

doors, because they fly close to the ground. Hummingbirds were a problem inside the Math Sciences Institute. During hot summer days the doors at the ends of the hallways were left open to provide ventilation, and the birds were attracted to large, red fire alarm bells on the walls just inside the entrances. The campus fire marshal was consulted regarding code requirements for the color of fire alarms; there were none. The bells were painted white, and the hummingbirds no longer come inside.

No complaints have been received about the five species that nest on (or in) buildings in small numbers and no controls are used. Kestrels nest in a second store space between the ceiling and roof of a married student apartment. They gain access where a ventilation screen has been removed. Nesting kestrels are very noisy, but there have not been any complaints to date. The barn owl nest sits on a ledge, and aside from the whitewash, there is little visible evidence. Pellets and droppings fall into an unused nook. White-throated swifts nest in expansion cracks in Memorial Stadium, and are not noticeable. Black phoebes, a new resident in recent years, nested on three buildings in 1997. Robins mostly nest in out-of-the-way locations and there have been no complaints. The starlings nest in holes, and the author is surprised that there have been no complaints from residents of the student apartments.

Minor complaints have arisen from a few barn swallows nesting on porch lights, and a few from cliff swallows nesting above entrances. Barn swallows are uncommon and the person who used to complain has retired; no one else has taken up the issue. Cliff swallows nesting above sites where droppings will not catch on the side of the building below, or where the droppings collect on the ground are almost never a source of complaints. A few nesting above a building entrance, or where an unsightly mess accumulates can usually be prevented from nesting by physical removal of the mud foundations by maintenance personnel. Mourning doves enter rooms through open windows. Usually the nest is removed and cleaned up after the young have fledged, and the window is closed. After the nest is abandoned chicken mites (*Dermanyssus gallinae*) may attack humans in the room. Chicken mites are easily killed with pyrethrin aerosols registered for space application in offices.

House finches and house sparrows nesting on a ledge provided on the inside of decorative columns created a racket that bothered researchers in the building. During the winter, nesting materials were removed and the gaps at the tops of the columns were sealed with patching concrete.

METHOD—SINGLE SITE PROBLEMS

Barn owls nesting in Memorial Stadium were welcomed, though messy. Initially the mess was mostly out-of-the-way and of little consequence. When a \$300,000 elegant food stand was constructed in the stadium, white fecal smears on the decorative awnings and accumulations of owl pellets were distressing in the extreme. The problem was resolved by glazing the openings to the outside. The opening under the owl nesting ledge remains open, and they rarely venture

inside to the food stand. The problem has largely been abated.

In the last few years ravens have immigrated onto the campus. The Life Sciences Addition is an energy efficient building with "silvered" windows. Ravens see their mirrored image in the windows and attack. They severely scratch the Lexan panes and frighten the occupants of the rooms inside. A solution to this problem is still being sought.

METHODS—MAJOR PROBLEMS

Cliff swallows and feral pigeons are sources of the most serious bird problems on buildings. Cliff swallows nesting on buildings adjoining swimming pools create a slippery mess and a potential source of pathogens (Weber 1979), and nesting near observatories can befoul telescope lenses with their droppings. In these locations the nests were removed and sticky repellents were applied. The sticky repellents are messy, but tolerable compared with the mess from the nesting swallows. On the west face of the Lawrence Hall of Science, a three-story man-made cliff, high on a hill above the Berkeley campus the visual impact of the sticky repellents is not acceptable and the newly started nests are removed by building maintenance personnel each season until the swallows give up, an expensive, but effective solution.

Pigeons are the major pest species. Problems associated with pigeons on buildings are from droppings, noise, ectoparasites and animal rights activists. Droppings create potential health hazards from the pathogens that they contain (Weber 1979). They are expensive to clean up, and accumulations of pigeon droppings are a major breeding source of little house flies (*Fannia canicularis*) in cities in the San Francisco Bay Area (Poorbaugh 1990). People slip and fall on slippery accumulations on porches, and the acidic droppings even erode stone window sills. Noise from nesting and courting birds is disruptive for nearby office workers, and ectoparasites, chicken mites, often invade adjacent workplaces.

Controls used for pigeons on the UCB campus involve exclusion, baiting (now much more limited than in the past because of the presence of raptors preying on the pigeons), and trapping. Exclusion is used where possible, because it provides the most cost effective, long-term benefits. Exclusion measures used are netting and elimination of nesting and roosting ledges. Baiting with Avitrol® has been used on buildings where exclusion is not possible and to eliminate resident birds that "hang around" after exclusion has been completed. Trapping is still being used in one location where non-target racing pigeons would be affected by baiting.

Exclusion with netting has been used at two sites, Hearst Mining Building and the Banway Building. Hearst Mining, a four-story building with decorative beams under an overhanging roof, is on the national historic building registry. Few buildings have been better constructed for the shelter and propagation of feral pigeons. Pigeons have been trapped on the roof for several years since 1973, but this had to be given up because the traps could not be protected from vandals. It took over 10 years of complaints about bites from ectoparasites, people falling down the front porch stairs,

and a number of costly cleanings of the window sills before campus architects would relent to having the beams covered with black, nearly invisible plastic netting. The Banway Building is seven stories and has an outer wall of decorative blocks. Each floor has a three foot wide porch between the decorative block wall and the outer wall of the offices. Pigeons were nesting and roosting on this porch. Office workers were complaining about the mess, noise (from squabs and adults), and ectoparasites that covered their walls and furniture, and bit some of the employees. Wire mesh screen was installed on the inner face of the decorative blocks. However, the problem persisted in one location. There was a hole in a corner of one of the porches that a pair of pigeons continued to nest in. Removing the young, treating the nesting cavity with a pyrethrin aerosol, sealing the entrance, and space treating the adjacent offices with the pyrethrin aerosol ended the complaints.

Exclusion by ledge elimination has been used at three sites. In two of these buildings, steeply sloped (Courtsal 1983), smooth patching concrete was used to cap protected flat ledges used for nesting and night time roosting. Flat-topped light fixtures hanging in a passage way at one of the sites were used for roosting. "Dunce cap" tops were added to these fixtures. In the third building, Sproul Hall, an exposed third story ledge over a plaza feeding area was used for loafing. Sproul Hall is covered with glazed sandstone that resembles granite. To refinish and protect the decomposing glaze this building was sprayed with seven layers of acrylic and epoxy polymers (Hitchins America, Inc.) that provided a smooth, self-cleaning, slippery surface that the pigeons no longer landed on.

Baiting with Avitrol® has been used on six buildings (Memorial Stadium, Martin Luther King Student Union, Barker Hall, Life Sciences Addition and Evans Hall). Whole corn is used for prebait and treated bait (Jackson 1991). All baiting has been done on rooftops. The size of the bait and locations (three to 12 stories high) have tended to exclude non-target birds species. Baiting was done as soon as the first pigeons were noticed (before the birds were numerous enough for people to notice and start feeding). However, four years ago, and each year since, Cooper's hawks have nested on campus. They actively pursue and capture pigeons. For the last four years pigeon carcasses have also been found on the roofs of Barker Hall and the Life Sciences Addition that appear to have been preyed upon by a raptor. There is a small room on the LSA roof in which the pigeons can hide. The access points are being screened, and all areas of the roof will then be accessible to raptors. Because of concerns about the potential secondary hazards of Avitrol® baits (Holler 1982) baiting has been stopped on the central campus area.

Memorial Stadium has an internal maze of structural steel beams that cannot be practically modified to exclude pigeons. However, the stadium is not close to a source of immigrant birds, and it has only been baited once in the last 10 years.

Martin Luther King Student Union is between Upper and Lower Sproul Plazas. There is a large flock of pigeons that is fed three blocks away at People's Park and, in the past, a small group of immigrants would

appear on the Student Union. If allowed to remain, they would attract others, and people would start to feed them. More would be attracted, and they would start to nest in the open-ended, fluorescent light fixtures at the northeast corner of Lower Sproul Plaza. Additional risks were posed by animal rights groups which placed informational exhibits and tables on Upper Sproul Plaza within view of the bait placement site. Recently, the historical pattern of flock development has changed. The birds come and go, and a Cooper's hawk has been seen in the area. This is close to the hawk nesting sites. If the pigeon problem increases, trapping may again be used.

Barker Hall roof has shelter, water, and grit-sized aggregate. It is also the location of a high-tech biohazard containment laboratory and is close to sources of immigrant birds (downtown Berkeley and Ohlone Park). The roof, and that of the Life Sciences Addition, has an open center with shelves of parallel hung pipes, ventilation fans and ducts placed under a 10 foot wide overhang around the outer perimeter. Pigeons were also using a storeroom which had an open sliding door and no screen door. Installation of a screen door eliminated pigeons in this room. However, the birds cannot be excluded from the rest of the roof area without interfering with access for stationary engineers and other maintenance workers. In this location bait was used two to three times per year. Then a nesting site was found hidden under a large ventilation duct. After the nests were cleaned out and access screened off, the problem almost disappeared. Now and again a raptor-killed carcass is found.

Evans Hall is a massive concrete-walled cliff rising from the campus. It was designed with slanted window ledges, and it can be used as an example of how window ledges should be constructed to prevent bird problems. However, the top floor has porches on the east and west sides that extend the length of the building. The porches are covered, but open on the sides and provide wonderful views. Little used picnic furniture and planter boxes were used by pigeons for nesting, and the mathematicians and computer scientists who also occupied the top floor complained about the mess and the incessant cooing. The picnic furniture was removed, bird netting was placed over the planter boxes, and baiting was used to remove the site loyal birds (Jackson 1991). The site remained attractive, and baiting once or twice a year was used to remove new immigrants. No new immigrants have appeared since the Cooper's hawks started to hunt in the area.

The only location where trapping is still used is on the roof of the Marchant Building. This former manufacturing plant covers an entire city block, and after the university acquired Marchant, the fourth floor was rented to a biotechnology company in a joint venture. A flock of several hundred birds used to live on the roof, roosting and nesting in an unused cooling tower, and feeding on broken pie crusts that were tossed on the sidewalk across the street at the Saint Francis Bakery. The conservator of the Campus Herbarium, also housed in the Marchant Building, requested that the bakery no longer put out the pie crusts because the odors were attractive to herbarium (also called cigarette) beetles (*Lasioderma serricorne*) from several miles away. The

bakery stopped putting out the broken pie crusts. The cooling tower was cleaned up and removed by a contractor, and the remaining flock was baited. After several months a flock of 30 birds suddenly appeared after a baiting program at a horse track several miles away. Staff members of the biotechnology program were concerned about pathogens vectored by pigeons and upset that the pigeons were roosting over the ventilation supply intake and that droppings were collecting on the vents. The area was baited again and caused some mortality in a newly started nearby racing pigeon flock. To prevent further problems a joint program was established. The Pest Management Program staff supply the traps, bait and advice; the Biotechnology staff members bait the traps whenever new pigeons appear on the roof. The staff members notify the pigeon racer whenever birds are trapped, and he picks them up and removes them. Aggregate on this roof is mostly larger than ¼ inch and is not suitable for grit.

DISCUSSION

Management of birds associated with buildings in the UCB program begins with an assessment of which control measures can be practically and legally applied. Redesigning buildings to exclude birds by screening, eliminating roosts, or eliminating the attraction (painting red fire alarm bells white), eliminating an attractive food source (broken pie shells) is preferred to shorter-lived treatments. Sometimes sticky bird repellents are used where the messiness is not objectionable. Where it is objectionable, active nest removal by building maintenance workers has proven effective, but expensive. Baiting has been used to control feral pigeons where habitat modification is not practical, and baiting has been an essential part of the program in the past. With the arrival of Cooper's hawks, the use of bait has been almost eliminated because of the potential risk to the accipiters (Holler 1982). This poses a potential problem because the Cooper's hawks may not provide as effective control, or control that is not effective enough. Pest Management is having building modified (LSA) to maximize accessibility of the pigeons to the raptors.

UCB Pest Management provides short-term services (evaluations and recommendations for redesign, application of repellents, and minimal baiting). More labor intensive controls (active nest removal and trapping) are provided by maintenance and support staff members on site.

In the past, early population control, largely through baiting, enabled efforts to be centered on the most attractive sites for the major problem species; feral pigeons. There are a number of additional sites that would provide additional protected roosting and nesting sites if the population were higher, and birds were forced into less attractive, but perfectly suitable locations. At

this time predation by Cooper's hawks has supplanted the baiting program.

Blueprints for new buildings are reviewed and the author has had some success with campus architects in developing criteria for preventing the use of pest-inducing designs. However, the goals of people who use and maintain structures are usually in conflict with the short-term benefits of selecting the lowest bidder and bringing a contract in on time and at the least cost. This conflict is much broader than pest prevention and poses profound fundamental concerns in a future of declining operational funding for the University.

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