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Reducing monk parakeet impacts to electric utility facilities in South Florida

Abstract

The monk parakeet (Myiopsitta monachus) is native to South America but has become established in several locations throughout the United States, and in other parts of the world, through purposeful and accidental releases. Unlike other psittacines, this species is not a cavity-nester but instead builds a bulky nest structure of sticks. Parakeets often build their nest structures on electric utility facilities, and nest materials cause short-circuits that result in costly power outages and damage to the equipment or facility. In south Florida, monk parakeet damage and associated outages have increased substantially in recent years, and it is evident that current methods to manage the problem at electric utility facilities are inadequate. The current research project, initiated in 2001, seeks to develop new information on the extent of the parakeet problem at electric utility facilities and to investigate new management alternatives for reducing power outages caused by parakeet nesting activity. To date the most effective approach has been a concerted effort to trap birds at nests on utility structures and then to remove the nests. Dispersal of birds using a hand-held laser did not provide long-term relief, but experiments with reproductive inhibition have been promising.

Key words

exotic species; management methods; monk parakeet; Myiopsitta monachus; nest removal

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The monk parakeet (*Myiopsitta monachus*) is native to South America, occurring from central Bolivia and southern Brazil south to central Argentina. The species has been introduced and become established as a breeding species in the United States and Puerto Rico, and it also occurs in Belgium, Italy, Spain, and the Canary Islands (Spreyer & Bucher 1998). Monk parakeets became established in the United States during the 1960s because of accidental and purposeful releases by individuals or pet shops. In Florida, the species was first recorded breeding in Miami in 1969 (Stevenson & Anderson 1994), and it is now firmly established in Florida. Since 1980, numbers of birds, as evidenced by annual Christmas Bird Count data, have increased exponentially (van Bael & Pruett-Jones 1996; Figure 1).

Despite the species' reputation as a serious crop pest in its native range (e.g., Mott 1973), there has been relatively little crop damage in the United States. In Connecticut, there have been reports of parakeet dam-

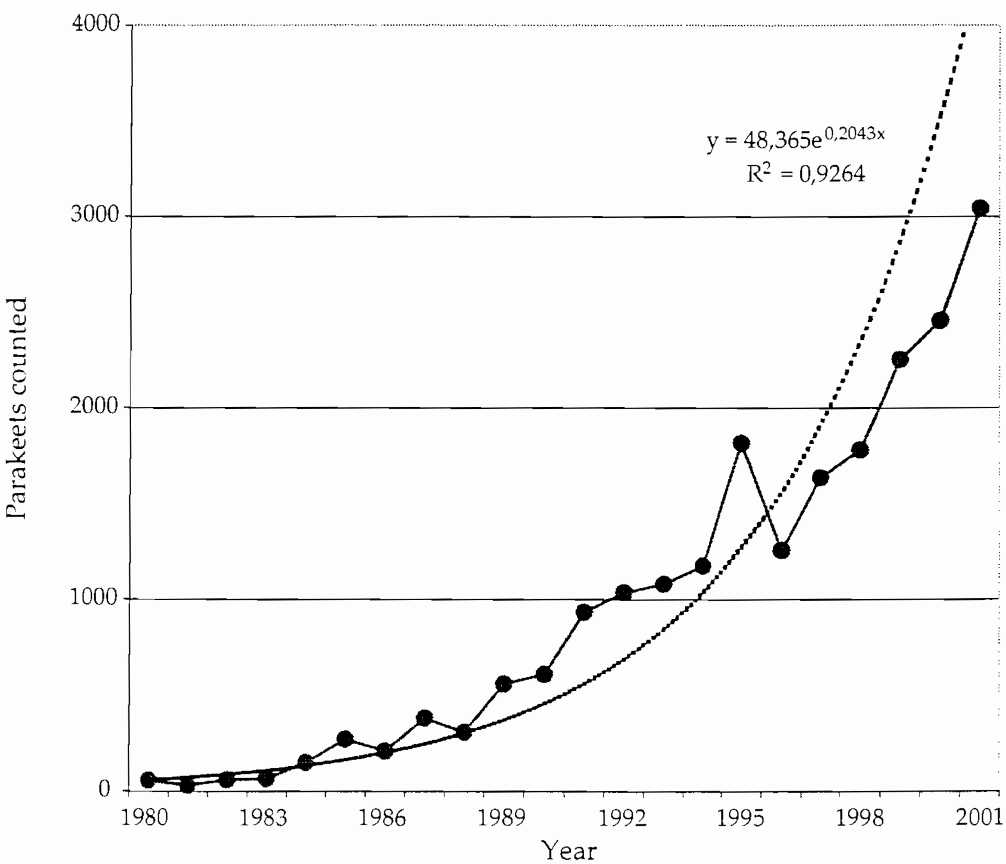

Figure 1: Christmas Bird Count data from Florida suggests an exponential increase in monk parakeets since 1980.

age to sweet corn, while in south Florida, parakeets are known to damage cultivated tropical fruits (Tillman *et al.* 2001).

In the United States, the main problem caused by monk parakeets relates to their propensity to build nests in electrical utility facilities. Unlike other members of the Psittacidae, monk parakeets construct large nests of sticks and branches. When the nest material gets wet, short circuits can occur and power outages result. Furthermore, parakeets breed colonially and communal nests, with many entrances to nest chambers, can be massive structures. Parakeets use and maintain their nests year-round, not just during the breeding season (Martella & Bucher 1993). Parakeets build nests in a variety of trees and manmade structures (Spreyer & Bucher 1998). Electric utility facilities are often favored as nest sites, both in the native range (Bucher & Martin 1987) and in the United States (van Doorn 1997). A preliminary survey along 60 transects in south Florida showed that 59% (93 of 157) of the parakeet nests encountered were on utility structures, 21% were on other manmade structures, and 20% were in trees.

In south Florida and other parts of the United States, the parakeets' use of electric utility facilities brings them into direct conflict with human interests. Short circuits or any loss of electric power translates into direct short-term economic impacts, including damage to equipment, lost electric power sales revenue during outages, costs for restoration of power after outages, and costs to customers for loss of service. In the long term, the nesting activity of parakeets and resultant power outages negatively affect a utility company's reliability rating assigned by State public service commissions. A lower reliability rating reduces the rates which a utility company can charge for their electric service. Lower rates mean less profitability. Thus, the economic impacts of parakeet nesting are potentially great, and there is much incentive for a utility company to rid their facilities of the nesting birds (Hodges & Newman 2002).

Constraints to management of monk parakeets

Although the monk parakeet is an introduced species and is therefore not subject to State and Federal wildlife protection laws, there are other applicable ordinances that restrict the use of certain methods of control, such as pyrotechnics and chemicals. Public opinion is a major factor in any proposed management activity associated with parakeets. In most places, parakeets quickly become favorites of local birdwatchers and animal lovers. Residents and business owners provide food to encourage the birds and to facilitate their survival in harsh winter weather. The birds are viewed by many people as a positive community resource and efforts to remove the birds or their nests are often met with serious opposition (Spreyer 1994). In light of such public sentiment, initiating a management program aimed at parakeets can be a very delicate and controversial matter.

construct nests on three types of electric utility structures – transmission lines, substations, and distribution lines. The high voltage transmission lines carry electricity from the generating facility across the landscape to the substation. At the substation, the voltage is transformed to lower voltages in preparation for distribution to local communities. Distribution lines carry the electricity from the substation to businesses and residences. It is unlikely that a single management approach will suffice for the different types of utility structures, and nesting by monk parakeets is increasing on each type of facility (Figure 2). Effective control of monk parakeet nesting on utility structures must include techniques to limit nesting on the structures and strategies to reduce the size and distribution of the population.

Discouraging Nesting on Utility Structures

Nest removal

Physical removal of nests is the most common technique for combating monk parakeet nesting problems on electric utility facilities. To remove nests on Florida Power and Light Company (FPL) distribution lines, a

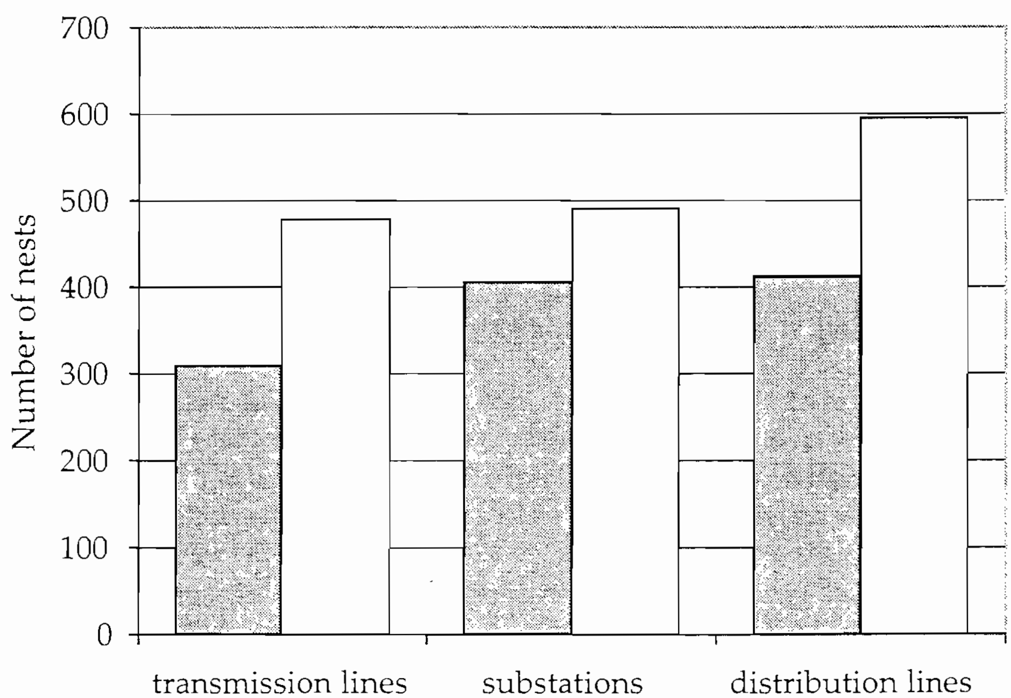

Figure 2: Numbers of monk parakeet nests on Florida Power and Light electric utility facilities increased substantially from 2001 (dark bars) to 2002 (open bars).

crew of two or more uses a bucket truck to access and remove the nest. Water cannons have been used to remove nest structures higher up on transmission lines. Often nest removal requires power to be turned off to the facility which adds to the cost of the removal effort.

Nest removal addresses the immediate risk of an outage, but it is not a long-term solution as monk parakeets readily return and rebuild at the same location. In addition, removal of the nests without capturing the birds could actually compound the problem. When a multi-chambered nest structure is removed, parakeets that occupied separate chambers of the single nest structure will disperse and presumably each pair will then build a separate nest. Thus, the total number of electric utility facilities affected could actually increase.

Structural modifications

Specific recommendations vary according to the actual design, but the goal is to eliminate structural features which permit the parakeets to obtain a firm base from which to begin their nest construction. One example of the effects of structural design involves two types of 230 kV transmission line supports used by FPL. The older, multi-circuit design consists of 2 vertical supports connected by horizontal and diagonal crosspieces which provide numerous nesting opportunities for parakeets. The new standard design is a single circuit on a single vertical pole with insulators coming off at angles. This gives the parakeets no suitable substrate on which to build a nest.

Another option is to eliminate the acute angles that occur on transmission line support structures and in substations. The angles are formed where a horizontal beam is intersected by a diagonal support piece. Inserting a triangular block in the acute angle would create a right angle that presumably the birds would find less appealing as a nest site. Another approach is to eliminate the flat surfaces upon which the parakeets begin nest-building activity. This could be accomplished through installation of rounded, semi-circular covers on the flat surfaces of beams. The more smooth and slippery the surface, the more effective a nesting deterrent it will be. The drawback to structural modification is that so many angles need to be eliminated and so many surfaces need to be rounded that it is unrealistic to expect they could all be done. Nevertheless, it might be possible to use this approach at some locations on the structure where nesting by parakeets is particularly unwelcome, and it should be adopted especially on new facilities.

A number of scaring devices have been tried in order to dissuade parakeets from using utility facilities. These devices include models of owls, rubber snakes, and scare-eye balloons. None has been effective. Different types of loud noises including the banging of chains against metal have likewise been ineffective.

Recent research has demonstrated that vultures can be dispersed from roosts by hanging a vulture carcass or taxidermic effigy at the site (Avery *et al.* 2002b). In Florida, we evaluated this approach with monk parakeets, but with no success. The birds were not affected at all by the presence of a taxidermic parakeet effigy suspended near their nests in a FPL substation (Avery *et al.* 2002a).

Low-powered, handheld lasers have proven effective for dispersing a variety of bird species from roosting areas (Glahn *et al.* 2001; M.L. Avery, unpubl. data). We evaluated this method against monk parakeets at two substations in south Florida. The birds were readily dispersed by the laser, but only temporarily. They flew from their nests but returned to the substation the next day. Even when the nests were taken down, the birds returned each day and occupied the areas where the nests used to be (Avery *et al.* 2002a). After one week of daily laser dispersal, we concluded that the laser will scare parakeets but will not prevent them from returning to nest on substations.

Chemical repellents

There has been limited testing of chemical repellents for monk parakeet management. ReJeX-iT® is a registered avian repellent whose primary ingredient is methyl anthranilate (MA). This repellent was developed initially as a feeding deterrent, but it has recently been formulated to be applied as a fog for use as a harassment tool. MA is a contact repellent that is irritating to a wide range of avian species. FPL conducted a trial at a substation in Homestead, FL to evaluate it as a means to discourage monk parakeet nesting. The weeklong trial confirmed that MA is an irritant to monk parakeets, but the birds were not driven from the facility (B. Merchant, FPL, personal communication August 2001).

Even though it is known that MA is irritating to parakeets, the birds only respond to the chemical when it is present, and as an aerosol or fog, the chemical is quickly dispersed by wind. Rather than as a means to evict birds from existing nests, MA might be more effective as a means to prevent parakeets from recolonizing a structure after their nests have been removed. A system of aerosol or fog dispensers could be installed on a substation and the MA applied whenever birds begin to rebuild their nests. Possibly, with sufficient negative reinforcement from the irritating effects of the chemical, the parakeets would abandon nesting attempts at the site.

Population Management

Population reduction can be achieved by directly removing birds from the population or by lowering their reproductive output. The success of population reduction will depend on a number of factors including the number of birds affected, the area covered, the rate of increase in the population, and the distance young birds disperse. The goals and objectives of a population reduction program need to be clearly defined and include costs and public acceptance considerations.

Reproductive inhibition

Presently, we are investigating the potential utility of diazacon as a reproductive inhibitor. This compound interferes with the conversion of desmosterol to cholesterol, which is an essential precursor to egg and sperm formation. Diazacon was formerly registered under the name Ornitrol® as an orally administered reproductive inhibitor for pigeons (Erickson & Jackson 1983). The registration lapsed and this compound is no longer approved for use in the U.S. Diazacon has the advantage that a relatively short period of exposure (5–10 days) will likely inhibit egg production for several months (Miller & Fagerstone 2000). Our testing so far with monk parakeets confirms that levels of cholesterol were reduced following exposure to diazacon, and additional trials are underway to measure directly in captive birds the impact on egg-laying. Successful completion of the captive bird testing will be followed by field evaluations. Important practical issues such as bait formulation, bait delivery, and reducing exposure of nontarget species will need to be addressed before this compound can be applied operationally.

Lethal control – chemical toxicants.

In Uruguay and Argentina, one method to reduce parakeet populations is to smear a toxic paste around nest openings (Rodríguez & Tiscornia 2002). Birds that enter a treated nest contact the paste and die from ingesting the toxin, usually carbofuran, as they preen. There is currently no chemical registered in the U. S. for use against monk parakeets, but 2 toxicants are registered for use against other birds. For example, Starlicide® (DRC-1339; 3-chloro-p-toluidine hydrochloride) is a restricted-use pesticide approved for use against starlings, blackbirds, crows, gulls, and pigeons. This compound is attractive because of high toxicity to target species but low toxicity to most mammals and predatory birds (DeCino *et al.* 1966).

Avitrol® (4-aminopyridine) is registered for use against gregarious species such as pigeons and blackbirds. Birds that ingest the toxic bait develop convulsions that cause them to emit vocalizations and to behave in an unnatural manner that frightens nonintoxicated birds from the treated area. This effect (called area repellency) reduces the damage caused by the flock with minimum mortality (Besser 1976, Schafer 1991).

It is possible that uses for either of these chemicals could be expanded to include monk parakeets. We are currently evaluating the sensitivity of monk parakeets to DRC-1339. If the species proves sufficiently sensitive in the cage trials, then a baiting strategy for actual field use could be developed. If DRC-1339 appears to be insufficiently toxic to monk parakeets, then our attention will shift to Avitrol® as a possibility. Carbofuran is highly toxic to birds, and previous incidents of accidental poisoning of birds from agricultural applications of carbofuran have resulted in restrictions in the use of the chemical (Stinson *et al.* 1994). Carbofuran use is opposed by wildlife agencies and environmental groups, thus it is unlikely that current registered uses could be expanded to include parakeet control in the U.S. Selective baiting strategies must be developed before any toxicant could be used in operational programs. One option to limit exposure of nontarget birds might be to insert a treated bait block into parakeet nests.

Lethal control – trapping and removal.

One alternative to toxins for lethal control is to trap birds and then euthanize them. Overdosing with carbon dioxide gas is an acceptable method of euthanasia for small birds such as parakeets (Andrews *et al.* 1993, Gaunt & Oring 1999). A small tank of compressed carbon dioxide can readily be connected with a hose to a suitable airtight container to form a portable euthanasia chamber.

Parakeets are best trapped after dark when the birds are in their nest. This can be done from the ground using a long-handled net to cover the nest opening and to catch the birds as they fly out of the nest (Martella *et al.* 1987). The net is positioned as quietly as possible and then the birds are disturbed to make them fly out. Trapping is more easily accomplished, however, if a bucket truck can be used to raise one or two workers to the level of the nest. Once in place the workers can then employ long-handled nets and cover 1 or 2 openings to trap birds as they attempt to flee. This operation is effective only at night when all the birds are inside the nest. If it is attempted during daylight, the birds will leave before the net can be properly placed. Trapping parakeets at the nest requires that the power to the pole be turned off. We redesigned parakeet capture nets (Martella *et al.* (1987) to make the nets more lightweight and flexible. Then, FPL personnel used the nets to trap parakeets from nests on their distribution line system

(Tillman *et al.* 2003). Capture success at individual nest sites ranged from 0 to 100% with an overall capture rate of 50% (654 of 1303) at > 400 nest sites. At almost all sites where trapping occurred, the nest was removed immediately or shortly after netting. Monitoring is on-going, but initial findings have revealed that higher capture rates at nest sites greatly retard the rate at which nests are rebuilt at those sites. By revisiting nest sites on a regular basis, and by trapping birds and removing nests as needed, it appear that substantial reductions in nesting activity can be achieved.

Even though trapping at the nest is an effective technique for capturing parakeets on distribution lines, this method is not very useful at substations where it is very difficult to gain access to the nests. Furthermore, substation nests are quite close together, so the disturbance at the first nest where netting is attempted causes the other birds at the site to leave their nests prematurely and avoid capture. Therefore, at electric substations we tested two passive trap designs: a drop-in style trap and a walk-in style trap. Monk parakeets were wary of traps, however, and were not easily captured even with extensive pre-baiting and the use of decoy birds (Avery *et al.* 2002a). We concluded that a passive, unattended trap will not rid a substation of its parakeet population. However, it might be possible to lure birds into a very spacious, open box trap with end doors that an observer can slam shut at the proper instant via remote control. While it is doubtful that the entire substation population could be trapped in this way, it might be possible to remove a substantial portion. The site could then be retrapped at a later date to remove additional birds.

Management Implications

In devising our parakeet management program, we emphasize that the goal is not to eradicate monk parakeets from Florida. Rather, the objective is to assure reliable delivery of electric service. To this end, development of management methods is focused on birds nesting on utility structures. So far, a program of parakeet trapping, euthanasia and nest removal seems to be practical and effective for alleviating problems at distribution pole facilities. This approach not only offers the best chance for achieving the management objective but also helps to assuage concerns raised by parties interested in the welfare of the parakeet population. At substations, some progress has been made in reducing nesting populations using operator controlled box traps, although this method is still under evaluation. It remains to be seen whether the trapping approach can be extended to transmission lines which are especially challenging because the nests are so high above the ground and because the sites are in full public view, which leaves any unattended trap vulnerable to vandalism and disturbance.

The monk parakeet is a charismatic species that attracts much public support even though it is a non-native bird. Most residents probably do not care if the bird is non-native because so far at least, the monk parakeet has not exhibited the negative characteristics usually attributed to exotic or invasive species (Long 1981). For example, at this time, there is no evidence that monk parakeets compete with native species for essential resources. Nor is there any indication of serious human or wildlife health-related issues associated with the parakeets. Although some agricultural damage has been documented in the U.S., parakeets have not yet lived up to their South American reputation as serious crop depredators.

The impacts of parakeets on electric utility facilities are undeniable, however. Furthermore, another non-native species, the European starling *Sturnus vulgaris*, remained at relatively low numbers for almost 50 years before attaining high population levels and spreading throughout North America (Nilsson 1981). Therefore, a complacent attitude regarding management of the monk parakeet is not appropriate. Instead, aggressive, science-based management is needed to address specific current problems and to minimize future impacts. The relative lack of information on the ecology and population biology of monk parakeets in Florida should not deter their management (Simberloff 2003). We continue to investigate the natural history and ecology of monk parakeets in south Florida (e.g., food habits, reproductive biology, seasonality of moult) while we develop and implement effective methods to reduce their impacts on electric utility facilities. Even though management methods under development such as night trapping and reproductive inhibition might be expensive to implement, costs will decline as numbers of birds and numbers of nests are reduced. And relatively high costs of parakeet management should be acceptable to ensure more reliable electrical service.

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