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RAPTOR NEST MANAGEMENT ON POWER LINES

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ABSTRACT
Although nesting on power line structures has benefited some raptor species, line operational problems have occurred, and utilities have implemented labor-intensive methods to combat bird nesting on their lines. Historically, methods have typically included direct nest removal and trimming of nesting materials. This approach often has been unsuccessful, and a number of utilities have ultimately concluded that accommodating bird nests is a more sound approach. Managing where raptors nest on utility structures has not only solved many operational problems, but it also has resulted in positive publicity for many line operators. There also are a variety of stick deflectors that can be used to discourage nesting. In distribution construction, engineered single crossarms are preferred over double arms at potential nesting areas. A successful nest management program includes plans to make nearby lines raptor safe from electrocutions. The combination of providing nests with bird-friendly utility configurations can result in electric facilities enhancing wild raptor populations without impacting power reliability.

KEY WORDS
Birds, nesting, power lines, artificial nest platforms, stick deflectors, nest relocation

Background

The availability of suitable nest sites can limit raptor (i.e., birds of prey) populations for both diurnal and nocturnal species [1]. Historically, power line operation has resulted in adverse effects to some raptor populations because of increased bird mortalities from electrocution and collision; however, positive interactions between raptors and power lines also have been noted [2] [3]. Both transmission and distribution power lines in treeless regions have increased the availability of nesting sites for some eagle, buzzard, and falcon species. Ospreys also have benefited from the use of power line structures and preferentially choose utility structures near water to construct their nests [4]. Additionally, exposure to electric and magnetic fields has not demonstrated any significant negative biological effects to birds nesting on power lines [5].

Although nesting on power line structures has benefited some raptor species, line operational problems have occurred, and utilities have implemented labor-intensive methods to combat bird nesting on their lines. Historically, methods have typically included direct nest removal and trimming of nesting materials. This approach often has been unsuccessful, and a number of utilities have ultimately concluded that accommodating bird nests is a more sound approach [6]. Managing where raptors nest on utility structures has not only solved many operational problems, but it also has resulted in positive publicity for many line operators.

Utility Concerns

Although raptors may nest on structures without creating operational problems for the utility, there are exceptions. In general, the larger the raptor species the larger their nest and the longer period of time they will continue to return to the same nest annually [1]. Each year the adults will bring additional nesting material to the existing nest structure, increasing its size and weight. In some cases, raptor nests can weigh over 200 kilograms and become a structural concern (Photo 1). Raptors also may incorporate conductive materials, such as wire or other metals, into the nest, which can compromise electric safety clearances and result in electrical faults or outages on that line segment. Additionally, raptors perching on transmission structures may increase contaminant levels on insulators and increase line outages due to fecal streamers [9]. At distribution voltages (69kV and below) raptor phase-to-phase and phase-to-ground contacts are a concern. Nesting material on smaller distribution lines may contact energized wires, resulting in pole fires [7] and increasing bird electrocution risks.

The presence of nesting birds also may affect routine or emergency maintenance on transmission and distribution structures. In the United States, nesting raptors are protected so maintenance activities may require special permits during the nesting season, depending on the

species of the bird. The following is an overview of various nest management techniques designed not to interfere with electric utility operations and maintenance activities.

Photo 1 Golden Eagle Nest to be Relocated Due to Streamer Issues on V-String Insulators

Nesting Solutions

Power lines must be maintained and operated with human health and safety as a primary overriding concern. This includes maintaining the lines so they are not susceptible to outages. When raptor nests create conflicts with these goals, action is required. It is important to note that many countries have laws protecting raptors and their nests. Any action taken should be coordinated with the appropriate regulatory agency. Additionally, there are many conservation organizations that specialize in raptors that can be contacted to help with utility nesting issues.

Transmission Lines

In general, transmission lines (defined as greater then 69kV) are least susceptible to nesting outages. This lower susceptibility is because higher voltage lines utilize greater clearances. However, nesting-related outages on transmission towers have been caused by bird fecal streamers and contamination of insulators [8]. Fortunately, this type of outage often can be mitigated without removing nests. Fecal issues can be resolved by using perch management devices (e.g., raptor spikes, triangles, perch deterrents, etc.) to simply shift birds away from critical portions of the structure [9]. However, it is critical to select perch guards specifically designed for raptors and to install the guards correctly. Although effective in deterring perching, perch management devices are not effective in preventing nesting for both raptors and other species. In Spain, perch guards designed to prevent white stork nesting on transmission lines (Model EDF) were unsuccessful on "Cat-Head" transmission tower configurations as reported by Navazo and Lazo [10].

In cases where conductive material in the nest is a concern (e.g., wire, Mylar, etc.), trimming or removing the conductive material may be an option. If this is not an option, the nest can either be removed or relocated to a less problematic location. Relocating the nest on the same structure is always the preferred option because raptors will likely try to reestablish a nest on the same or nearby transmission structure once removed [11]. This is particularly true for larger raptors such as eagles because they generally have fewer alternative places to nest.

When relocating a nest, it is important to consider nest location height, aspect, and shade coverage. A raptor biologist should assist with relocating decisions, based on the bird species' requirements. Although trimming conductive material can be done during the breeding season, it is best to complete all nest modifications in the nonbreeding season to prevent nest abandonment by the adults.

Pertaining to worker safety issues, utility employees should be aware there are diseases that can be transmitted by contact with nests, and they should wear gloves or use an inverted plastic bag to pick up nests. Breathing filters are recommended because moving nests will often disperse dried bird feces into the air. Some raptors also will vigorously defend nest sites and may attack people in or around the nest site.

When constructing new transmission lines across treeless habitat, it is likely raptors and other birds will use the structures for nesting. If nesting presents potential operational problems, artificial structures should be built into the line design [12]. Nesting platforms should be designed to both accommodate the raptor species most likely to use them and positioned on the structures in a way to prevent future operational problems. This approach should also be employed for other species including storks and corvids.

It also should be recognized that there are cases where raptor nesting and perching should be discouraged altogether. For some sensitive grouse species in the United States, it is believed that artificial, aboveground structures, such as power lines, allow raptors to predate on displaying male grouse, nesting hens, and brooding chicks [13]. Some researches have concluded that perches near critical breeding areas should be modified to preclude raptor perching. They also recommend restrictions on the sighting of new power lines relative to grouse breeding locations.

Distribution Lines

Many utilities experience problems with raptors, such as ospreys and buzzards, nesting on their distribution facilities. Nests are typically located on double crossarm structures (see Photo 2). These nests can become problematic if they connect energized wires or hardware.

In the American southwest, raptor nests often become a problem during the nonbreeding season when seasonal rains soak deteriorating nests and the sticks blow into energized conductors. Constructing new distribution power lines with armless vertical construction will eliminate this problem. Where crossarms are required, employing single apitong or fiberglass crossarms eliminates a place for raptors to nest (see Photo 3). These single-arm units can be manufactured with the same strength as double-arm units, while eliminating potential nesting sites. This approach is particularly effective at river crossings in osprey habitat.

Photo 2 Distribution Recloser Pole with an Active Red-tailed Hawk Nest on Double Crossarms

Photo 3 Distribution Pole Employing a Single Apitong Wood Crossarm with Jumpers under the Arm to Prevent Nesting and Electrocutions

Unfortunately, these solutions to restrict raptor nesting are not practical for existing poles. For retrofitting an existing structure, a stick deflector can be used to deter raptor nesting. Deflectors are designed to prevent nest material from accumulating during initial nest construction, resulting in the breeding birds abandoning the effort at that site. These deflectors either can be purchased commercially (Photo 4) or fabricated by the utility (Photo 5). Stick deflectors yield varying results depending on the design and installation method. Structures with deflectors must be monitored and new sticks removed before a solid nest foundation can be formed.

Photo 4 Kaddas Stick Deflector at a Double Deadend Structure

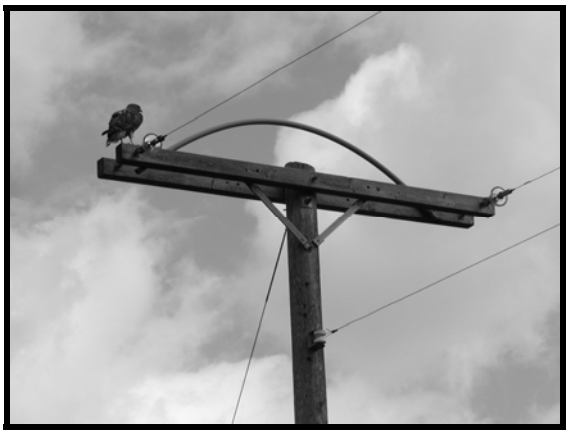

Photo 5 PVC Homemade Stick Deflector at a Double Deadend Structure

When trying to discourage nesting, utilities should encourage raptors to shift their efforts to a more suitable location. This can be achieved with a variety of approaches. One method that is appropriate for distribution line structures is placing a taller, surrogate nesting pole nearby to encourage the birds to avoid nesting on the energized line [6]. Birds are territorial, and shifting the birds to a surrogate structure also can prevent other birds from nesting on nearby structures. Raptors often will readily accept nesting platforms, especially if sticks are placed on the new platform. Various nesting platform designs can be found in *Suggested Practices for*

Raptor Protection on Power Lines: The State of the Art in 1996 [6]. This document is available in both English and Spanish. It is important to also examine and retrofit nearby poles, if applicable, to minimize the potential of fledgling birds becoming electrocuted.

An alternative to a separate nesting pole is to install an elevated platform on the problematic distribution structure (Photo 6). Elevated platform are effective but in some cases may allow birds (especially juveniles) and nesting material to come into contact with unprotected equipment under or adjacent to the nest (Photo 7). It is therefore critical to protect adjacent phases and equipment with cover up material. APLIC [6] also recommends nesting platforms be constructed 122 cm above distribution conductors to prevent nest material and excrement problems.

Photo 6 Elevated Nesting Platform on a Partially Unprotected Structure

Photo 7 Power Poles with Elevated Nests should be Retrofitted to Prevent Electrocution of Young Birds

Approaches that have proven to be ineffective in deterring nest building on power line structures include the use of effigies of predatory birds (Photo 8) and use of perch deterrent devices on crossarms (Photo 9). Utilities also have tried mirrors, spinning devices, and unstable perches to deter nesting. These all have typically been unsuccessful, and in same cases, deterrents actually may facilitate nest construction by providing an anchor or substrate to attach sticks (Photo 9). These anchored nests can be very difficult to remove.

Photo 8 Osprey Nest on Double Deadend Unit with an Ineffective Stick Deflector and Owl Effigy

Photo 9 Raptor Nest Using a Perch Deterrent as a Nest Anchor

Conclusion

Typically, there are two overall limiting factors to raptor populations: food availability and nest sites. Raptors show an amazing ability to nest on manmade structures. This adaptability includes the use of bridges, buildings, billboards, marker buoys, communication towers, transmission line structures, and distribution power poles. In some parts of the world the availability of utility structures has resulted in birds flourishing due to an unlimited potential for nesting sites. Examples of this

phenomenon in the United States include ospreys along the Willamette River in Oregon [4] and ferruginous hawks in Wyoming [14]. As birds adapt to these artificial structures, their young are more likely to imprint on and adopt these same patterns. Accordingly, electric utility companies should expect that nest management will become a greater part of their future activities. In addition to establishing procedures to address nesting issues, a successful nest management program should include plans to make nearby lines raptor safe from electrocutions. The combination of providing nests with bird-friendly utility configurations can result in electric facilities enhancing wild raptor populations without impacting power reliability.

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