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ARTIFICIAL NESTING PLATFORMS FOR BALD EAGLES IN SOUTHERN ONTARIO, CANADA

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ABSTRACT.—We constructed artificial nesting platforms to encourage the return of nesting Bald Eagles (*Haliaeetus leucocephalus*) to former breeding territories in southern Ontario, Canada. Eight platforms were constructed in historical breeding territories along the north shores of Lakes Erie and Ontario between 1988–95. Three platforms along the Lake Erie shoreline have been occupied by breeding adult Bald Eagles and, from 1991–96, they have been the sites of eight nesting attempts, seven of which were successful fledging a total of 16 young. From 1994–96, the three successful nests accounted for 15.4% of the nesting attempts in southern Ontario.

KEY WORDS: *Bald Eagle*; Haliaeetus leucocephalus; *nesting platforms*; *southern Ontario.*

Plataformas artificial de nidar para *Haliaeetus leucocephalus* en sur Ontario, Canada

RESUMEN.—Para animar el regresso de *Haliaeetus leucocephalus* de cria a territorios de cría anteriomente en sur Ontario, Canada, plataformas artificial para nidar fueron construidas y instaladas. Ocho plataformas fueron levantadas en territorias de cría historicas enseguida de la playa norte del Lago Erie fueron ocupadas con Aguilas adultos de cría. De 1991–96, los tres plataformas resultaron en ocho intentos de nidar, siete de ellos con exito, teniendo un total de 16 pajaritos. De 1994–96, tres intentos con exito contaron por 15.4% de los intentos de poner en sur Ontario.

[Traducción de Raúl De La Garza, Jr.]

Bald Eagles (*Haliaeetus leucocephalus*) bred commonly along the shorelines of the Great Lakes of Ontario before European settlement; however, their numbers declined steadily after the mid-1800s due to habitat loss and persecution (Broley 1952, Gerrard and Bortolotti 1988, Austen et al. 1994, Hunter and Baird 1995). A further decrease in this Bald Eagle population began in the mid-1940s with the introduction of organochlorine chemicals such as DDT which caused severe reproductive impairments in several raptor species (Spitzer et al. 1978, Grier 1982, Springer et al. 1984, McKeane and Weseloh 1993, Ewins et al. 1995). Weekes (1974) estimated that the breeding population of Bald Eagles in southern Ontario (south of Georgian Bay but including the Bruce Peninsula) declined from approximately 100 pairs in 1950 to an estimate of 10 pairs by 1970. More rigorous counts of nests in 1970 recorded six pairs in

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southwestern Ontario and another 1–2 pairs in the southeast of the province (S. Postupalsky pers. comm.). The Bald Eagle was listed as an endangered species in Ontario in 1973, and between 1978–80 counts of territorial pairs ranged from three (Hunter and Baird 1995) to six (S. Postupalsky pers. comm.).

Recovery projects aimed at increasing breeding populations of Bald Eagles were started along the Canadian shorelines of the lower Great Lakes in the 1980s. These projects emphasized cooperative volunteer and government partnerships, and included population and habitat management, analysis of environmental contaminants in eggs and blood of nestlings, and interpretive initiatives. Prefabricated nesting platforms were installed in suitable habitat to encourage adult Bald Eagles to nest in historical territories. Platforms were specifically installed in areas where suitable, preferred "super-canopy" trees were scarce or absent from historical territories.

Many species of raptors including Ospreys (*Pandion haliaetus*), American Kestrels (*Falco sparverius*), Peregrine Falcons (*F. peregrinus*), Eastern Screech Owls (*Otus asio*) and Barn Owls (*Tyto alba*) have nested in or on artificial structures (Cadman et. al. 1987, Cade and Bird 1990, Ewins 1994, 1996). Artificial nest structures have been used as management tools in population recovery projects for Bald Eagles (Postupalsky 1978, Grubb 1995), Golden Eagles (*Aquila chrysaetos,* Postovit and Grier 1982) and White-tailed Sea Eagles (*H. albicilla,* Helander 1975). Bald Eagles have been occasionally reported to use a variety of artificial nest structures including wooden pallets (Dunstan and Booth 1970), oversized, solid-based Osprey platforms (Postupalsky 1978, 1979), aluminum, wire-mesh baskets (Grubb et al. 1982) and natural materials such as sticks (Grubb 1995, M. Shieldcastle, pers. comm.).

This paper details the design and techniques used to locate, construct and install prefabricated, adjustable, Bald Eagle nest platforms along the north shores of Lakes Erie and Ontario in southern Ontario, Canada.

METHODS

In the last several decades, most Bald Eagle nests in southern Ontario were built in trees such as oaks (*Quercus* spp.), maples (*Acer* spp.), eastern cottonwood (*Populus deltoides*), hickorys (*Carya* spp.) and white pine (*Pinus strobus*). Nests occurred in either super-canopy trees within a woodlot or in mature trees at forest or woodlot edges and along fence lines. Super-canopy trees were approximately 30% taller than the rest of the forest and had a suitable tree crotch above the surrounding treeline, thereby providing eagles with open flight paths to nests (Stalmaster 1987).

Historical records (Ontario Ministry of Natural Resources) were searched to locate sites for platform installation. Interviews with local naturalist clubs and landowners gave crucial information regarding historical and current sites. Where a super-canopy tree could not be located, a mature tree with suitable flight access within an even-aged woodlot was chosen in an historical territory

Trees selected for platform installation had crotches with two or preferably, three tree limbs. A suitable tree crotch had an approximate 2-m span, was estimated to be able to support at least 150 kg and provided two flight paths, at least 2-m wide, to and from the platform approximately 1–1.5 m above the platform (Figs. 1 and 2).

Platforms were constructed using a 1-m^2 (outside measurement) frame constructed of pressure treated, all-weather 38 × 140 mm spruce wood. In each corner, a brace with a 19-cm long face was located at 45° to the 90° corner of the frame, leaving a 9-cm (inside measurement) triangular opening. Holes were drilled every 7.6 cm around the perimeter of the box. A single strand of #8 galvanized (4 mm) wire was interwoven to form a mesh floor of 7.6-cm squares. The wire provided a sturdy base for the nest and allowed for drainage (Fig. 1).

The prefabricated frame was mounted on 2, 3-m long (or longer when needed in larger trees), pressure treated, 38 × 1140 mm spruce planks. Holes were predrilled into the middle of both planks at 30 cm, 60 cm and 90 cm from the plank's end. Threaded, galvanized steel rods 90 cm in length were used to attach the planks onto the selected tree. The frame was secured to the planks using threaded rods approximately 72.5-cm long that were bent into U-shaped mounting clamps approximately 32.5-cm long and 7.5-cm wide. A steel bar measuring 3 mm × 89 mm was used as a retaining plate. Four U clamps were used, one at each of the frame/plank interfaces.

To prevent raccoon predation, predator guards were attached to the trees (Fig. 2). These consisted of #14 sheet metal, approximately 1–1.5 m high and 3-m long Wood screws, #8 sheet metal screws and four 2.5 cm × 5 cm × 1 m wood straps were used to attach the predator guard to the tree. The sheet metal was painted an unobtrusive brown color.

We found that three people in the tree and two on the ground was the ideal team size for installing platforms. The two people in the tree assembled the platform and the third person handled and passed the equipment to and from the ground crew. The planks were secured in a horizontal position often in the forks of branches on the tree trunk. If absolutely necessary, nails were used to secure the planks. Holes to fit the threaded rods were drilled as required. The frame was located onto the planks allowing for two, 2-m flight paths on either side for access to the nest. Locations of flight paths sometimes necessitated offsetting the frame to one side of the center of the planks and tree crotch. The frame was horizontally secured onto the planks. Both plank and frame structures were secured well enough to support a climber's weight. The remaining lengths of the mounting rods were left to allow for later adjustments as the tree grew. The platform and adjacent trees were pruned to ensure that the flight paths were large enough.

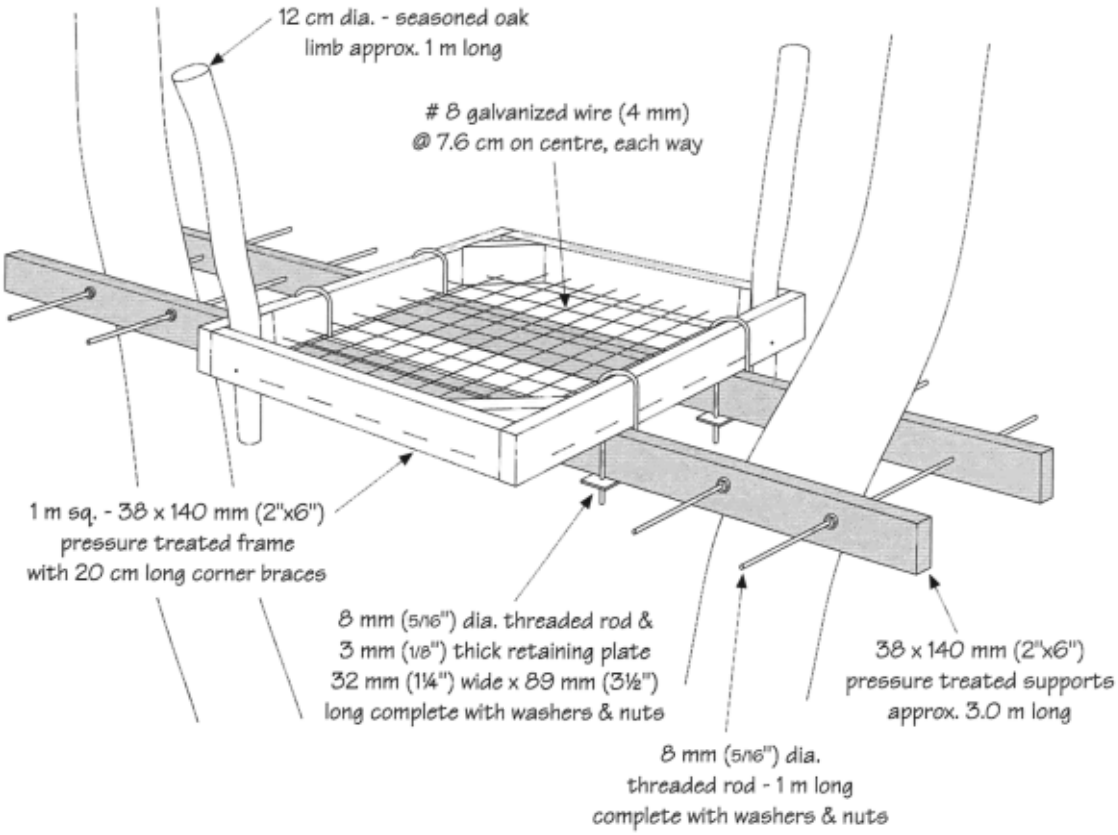

Figure 1. Bald Eagle nesting platform showing measurements and construction details.

Two oak limbs were firmly placed into the corner triangles of the frame to act as building joists for nest construction. Branches gathered from the ground were placed horizontally inside the nest frame, removing the artificial appearance of the wire floor and to provide natural materials for the eagles to perch. The predator guard was then installed. The four wood straps were secured top and bottom to the tree trunk with one strap in each north, east, south and west direction. The metal sheet was screwed onto the wood straps. It was attached at the top, middle and bottom of the sheet working progressively around the trunk of the tree. The wood straps provided the tree trunk with air ventilation thereby reducing the potential for trunk rot. Any nearby tree branches that could provide predator access to the nest tree above the predator guard were removed.

Platforms were inspected annually from the ground to determine the need to modify the structure. Every 2 or 3 yr we loosened the threaded rods holding the platform to the tree, as well as the metal screws on the predator guard, to accommodate the natural growth of the tree. The same visits determined the need to further manage the canopy in the vicinity of the nest platform in order to maintain open flight paths.

RESULTS

Eight Bald Eagle nesting platforms were installed along the shorelines of Lakes Erie and Ontario in a range of tree species (Table 1). Three platforms were placed in occupied territories and five in vacant, historical territories between October 1988–February 1995. To date, three platforms have been used by adult eagles that attempted to build nests. All of these territories were occupied by 1–2 nonbreeding eagles at some time in the 1980s. From 1991–96, there has been a total of eight nesting attempts on nesting platforms. Seven of these have been successful fledging a total of 16 young. From 1994–96, these three platforms have accounted for 15.4% of the nesting attempts in the region (Fig. 3).

Platform #1 was occupied in 1990 but it did not produce young that year. Between 1991–95, it has produced a total of 10 young (Table 1). In 1996,

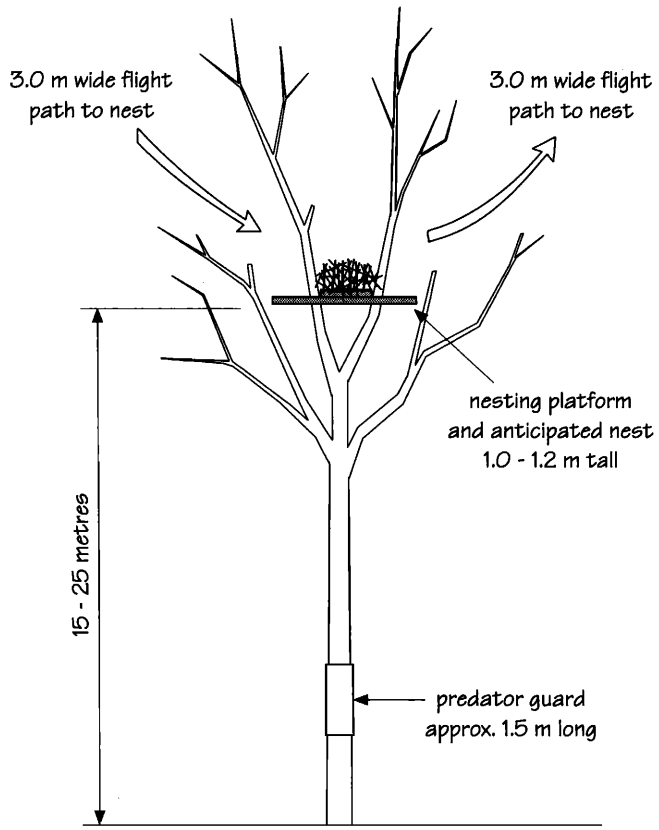

Figure 2. Bald Eagle nesting platform situated in nest tree showing dimensions, flight path and predator guard.

Table 1. Locations, occupancy and success of nesting platforms in eight historical Bald Eagle territories in southern Ontario.

Site #	Territory Activity in the 1980s	Year Platform Installed	Tree Species	Approx. Height (m)		Year Platform Used
				Tree	Platform	
Lake Erie						
1	occupied	1988	shagbark hickory	29	19	1990–1995
2	occupied	1991	white ash	27	23	1992–1994
3	occupied	1993	white pine	26	22	1994–1996
4	vacant	1993	burr oak	24	20	—
5	vacant	1994	eastern cottonwood	27	17	—
Lake Ontario						
6	vacant	1994	white oak	21	13	—
7	vacant	1995	chinquapin oak	24	18	—
8	vacant	1995	white ash	20	16	—

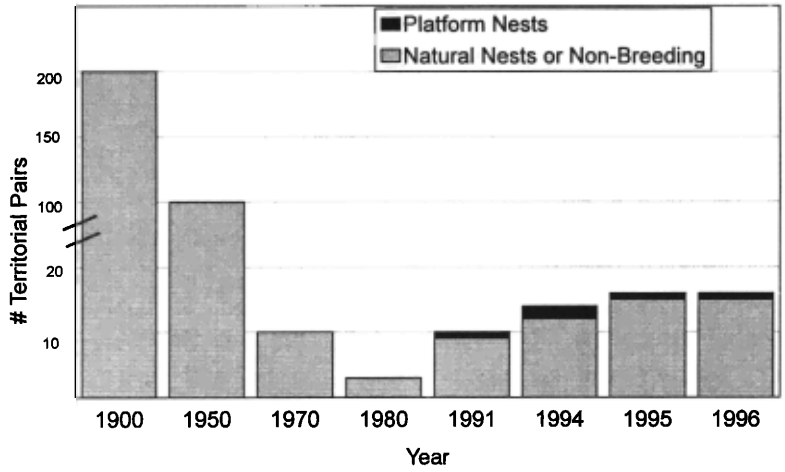

Figure 3. Estimated number of Bald Eagle territorial pairs in southern Ontario 1900–96.

this territory continued to be occupied, but a new nest was built in another tree and successfully fledged two young.

At platform #2, one egg was laid in 1992 but failed to hatch. Although the eagles made periodic visits to the platform in 1993 and 1994, no young were raised. In 1996, a single young was raised presumably by the same pair at a natural nest built in another tree in the territory. In 1994, eagles at platform #3 successfully raised three young. Although they were observed at the platform in 1995, they nested elsewhere and raised three young. Late in the nesting season, however, the nest blew down in a storm and the pair moved with their recently fledged young back to the nesting platform which they continued to use for the rest of the season. The platform was used again in 1996 raising three young.

Although no nesting attempts have been observed at the Lake Ontario platforms, adult Bald Eagles were observed in the vicinity of Platform #6 in 1996.

DISCUSSION

The Bald Eagle population in southern Ontario has increased steadily since 1980, when there was only one possible successful nest. In 1996, the population had increased to a total of 16 breeding pairs, 10 of which were productive. Postupalsky (1978), observed a similar return of breeding eagles in Michigan, and suggested that artificial nest supports such as platforms may provide the necessary stimulus for nest-site selection as eagles return to vacant, historical territories. The three platforms used by eagles in southern Ontario were located in territories already occupied by eagles in the 1980s. This suggests that when locating platforms in historical territories, success in attracting breeding eagles may be dependent upon the most recent occupation history of the site. Of the five platforms yet to be used by eagles, none is in a territory known to have been occupied by eagles in the last 20 yr. Elsewhere, platforms have remained unused for many years before attracting an adult pair of nesting eagles. An oversized, solid-base Osprey platform installed for eagles in Michigan in 1982 was not utilized until 1993 (S. Postupalsky pers. comm.).

It is worth noting that in all three territories where breeding has occurred on platforms, the breeding pairs have moved to natural nests within the territory, and in one case, have moved back to nest on the platform. This suggests that eagles may prefer natural nest-sites to platforms; however, platforms provide a backup in case the natural nest is destroyed.

Nesting platforms have been used successfully elsewhere in North America to replace natural nests that have been destroyed or threatened due to wind and flood damage (Grubb 1983, Manion et al. 1992) or incompatible human activity (Postovit and Grier 1982). The availability of super-canopy trees with open crowns is a key characteristic in Bald Eagle nest-site selection (Bowerman 1993). We specifically installed platforms in formerly occupied ter-

ritories where super-canopy trees were no longer available, and ensured that the area around the platform was open enough to allow flight access by trimming branches from nearby trees.

The platforms that we have designed and installed are very sturdy and clearly offer a relatively stable support for eagle nests. We expect that, over time, reproductive losses due to nest blow down or predation would be lower at trees fitted with platforms and antipredator guards than at natural sites.

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