

A Second Chance—Raptor Rehabilitation

By Stephen R. Rapp . St. Louis, Missouri

In recent decades a public awareness has developed concerning the plight of birds of prey, also known as raptors. Indiscriminate shooting and trapping, collisions with automobiles, barbed wire fences, power lines, and other manmade structures as well as loss of habitat and pesticide poisoning have contributed to the decline of many raptor species. Unless measures are instituted to halt the decline of not only raptors but all endangered species, it is very possible that in our lifetime we could see the disappearance of many species from the face of the earth. Long range solutions, including environmental education of the public, wise land usage, and reduction in the use of pesticides are necessary although we must also design management programs to deal with immediate problems facing those species presently in danger of extinction. The peregrine falcon was brought back from near extinction in North America through the intensive efforts of raptor biologists. Must we wait until such a perilous point is reached with other species before instituting management programs to preserve them?

R.R.P.P., Inc.

In Missouri, the red shouldered hawk (Buteo lineatus), the Cooper's hawk (Accipiter cooperii), the sharp-shinned hawk (Accipiter striatus), the marsh hawk (Circus cyaneus), the peregrine falcon (Falco peregrinus), the bald eagle (Haliaeetus leucocephalus), the osprey (Pandion haliaetus), and the barn owl (Tyto alba) are all listed as endangered species by the Missouri Department of Conservation.

In an effort to preserve these magnificent but dwindling creatures, the author assisted Walter C. Crawford, Jr., in establishing the Raptor Rehabilitation and Propagation Project Inc., (R.R.P.P., Inc.). The R.R.P.P., Inc. is located at Washington University's Tyson Research Center near Eureka, Missouri, approximately fifteen miles west of St. Louis. Originally established to rehabilitate injured raptors, the project has since expanded to include captive propagation of endangered raptor species, research and education. The R.R.P.P., Inc. is a non-profit, tax exempt organization relying solely on contributions from interested individuals, groups, and corporations for support. Funding is also received from university and governmental sources in the form of research grants to support specialized research projects. A notable aspect of the

R.R.P.P., Inc. is that all personnel, including the director, are volunteers, receiving no salary for their work.

Through various generous financial support of local corporations, individuals, and the Missouri Department of Conservation, the project has designed and built facilities to house raptors undergoing rehabilitation, for research programs and for captive propagation. Rehabilitation facilities include a surgery and post-operative care area as well as several outdoor enclosures to house recovering and permanently injured, unreleasable birds. Additional facilities house incubators and hand rearing equipment as well as a Coturnix quail colony. The Missouri Department of Conservation had financed three facilities used for captive propagation. These are multi-chambered buildings that allow breeding pairs to be housed and maintained under conditions that are conducive to successful propagation. At the present time these are being used for the captive propagation of barn owls. Two of the buildings consist of chambers with one-way viewing glass that allows project members to conduct detailed behavioral observations. Additional facilities house breeding pairs of golden eagles (Aquila crysaetos), red shouldered hawks, Cooper hawks, marsh hawks and sharp-shinned hawks as well as American

Rehabilitation

kestrels (Falco sparverius).

The R.R.P.P., Inc. has treated 318 injured raptors that were brought to us by local park rangers, concerned individuals, state and federal wildlife agents over the past three years. Our initial action upon receiving an injured bird is to stabilize its condition and then institute reparative measures. If a broken bone is suspected, radiographs are taken. With the assistance of local veterinarians, the injury is treated and the bird is housed in indoor facilities until its condition has stabilized. Once stable, the bird is moved to outdoor facilities where it is housed until its wounds are completely healed. When recovered, the bird is allowed to exercise in the outdoor facilities and ultimately. is released back into the wild. In an effort to document the success of the rehabilitated birds, the project is currently seeking funding to obtain transmitters that will allow us to track them after their release.

In 1979, we developed a prosthetic limb for use on golden eagles that have suffered the loss of a foot due to a steel trap or gunshot injury. While not a functioning limb, this prosthetic device allows the bird to perch naturally, to support its weight on both legs rather than one. This reduces the chances of a foot problem such as bumblefoot occuring on the remaining limb since, without the prosthesis, the bird would have to rely on only one limb to support all its weight. A bird with this device could never be released; however, it could lead a much less stressed, hopefully reproductive life in captivity.

Propagation

Occasionally, a bird will suffer an injury requiring amputation of a foot or wing, or suffer permanent, restricted use of such a limb and thus cannot be released. As an alternative to euthansia, we began utilizing many of these birds for our captive propagation program. Through the release of captive-bred offspring, these crippled birds are still contributing to the maintenance of their species. In addition to crippled, unreleasable birds, raptors from zoos, nature centers and government research facilities are also used for captive breeding programs. In particular, five pairs of barn owls from Patuxent Wildlife Research Center in Laurel, Maryland, form the core of our barn owl breeding colony, which currently consists of 10 breeding pairs. Our goal is to establish large scale breeding programs with those raptors that are classified as endangered species in Missouri and on which not much captive work has been done. Several institutions are working with well known raptor species such as the peregrine falcon and the bald eagle; however, there are very few working with lesser known species such as the Cooper's hawk, sharp-shinned hawk, red shouldered hawk, marsh hawk and the barn owl. These five species form the core of the R.R.P.P., Inc.'s captive propagation program.

The initial step in any captive propagation program is the pairing up of prospective mates in a facility that is conducive to breeding. Since the sexual dimorphism in size between males and females among most raptor species is not a reliable indicator of sex, our breeding pairs are accurately sexed using an otoscope or laparoscope for internal visualization of the gonads. This is a safe and commonly used technique to accurately sex birds.

Breeding chambers are made of solid wood construction with a large four by eight window in the rear wall of each chamber along with a smaller one foot by eight foot window near the ceiling in the front of the chamber for ventilation.

One half inch metal conduit placed on one inch centers serves as a barrier in these windows. In all breeding chambers the large rear window faces a wooded hillside. This design insures that the birds will be free of visual and most auditory disturbances that may interfere in their reproductive cycle. Through the use of proper nest structures, perches and diet, we hope to stimulate natural behaviors that will lead to the ultimate goal of reproduction.

As a stimulant to breeding we have found live Coturnix quail, commonly used in laboratory research, to be indispensable for several reasons. During initial pair bonding, many raptors will behave instinctively aggressive towards one another in such a way that pair bonding may not occur. However, by feeding live quail, this potential motivation to be aggressive towards one another can be channeled into pursuit, capture and feeding on a live food source. Once lower levels of aggression are reached between a pair of birds, natural behavior patterns conducive to formation of pair bonding such as presentation of food by one bird to another, mutual preening, bowing, etc. may be observed. Any breaks in this chain of behavioral events could stop the entire reproductive process. By feeding live food to stimulate and simulate natural behaviors, these links in reproductive behavior are maintained, thus increasing the chances for successful reproduction.

To date, we have been successful in raising two endangered species, the Cooper's hawk and barn owl as well as American kestrels (Falco sparvenus), screech owls (Otus asio), red tailed hawks (Buteo jamaicensis), and Harris's hawks (Parabuteo unicinctus).

In 1981, the project's colony of seven pairs of barn owls produced 66 young. As of July 1, 1982, 52 barn owls have been raised with many pairs still on eggs. This is in dramatic contrast to barn owls productivity in the wild during this period. In 1981, the Missouri Department of Conservation reported only one active wild barn owl nest throughout the state of Missouri. In 1982, no observed nestings occurred. Data collected in 1978, 1979 and 1980 showed four, two, and two active barn owl's nests, respectively, during these years. Unfortunately, this poor barn owl reproductive performance has not been limited only to Missouri, but is common throughout the midwestern states. Illinois, Iowa, Wisconsin and other states have reported similar low barn owl productivity. It became clear that our task was to maximize the number of barn owls raised in



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captivity so that we could begin serious. large scale reintroduction efforts.

Artificial Incubation and Handrearing

Towards this goal we began a program of double clutching our breeding pairs of barn owls. The clutch of eggs, numbering between five and eight, are removed seven days after the last egg of the clutch is laid. Once removed, the eggs are then incubated in a Roll-X (Marsh Farms) incubator until hatched. During incubation, the incubator is maintained at 98.5 degrees dry bulb thermometer and at 83 degrees wet bulb or 48% relative humidity. Raptor eggs should lose approximately fifteen-seventeen percent of their weight via water evaporation through the eggshell during incubation period. To monitor this, the egg should be weighed just prior to placement in the incubator and a fifteen-seventeen percent weight loss curve calculated. By weighing the egg every three days its progress can be followed by comparing the weight to the fifteen-seventeen percent weight loss curve previously drawn. If the eggs are too heavy during the incubation period, indicating excessive humidity, the humidity in the incubator should be decreased. If the eggs are too light, the humidity must be increased. The proper moisture content of the egg is critical to the successful hatching of the chick.

Once hatched, the chicks are fed a diet of ground up whole mice and rats, minus tails and skin, which is then dipped in a solution of Plex-Sol C (Vet-A-Mix, Shenandoah, Iowa) and water before feeding. As the young barn owls mature. casting material, hair and bones are included in the diet. Once the birds are feathered out, they are moved to large chambers that will allow them to exercise. It is during this stage that they are introduced to live food, quail and mice, to prepare them for release. Once we have determined that the birds are killing prey on their own, they are ready to be released.

Release

One or several pairs of captively raised barn owls are placed inside an enclosed barn or other type of man-made structure at the release site. While kept from escaping in this facility, the birds are fed first dead, then live food. This gives them time to further perfect their flying and prey capturing ability in a situation where we can monitor their progress. Periodic checking of castings in the barns will tell us if the young owls have caught any wild prey by examining the composition of bones in the casting. Bones, primarily skulls, of domestic mice are easily discernible from those of wild rodents. When we feel the birds are

ready to be released, a door or window is opened so the owls can come and go as they please.

During this time of initial freedom, we continue to provide a source of food at the release site so the birds can return to eat if they are unsuccessful in their early hunting attempts. Ideally, a pair of birds will remain in the vicinity of the release site and establish their own nesting territory. To encourage this, we choose release sites that will provide adequate nesting sites and prev availability. In some instances, artificial nesting boxes are added if adequate nesting sites are not present. Working together with state conservation officials as well as concerned individuals, the project has succeeded in placing 66 barn owls throughout the state of Missouri in the past year. To date, three barn owls have been fitted with radio transmitters which allow us to monitor their movements upon release. Owls with transmitters are initially tracked with either a helicopter or fixed wing aircraft followed by a ground search with an automobile to verify the location of the birds.

In addition to barn owls, in 1981 we were successful in raising three Cooper's hawks. In 1982, one pair of Cooper's hawks laid two clutches of eggs, producing one chick from the second clutch. Unfortunately, this chick died at five days of age. Also, in the past breeding season of 1982, one pair of sharpshinned hawks laid a clutch of five eggs. This was the first time that any of the project's breeding pairs of sharp-shinned hawks have laid eggs. Unfortunately, this inexperienced breeding pair constructed a very poorly built nest that caused the eggs to slip down deep inside the nest structure itself such that the female could not incubate them. Although fertile, the embryos died before hatching. Sharp-shinned and Cooper's hawks, members of the Accipiter genus, are very secretive, forest dwelling birds that are notoriously difficult to maintain in captivity. In addition, many of these are permanently crippled making captive propagation a much more difficult task. These two factors, while difficult to overcome, will make any success in the future with these two species that much more gratifying.

Our colony of red shouldered hawks has produced many eggs over the past three years; however, none have been fertile. To our knowledge this species has never been bred in captivity in North America. In fact, the R.R.P.P., Inc. has possibly the largest captive population in the United States. As with any avian propagation program, it takes time for a

breeding pair to become adjusted to one another to a point where reproductive activity can occur. Since egg production has been substantial, the project feels that there is an excellent chance to raise red shouldered hawks in the near future. "Julie" and "Bill"

A particularly interesting pair of birds in the propagation program is one pair of golden eagles. "Julie," an eight-year old female, is permanently crippled due to a gunshot wound to the right wing. The male, "Bill," is thirty-eight years old and perhaps the oldest golden eagle in captivity. "Bill" was found as a downy chick, injured after a forest fire. "Bill" spent the first thirty-five years in his life in a small zoo on the campus of Principia College in Elsah, Illinois. In 1979, the college agreed to place "Bill" on a breeding loan to the project. Due to his age and the fact that he had spent all of his life isolated from other eagles, we were uncertain whether any successful breeding would occur.

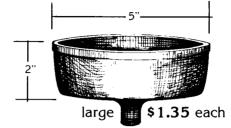
The first two seasons "Julie" and "Bill" were together only low levels of reproductive activity occurred. Short bouts of nest building by "Julie," and mutual preening and calling were observed on a few occasions. However, one interesting behavior that provided some hope was that during the breeding season, from mid-January to mid-March, "Bill" was very aggressive to individuals that approached his enclosure. He would even go as far as to try to attack someone through the wire of his enclosure. At times, feeding was difficult because "Bill" would challenge the person who was feeding. The fact that "Bill" became aggressive and protective of his "territory" during the breeding season was a behavioral sign to us that, despite his age, he might still be in reproductive condition. This past breeding season brought more involved courtship displays, vocalizations, mutual preening, and persistent nest building by "Julie." In April, 1982, "Julie" was observed sitting in the nest in an incubating posture. To the project's delight, she was incubating two eggs, her first clutch. After forty days had passed without any hatchings, we removed the eggs and found them to be infertile. Although disappointed that the eggs were not fertile, there was the encouragement that she at least did lay two eggs. "Bill's" age and "Julie's" injury are both factors that make successful breeding of this pair a difficult task. However, with the two eggs laid this past season, the project has high hopes for the next breeding season.

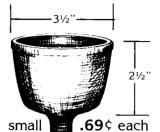
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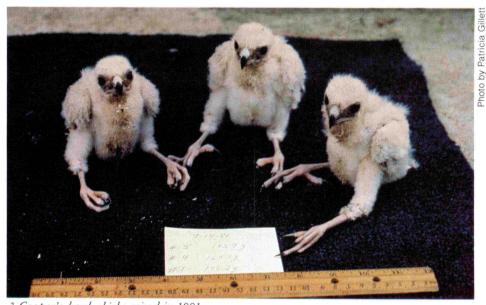


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A rehabilitated osprey is readied for release by Raptor Rehabilitation and Propagation Project Inc. personnel.



3 Cooper's hawk chicks raised in 1981.

6 juvenile barn owls in their nest box.

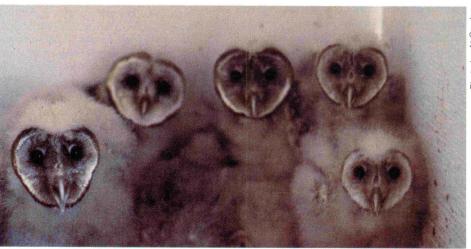


Photo by Al Gardner

Photo courtesy of Missouri Department of Conservation



Adult barn owl with its favorite prey, a field mouse.

An adult female golden eagle, a gunshot victim, utilizing a prosthetic limb designed by the Raptor Rehabilitation and Propagation Project Inc.



Photo by Walter C. Crawford, Jr.

in the field are an important part of the ongoing work at the R.R.P.P., Inc. In the field, the project participates in the yearly Bald Eagle census organized by Dr. Thomas Dunstan of Western Illinois University. From December to March, a weekly aerial survey is conducted along the Mississippi River from St. Louis, Missouri to a point approximately one hundred miles north on the Mississippi River. During the survey the location and age, mature or immature, of each bald eagle sighted, is recorded. This data, when pooled with data collected by other survey teams, allows researchers to accurately monitor the bald eagle population in the United States. In the lab, a grant has provided funding to study the effect of environmental changes, diet, and reproductive condition on heart and respiration rates of captive raptors. This involves the use of sophisticated bio-telemetry equipment that allows us to monitor these physiological changes while the bird is in its enclosure, unstressed by any physical restraint. Electrodes are attached to the keel of the bird and connected to a small transmitter on the bird's back. Data is transmitted to a strip chart recorder where it is collected several times a day. It is hoped that ultimately these biotelemetry devices will be placed on birds in the wild, in particularly, bald eagles. Public Education

The R.R.P.P., Inc.'s Raptor Management Programs are augmented by a very aggressive public education program. In 1981 alone, the R.R.P.P., Inc. met with over 10,000 individuals in schools, scout groups and civic organizations to provide programs illustrating the problems facing raptors and the necessity of their preservation. Slides, visual aids and live birds are utilized as we discuss the natural history of North American raptors, work by the R.R.P.P., Inc. to preserve them, and ideas for projects that an individual can do to be active in wildlife conservation. The program is aimed at educating the public in the value of wise land use, habitat conservation and the role of predators in the food chain. Without cooperation between groups such as the R.R.P.P., Inc., state and federal wildlife agencies, and the general public, the future of many endangered species is a dubious one. Endangered means there is still time, extinct is forever.

If you would like more information about the Raptor Rehabilitation and Propagation Project, Inc., please write or call the following: (314) 938-6193 R.R.P.P., Inc. • Tyson Research Center P.O. Box 193 • Eureka, MO 63025 •

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