The Humane Capture, Handling, and Disposition of Migratory Birds

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1. PURPOSE

The purpose of this technical document is to serve as reference material on the humane capture, handling, and care of migratory birds captured for any purpose with an emphasis on depredation resolution in the United States and its territories. It is intended for wildlife managers, regulatory personnel, and individuals that handle or authorize handling of live-captured migratory birds. The U.S. Fish and Wildlife Service – Migratory Bird Program (USFWS MBP), the U.S. Geological Survey Bird Banding Laboratory (USGS BBL), and U.S. Department of Agriculture Animal Plant Health Inspection Service Wildlife Services (USDA APHIS WS) collaboratively prepared this document.

Humane and healthful conditions apply to the capture, possession, and transport of any live migratory bird, including bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), whether possession is temporary or long-term. Humane and healthful conditions include handling (e.g., during capture, care, release, restraint, and training), housing (e.g., whether temporary, permanent, or transport), shelter, feeding and watering, sanitation, ventilation, protection from predators and vermin, enrichment, veterinary care, and euthanasia. To be considered humane and healthful, conditions must minimize fear, pain, stress, and suffering to the extent practicable and reflect the best-known methods as supported by the best available science (USFWS personal communication 2022).

Natural resources are held in the public trust. Federal agencies must strive for the professional management of these resources and for the welfare of wildlife. Resource management decisions should be informed by the best available science and knowledge which includes care and handling of migratory birds using the best available information on humane and effective techniques. The guidance herein serves to provide information on current available techniques, correct methods, and other important considerations. Personnel are expected to be proficient in the use of any method prior to its use.

As with most natural resource decisions, capturing of migratory birds is a decision process often with no clear 'right' answer. When capturing birds for depredation purposes, there is a balance between the resources being protected (e.g., aviation) and the benefit of the bird remaining in the population. This document provides information that is designed to guide method selection from the various techniques and proper handling of birds. The document provides general information for consideration and more detailed information should be sought as appropriate.

Prior to utilizing any capture method for federally protected birds, permits must be obtained from USFWS or USGS (See Section 5 of this report). Additional federal permits may be required for bald eagles, golden eagles, and birds on the List of Endangered and Threatened Wildlife (50 CFR 17.11). State permits may also be required. The Animal Welfare Act (AWA, 7 U.S.C. § 2143; U.S. Department of Agriculture, 2013; 9 CFR 2.31) requires Institutional Animal Care and Use Committee (IACUC) review if using live birds for research, teaching, testing, experimentation, or exhibition purposes.

This document is not meant to be inclusive of all capture methods, techniques, and permit types. This document will be periodically reviewed and updated or revised as needed. It is the expectation that the person capturing will use their best judgement based on local conditions.

2. LIVE-CAPTURE METHODS

There are many live capture methods and tools that are humane when used properly. To be considered humane and healthful, conditions must minimize fear, pain, stress, and suffering to the extent practicable and reflect the best-known methods as supported by the best available science. We describe many live-trap types that are commonly used to safely capture raptors and other migratory birds below. This list is not all-inclusive. Any live-capture method selected for use should minimize the risk of injury or mortality to the targeted species, non-target species, and lure animals.

This document provides recommended check times for selected techniques. Additional checks are necessary during periods of inclement weather due to the increased risk of mortality (e.g., birds unable to thermoregulate). Additional considerations when using live-traps include but are not limited to the following: (1) the number of birds one intends to capture at one or multiple sites, (2) the number of devices that will be set and monitored at one time and the distance between them, (3) the training level of operators and the number of people required for the effort, (4) the time of year (e.g., breeding, migration, or molting periods), (5) the time of day, (6) weather and climatic conditions (see inclement weather definition in Appendix 1), (7) the risk of predation of the live-captured bird(s), and (8) the ability to use technology to aid in checks. Birds must be properly cared for once they are known to be captured.

2a Common Live-Traps
2a.1 Bal-chatri Trap

Photo: USDA, Wildlife Services. Bal-chatri with rock pigeon (Columbia livia) as lure.

Commonly targeted species: accipiters, medium/large buteos, small falcons and owls (Miller and Schlieps 2021).

The bal-chatri trap has been used to capture most raptor species in North America, including but not limited to red-tailed hawks (*Buteo jamaicensis*), Cooper's hawks (*Accipiter cooperii*), northern harriers (*Circus cyaneus*), snowy owls (*Bubo scandiacus*), great horned owls (*Bubo virginianus*), and American kestrels (*Falco sparverius*).

Description

The bal-chatri, derived from a Hindi word which roughly translates to "noosed umbrella" (Clark 1992), is a wire cage with nooses tied to the top, sides, or both (Berger and Mueller 1959). It is a relatively small, versatile, and effective trap that can be modified to capture individual species of hawks and owls. Live small mammals or birds are used to lure a raptor into landing on the trap. Nylon nooses, monofilament fishing line or coated fishing leader with crimps entangle its toes/feet and hold the bird until it is released.

Although bal-chatri traps are commercially available, they are easy and inexpensive to construct. There are several different sizes and shapes of bal-chatri traps including square-shaped, cone-shaped, and Quonset hut-type bal-chatris (Bub 1978). The door for the lure animal should be on the bottom of the trap where it will not interfere with nooses. Applying camouflage to the traps is important; spray painting the trap before nooses are attached is a common technique. Painting the trap bottom a bright color (orange) will indicate when the trap has been flipped. The flash of orange when the trap flips can help prompt the observer that some type of action is needed.

Bal-chatri traps should be secured with a weight suitable to prevent the raptor from flying away with or dragging the trap and breaking nooses (e.g., exercise and barbell weights work well) or tied to a flexible branch to keep a trapped bird from dragging the trap and breaking the nylon nooses (Bloom et al. 2007). For traps under constant surveillance, a suggested recommendation is to use a 2 pound. barbell weight attached to the trap via a 3 foot length of nylon cord with a "shock-absorbing" spring. Care should be taken so that the lure(s) cannot chew through the cord (e.g. secure the cord to the trap with a metal clip). Many practitioners attach the weight directly to the floor or sides of the bal-chatri trap. However, a spring or other "shock absorber" must be used in situations where the trap is tied to a stationary object.

The Quonset hut bal-chatri (Berger and Hamerstrom 1962) was designed for trapping large hawks and owls. The trap is often made from 1 inch chicken wire or ½ inch. hardware cloth formed into a cage that is 18 inch long, 10 inch wide, and 7 inch high at the middle. The floor consists of 1 inch mesh welded wire with a lure entrance door and steel rod edging for ballast. The top is covered with nooses of 40 pound test monofilament fishing line.

Noose carpets are similar to bal-chatri traps. They consist of a base (typically a strip of wire mesh) affixed with monofilament nooses. The trap is placed in a location the target bird will likely perch/rest such as near a nest or food source. In addition, a noose harness on a lure bird can work in a similar manner (Bloom et al. 2007).

General use/set criteria

Bal-chatri traps are effective only when placed where a perched or hunting raptor can see them. When placing traps, consider current uses of the area such as vehicles, large animals, and people who might crush, damage, or move the trap. See Bloom et al. (2007) for suggested noose sizes for targeted species.

Lures: house sparrows (*Passer domesticus*), starlings (*Sturnus vulgaris*), rock pigeons (*Columbia livia*), house mice (*Mus musculus*), gerbils (*Gerbillus spp.*), and other small rodents can be used as lures. Multiple color variants may increase attractiveness of lures. Migratory birds may not be used as a lure without appropriate permitting (See MBTA, 16 U.S.C. §§ 703–712).

Selection of lures (i.e., bait animals) used in bal-chatri traps depends on the size and shape of the bal-chatri as well as the species of hawk or owl being targeted.

Photo: USDA, Wildlife Services. Red-tailed hawk (Buteo jamaicensis) captured in a bal-chatri trap.

Trap check:

● Continuous monitoring

These traps must be monitored continuously, and captured birds removed immediately to prevent injury or predation by other raptors. Also, the nooses will eventually break and release the bird. In addition, note that lure(s) can chew and weaken nooses.

References

Berger, D. D., and F. Hamerstrom. 1962. Protecting a trapping station from raptor predation. Journal of Wildlife Management 26:203–206.

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 in Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

Bub, H. 1991. (Translated by F. Hamerstrom and K. Wuertz-Schaefer). Bird trapping and Bird Banding; A handbook for trapping methods all over the world. Cornell University Press, Ithaca, New York, USA.

Clark, W. 1992. On the etymology of the name *Bal-Chatri*. Journal of Raptor Research 26:196.

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

2a.2 Swedish Goshawk Trap

Commonly targeted species: accipiters, medium/large buteos, medium/large owls and small falcons (Miller and Schlieps 2021). The Swedish goshawk trap has been used to capture most hawk species, several species of owl, and American kestrels (*Falco sparverius*) in North America.

Description
The Swedish goshawk trap was originally described by Meredith (1953) and has since been improved and made more portable (Meng 1971, Kenward et al. 1983).

The Swedish goshawk trap is a relatively large, semi-permanent, trap that consists of two parts, a bait cage and a trap mechanism (Bub 1991, Bloom et al. 2007). The bait cage (e.g., a 3 x 3 x 1 foot cage made from 1 inch mesh welded wire) holds the lure animal(s) safely. The trap mechanism (often consisting of a wooden or metal "A" frame, heavy springs to pull the doors closed, nylon netting or chicken wire, and a trigger mechanism such as a hinged stick) is mounted on top of the bait cage. A raptor dropping into the trap will trip the trigger mechanism and safely be trapped inside. It is recommended that traps be secured to the ground by staking or tethering.

Photo: USDA, Wildlife Services. Red-tailed hawk (Buteo jamaicensis) captured on an airfield in a Swedish goshawk trap.

Smaller versions of the Swedish goshawk trap have been developed and successfully used to live-capture American kestrels. Additionally, a "double-chambered" small Swedish goshawk trap has been developed and used successfully to live-capture two American kestrels at a time during the same deployment period (Pitlik and Washburn 2016).

General use/set criteria
Swedish goshawk traps are particularly useful reducing the presence of raptors in large areas (such as an airfield), as many individual "live-traps" can be used simultaneously and trapped individuals can then be translocated away from the area.

Lures: rock pigeons (*Columba livia*) and European starlings (*Sturnus vulgaris*) are good lures because of their size, activity level (movement is important for attracting hawks and owls), non-protected species status, and ease of care. One or more lures should be placed in a bait cage or tethered to an anchor to increase their movement and attractiveness. Using different-colored pigeons creates an additional attractiveness for raptors. Rodents such as mice (*Mus musculus*), rats (*Rattus* spp.), and guinea pigs (*Cavia porcellus*) can also be effective lures. The trap should be placed in a location that allows for good

Photo: USDA, Wildlife Services. Biologist removing bird from trap for translocation.

visibility. Lure animals should be properly cared for and be provided food and water. Migratory birds may not be used as a lure without appropriate permitting (See MBTA, 16 U.S.C. §§ 703 – 712).

Trap check:

- **6hrs recommended**
- **12hrs maximum**
- **16hrs for nocturnal owls only**

Although trapping with this method is relatively slow, most birds that enter the trap are caught and do not escape. The best attribute of the trap is that it only needs to be checked at least every 12 hours or more frequently as weather conditions or other factors dictate. Swedish goshawk traps can be monitored in person, by camera, or by other remote-sensing technology such as trap transponders. Traps can be set overnight to target owls but must be checked within 16 hours.

References

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 *in* Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

Bub, H. 1991. (Translated by F. Hamerstrom and K. Wuertz-Schaefer). Bird trapping and Bird Banding; A handbook for trapping methods all over the world. Cornell University Press, Ithaca, New York, USA.

Kenward, R. E., M. Karlbom, and V. Marcström. 1983. The price of success in goshawk trapping. Journal of Raptor Research 17:84–91.

Meng, H. 1971. The Swedish goshawk trap. Journal of Wildlife Management 35:832–835.

Meredith, R. L. 1953. Trapping goshawks. Journal of the Falconry Club of America 1:12–14.

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

Pitlik, T. J., and B. E. Washburn**.** 2016. Non-lethal management of American kestrels: A case study at the Los Angeles International Airport. Proceedings of Vertebrate Pest Conference 27:244−247.

2a.3 Pole Trap

Commonly targeted species: medium/large buteos, medium/large owls and small falcons (Miller and Schlieps 2021). Pole traps (including modified foothold, noose poles and Verbail traps) have been used to capture most hawk species, several species of owl, and American kestrels (*Falco sparverius*) in North America.

Photo: USDA, Wildlife Services. Pole trap set.

Description

The term 'pole trap' is used to describe a variety of traps with the common denominator being that a trapping device is placed on a pole or structure that a raptor would perch on. Devices within the pole trap category include unmodified foothold traps, modified foothold traps, Verbail traps (Stewart et al. 1945), and perch snares (Prévost and Baker 1984, Dunk 1991).

Pole traps, as defined in this document, consist of a specially modified foothold trap secured to the top of a post or pole (using a wooden post, a metal pole, or PVC pole) to attract hawks and owls to use it as a hunting perch. When landing on the perch, the bird depresses the trap pan and the modified foothold trap jaws will firmly but safely capture the bird. The trap is secured to a 'slide' that allows the trap and captured bird to slip to the ground. It is *essential* that the bird is able to comfortably sit on the ground once captured to avoid possible injury. Foothold traps (a 1½ double-coil spring is a useful size) must be modified to weaken the strength of the trap to an appropriate level (i.e., removing or modifying one or more springs). Another valuable option is to replace the trap's springs with the wire springs from a rat snap-trap. The jaws of the foothold trap must be rubber padded or wrapped with surgical tubing and electrician's tape to protect the bird's legs. At least two swivels (preferably more) must be used in the trap's chain (i.e., one where it attaches to the trap itself and one where the chain 'loop' attaches to the slide) to prevent tangling. The chain of the trap is then attached to a pole, post, or other structure via a tether or slide that is long enough to allow the captured bird to safely descend to the ground. This description is not intended to be prescriptive. There are multiple ways to modify pole traps.

The Verbail trap was invented by Vernon Bailey (Stewart et al. 1945). The Verbail trap consists of a wire spring that throws a noose (typically made of cord) around the legs of a bird when pressure is exerted on the pan (Bloom et al. 2007). Verbail traps are difficult to find in the commercial market. These devices can be challenging to build.

General use/set criteria

Pole traps are effective especially where perching sites are limited (such as large, open grassland areas with no trees or structures). This trap should be considered if other traps are unsuitable and must only be used by experienced personnel as it can have an increased risk for potential injury. The use of pole traps may be prohibited in some states. Consult your state wildlife agency for regulations specific to your situation.

Lure: N/A; Lures or bait is typically not used with pole traps as the attractant is the perch location (typically as a vantage point for hunting raptors).

Trap check:

- **1hr recommended**
- **2hrs maximum**

Although trapping with this method is relatively slow, most birds that enter the trap are caught and do not escape. Pole traps can be monitored in person, by camera, or by other remote-sensing technology such as trap transponders. Birds must be removed and processed once they are known to be captured.

References

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 *in* Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

Dunk, J. R. 1991. A selective pole trap for raptors. Wildlife Society Bulletin 19:208–210.

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

Prévost, Y. A., and J. M. Baker. 1984. A perch snare for catching ospreys. Journal of Wildlife Management 48:991–993.

Stewart, R. E., J. B. Cope, and C. S. Robbins. 1945. Live trapping of hawks and owls. Journal of Wildlife Management 9:99–104.

2a.4 Bow Net Trap

Commonly targeted Species: accipiters, medium/large buteos, small falcons, owls and eagles (Miller and Schlieps 2021). The bow net trap has been used to capture most raptor species in North America, including red-tailed hawks (*Buteo jamaicensis*), short-eared owls (*Asio flammeus*), snowy owls (*Bubo scandiacus*), American kestrels (*Falco sparverius*), and eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos)*; additional permitting required for eagles (Eagle Act, 16 U.S. Code § 668c).

Description
The modern bow net trap (in concept and design) was originally developed in the Far East (likely in China) from the Chinese clap bow trap (Bub 1991). The modern bow net trap was likely first developed and employed in Europe (Meredith 1943).


Photo: USDA, Wildlife Services. Bow net set at airport with small rodent lure.

The modern bow net trap consists of two semi-circular bows made from light metal (e.g., aluminum), fiberglass poles, or plastic water piping with nylon netting strung loosely between them and attached to the bows. The two bows of the trap are connected at their bases with hinges and springs, which provide the mechanism for the trap to close. The lower bow is fixed to the ground using stakes or other means, and the upper bow is pulled over the lower stationary bow and latched into position. The attractant (e.g., bait or lure animal) is placed in the center of radius of the trap. When a raptor lands in the proper location, the trap is triggered mechanically (e.g., a person pulls a trigger line [Meredith 1943]) or electronically (e.g., by a remote-control unit [Jackman et al. 1994]). Bow nets with a 5 foot diameter are useful for most situations, although large bow nets with a 10 foot diameter are commercially available for use in live-capturing eagles and other large-bodied raptors.

Variations of the modern bow net trap include the E-Z catch trap (commercially available), the spring net trap (Kenward et al. 1983), the automatic live-trap for raptors (Tordoff 1954), and the German butterfly trap. These variations are self-triggering (that is, the raptor sets the trap off when it lands on or disturbs the bait (e.g., carrion) or attempts to get to the lure animal(s).

General use/set criteria
Bow net traps are particularly useful for reducing the presence of raptors in large areas (such as an airfield) where raptors are actively foraging. Individual raptors (e.g., snowy owls) are often targeted using bow net traps by setting up near where a bird is located. Bow net traps are particularly useful in minimizing the chances of non-target catches.

Lures: rock pigeons (*Columba livia*) European starlings (*Sturnus vulgaris*), house mice (*Mus musculus*), hamsters (Cricetinae) and gerbils (*Gerbillus spp.*). Rock pigeons (*Columba livia*), European starlings (*Sturnus vulgaris*), and small rodents are good lures because of their size, activity level (movement is

important for attracting hawks and owls), non-protected species status, and ease of care. One or more lures should be placed in a bait cage or tethered to an anchor to increase their movement and attractiveness. Using different-colored pigeons creates an additional attractiveness for raptors. The bow net trap should be placed in a location that allows for good visibility. Migratory birds may not be used as a lure without appropriate permitting (MBTA, 16 U.S.C. §§ 703–712.).

Trap check:

● Continuous monitoring

Unless the trap being used is self-triggering, these traps must be monitored continuously as the trapper activates the trap to capture the bird (either with a manual or electronic trigger). Self-triggering bow net type traps need to be checked at least every three hours or more frequently as weather conditions and other factors dictate. Bow net traps can be monitored in person, by camera, or by other remote-sensing technology such as trap transponders. For the welfare of the bird, it is critical to ensure the raptor is centered in the bow net. If the raptor is large with respect to the size of the bow net ensure that its wings are closed just prior to capture. Raptors can be seriously injured or killed if struck while the trap is closing.

References

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 *in* Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

Bub, H. 1991. (Translated by F. Hamerstrom and K. Wuertz-Schaefer). Bird trapping and Bird Banding; A handbook for trapping methods all over the world. Cornell University Press, Ithaca, New York, USA.

Jackman, R. E., W. G. Hunt, D. E. Driscoll, and F. J. Lapsansky. 1994. Refinements to selective trapping techniques: a radio-controlled bow net and power snare for bald and golden eagles. Journal of Raptor Research 28:268–273.

Kenward, R. E., M. Karlbom, and V. Marcström. 1983. The price of success in goshawk trapping. Journal of Raptor Research 17:84–91.

Meredith, R. L. 1943. Methods, ancient, medieval, and modern for the capture of falcons and other birds of prey. Pages 433–499 *in* Wood, C. A. and F. M. Fyfe, editors. The art of falconry. Stanford University Press, Stanford, California, USA.

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

Tordoff, H. B. 1954. An automatic live-trap for raptorial birds. Journal of Wildlife Management 18:281–284.

2b. Specialized Capture Methods

2b.1 Dho-gaza

Commonly targeted Species: medium/large buteos, small/medium falcons and small/medium/large owls (Miller and Schlieps 2021).

Lures: great horned owls (*Bubo virginianus*), house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), rock pigeons (*Columba livia*), small rodents), and rodents such as mice (*Mus musculus*), hamsters (Cricetinae) and gerbils (*Gerbillus spp.*). Migratory birds, live or mounted, may not be used as lures without appropriate permitting (MBTA, 16 U.S.C. §§ 703–712.).

Photo: USDA, Wildlife Services. Dho-gaza deployed with a small bow net trap.

The dho-gaza trap consists of a nylon net (see sizes below) stretced between two poles (Bloom et al. 2007). The net is attached to poles with a "break away" or other device on the side between the net and pole such as a clothespin or paper clip. The net should fall away from or slide down the poles when a raptor flies into the net. A line with an attached weight is fastened to a lower corner of the net to secure it. Birds generally approach into the wind so the net should be set up cross wind (e.g., at a right angle) to the prevailing wind with lure on the opposite side. Trap specifications for targeted raptors: large raptors – 7 feet × 18 foot, 4 inch mesh net; medium raptors – 2 foot × 4–5 feet, 4 inch mesh net; and for small raptors - 2 foot × 4–5 feet, 2.5-inch mesh net.

References

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 in Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

2b.2 Modified Australian crow trap

Commonly targeted species: crows (*Corvus* spp.), common ravens (*Corvus corax*), magpies (*Pica* spp.). Modified to catch starlings (*Sturnus vulgaris*), blackbird spp., sparrow spp. and other passerines **(**Miller and Schlieps 2021**).**

Lures: captured target birds, food/water

The modified Australian crow trap is a cage style, multi-capture trap with a wooden frame and wire sides. The "drop-in" V top entrance is modified to a 1.75 inches. opening to target starlings/passerines. See the link in references for trap specifications and construction (Gadd 1996, Johnson and Glahn 1994). The trap is best used in an area with high target species activity and/or when the target species is starting to flock, as the attractiveness (thus effectiveness) of the trap increases as more individuals are captured and remain in the trap thereby increasing interest in the trap. It is important to provide regular and adequate care (perches, food, and water) for captured birds.

Photo: USGS, Bird Banding Lab. Modified Australian Crow Trap.

References

Gadd, Pierre Jr. Use Of The Modified Australian Crow Trap For The Control Of Depredating Birds In Sonoma County. 1996. Proceedings of the Seventeenth Vertebrate Pest Conference 1996. 20. https://digitalcommons.unl.edu/vpc17/20

Johnson, Ron J. and James F. Glahn, European Starlings. 1994. The Handbook: Prevention and Control of Wildlife Damage. 72. https://digitalcommons.unl.edu/icwdmhandbook/72

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

2b.3 Waterfowl swim-in trap

Commonly targeted species: waterfowl.

Lures: bait (corn, milo, grains)

The waterfowl swim-in trap is a baited trap generally consisting of welded wire supported by rods with netting or chicken wire covering the top. Waterfowl swim through a funnel opening that allows the bird to easily pass through into the trap. The tapered access makes exiting the trap difficult. Extra caution should be used to prevent predation as birds are readily visible once trapped. Adding a float or platform inside the trap area is recommended to give the birds an option to rest. If available, existing structures such as stumps can be used as a resting structure.

Photo: USDA, Wildlife Services. Waterfowl in a baited swim-in trap.

References:

North, Norman R. and Randy J. Hicks. 2017. North American Bander's Manual for Waterfowl (Family – Anatidea).North American Banding Council. (41 Pages).

2b.4 Net Launcher/Cannon Net

Commonly targeted species: any bird species that can be baited or approached.

Lures: pre-bait/bait, lure animal (depending on target species)

Net launchers are stationary devices that use a blank rifle cartridge(s), compressed air, or gunpowder (i.e., an explosive charge) to propel a net over an individual or flock of birds. These devices propel heavy metal weights attached to the net over the intended target(s). Practice and experience using these devices is essential to maintain the safety of both the target birds and the personnel involved. Because rocket and cannon nets involve the use of explosives, individuals should be highly trained and certified prior to the use of these tools.

Photo: USDA, Wildlife Services.Net being deployed for a demonstration.

Photo: USDA, Wildlife Services. USDA Biologist setting net for deployment.

2b.5 Net Gun

Commonly targeted species: any bird species that can be baited or approached.

Lures: bait (depends on target species).

Net guns are similar to net launchers but are smaller and mobile, allowing the user to strategically target single birds (e.g. those causing problems). Net guns use compressed gas (e.g., carbon dioxide) or a blank rifle cartridge to deploy the net. To be used successfully and effectively, net guns require considerable training and practice. The operator should take care removing the bird from the net and placing it in an appropriate carrier.

Photos: USDA, Wildlife Services. Net gun after net has been deployed (Above). Net gun being used to capture a Canada goose (Branta canadensis) (Top Right). Hand-held net gun example (Bottom Right).

References

Caudill, D., G. Caudill, K. D. Meyer, G. M. Kent, J. Tarwater and E. Butler. *A Pneumatic Net Gun Method for Capture of Great Egrets (Ardea alba)*, Waterbirds, 37(4), 457-461, (1 December 2014).

2b.6 Padded Foothold Trap

Commonly targeted species: pelicans (*Pelecanus* spp.), herons (*Ardea* spp.), cormorants (*Phalacrocorax* spp.), new world vultures (*Cathartes aura* and *Coragyps atratus*), bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), and common ravens (*Corvus corax*).

Lures: fish/carrion (state laws may apply) or feeding/loafing sites (blind set)

Foothold traps can be modified for safe use in capturing eagles by reducing spring tension, adding padding to the trap's jaws, and installing multiple swivels and springs between the trap and anchor. For eagles, trap size No. 2 (no larger than No. 3) can be used if modified appropriately. Multiple traps are generally placed around a food source. Padded footholds can also be used to target pelicans, cormorants and herons (King et al. 1998). Modify the trap by replacing springs with weaker #1.5 trap coil springs (For details on traps, see Association of Fish and Wildlife Agencies 2006). To minimize potential injury when the captured bird lunges, replace the factory chain with aircraft cable and an elastic shock cord. Traps can be set on transects in areas with high bird activity. Eagles are protected by the Migratory Bird Treaty Act (MBTA, 16 U.S.C. §§ 703-712) and receive additional protection under the Bald and Golden Eagle Protection Act enacted in 1940 (Eagle Act, 16 U.S. Code § 668c).

Photo: USDA, Wildlife Serivces. Padded foothold traps can be set around white-tailed deer (Odocoileus virginianus) carrion to capture eagles (left.) This trapping technique requires constant onsite visual monitoring. Close up view of padded foothold trap set to capture eagles (top right.) Foothold modified to safely capture an eagle. Note multiple swivels and spring in between trap and anchor (bottom right.)

References

Association of Fish and Wildlife Agencies. 2006. Best Management Practices for Trapping in the United States. AFWA 2006. https://www.wildlife.state.nh.us/hunting/documents/trapping-bmps-intro.pdf

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 in Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

King, D. T., J.D. Paulson, D.J. LeBlanc and K. Bruce. 1998. Two capture techniques for American white pelicans and great blue herons. Colonial Waterbirds 21(2): 258-260.

2b.7 Vulture Walk-in Trap

Commonly targeted species: black and turkey vultures (*Coragyps atratus* and *Cathartes aura*).

Lures: live or fake vultures and/or carrion

Most any carrion can be used with an emphasis on quantity (e.g., the trap must contain enough carrion for it to be attractive) to increase effectiveness. A state permit might be needed if using a game species.

Photo: USDA, Wildlife Services. Vultures (Coragyps atratus and Cathartes aura) in walk-in style trap.

Vultures are trapped to alleviate livestock depredation (primarily cattle, but also sheep, pigs, and goats), to address various types of property damage (both residential and non-residential buildings, structural components of buildings, motor vehicles, boats, farm and construction machinery, electrical/utility structures, vegetation including shrubs/trees/turf, etc…), to protect human health and safety and to prevent wildlife hazards at airports.

When addressing vulture damage, an integrated approach should be used that includes lethal and non-lethal techniques. In most cases, non-lethal methods (e.g., habitat manipulation – mainly trash/carcass management, harassment, effigies, etc.) and/or harassment shooting coupled with effigies and limited lethal removal by firearm can be used prior to trapping efforts. Trapping is labor intensive and thus generally not the first management choice. Traps can be used to target the depredating bird(s) by setting enclosures on site or adjacent to where the damage is occurring. Managing the length of trapping and baiting must be done thoughtfully to prevent creating a food source that exacerbates the depredation problem.

There are several styles of walk-in traps that are effective for live capturing vultures (Bub 1978). The size of the cage depends on the number of vultures targeted for trapping. The enclosure can be square, rectangular, or circular. To catch 1-2 birds, traditional large cage traps (dog size) can be used. When trapping larger flocks, enclosures can be made with livestock panels; when the trap is set the dimensions are 30 feet Long x 10 feet. Width x 6 feet High. Netting or wire should be used to cover the enclosure's top to prevent vultures from flying out. Traps should be staked and tied down to ensure they are stable and secured. Once trapping is complete, remove all food.

Birds are contained in the enclosure via a drop gate/door, a funnel door, or drop-in entrance. Drop gate/doors can be rigged to deploy remotely and trapping programs often employ cellular (real-time) camera technology to monitor when to close the trap. A funnel door style trap has a funnel-shaped door on one side of the enclosure that allows birds to enter. Vultures walk into the trap through a narrowing funnel that is difficult to exit once inside. Drop-in entrances are made by creating gaps in the top of the trap that are 8-11 in. wide, allowing vultures to "drop in" to access food.

Ideally the site should be pre-baited (2-3 weeks) to let birds acclimate to the trap. Success may be increased by placing the trap close to a roost or near perching trees that allow the birds to stage prior to entering the trap. Secluded trap sites may produce better results.

Capturing non-target species can be avoided using remote cameras to monitor and close the trap door (i.e., the door is closed only when targets are present in the trap). If captured, non-targets should be quickly removed.

Trap Check

Traps should be physically checked daily or monitored with a remote camera.

Traps should be predator proof and be provisioned with enough food and water to last between trap checks (Bub 1991). Remotely operated gates can be used while crew is onsite to reduce time birds are held. The longer birds are in a trap, the greater the chance they will escape or may be injured. Traps should be placed in a shaded area or fabric can be placed on top of the trap to provide protection. Water should be available inside the trap and perching and/ or roosting devices can be added if birds will be held longer than eight hours.

References

Bub, H. 1991. (Translated by F. Hamerstrom and K. Wuertz-Schaefer). Bird trapping and Bird Banding; A handbook for trapping methods all over the world. Cornell University Press, Ithaca, New York, USA.

2b.8 Mist Net

Commonly targeted species: most birds can be targeted with mist-netting techniques when appropriate mesh size is used.

Lures: food, recorded calls, decoys, or travel corridors to nests or openings Mist nets are one of the most common trapping techniques for capturing birds for banding and research purposes. Mist nests may be appropriate in certain, unique depredation situations. Use of mist nests for depredation should target capture of specific individuals. Mist nets consist of at least two poles with specially designed mist nets secured between them. The set up resembles a volleyball net. Poles must be tall enough to support the net and thin enough to easily push into the ground (or use supports; usually good poles to use have a minimum height of 10 ft. and diameter of 1 in. or less). Use of mist nets is especially effective for passerines. Nets can be sized and set to target most any bird species including raptors. Be sure to choose the appropriate mesh size for targeted birds (Bloom et al. 2007). Mist nets need to be checked frequently. Close nets properly when not in use.

Photo: USDA, Wildlife Services. Biologist removing immature Cooper's hawk (Accipiter cooperii) from mist net set to capture raptors.

References

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 in Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

3. HANDLING

All migratory birds must be handled and cared for in a humane and healthful manner (50 CFR 13.41). This includes utilizing appropriate trap and methodology, extracting birds from traps, retaining in possession, transporting, and releasing birds back to the wild.

3a. Trap checks

Birds must be properly cared for once captured. The longer a bird is in a trap, the more opportunity for the bird to injure itself, be predated upon, escape, or for other unforeseen situations to arise. For live-trapping methods where continuous, in-person monitoring is not required, traps may be checked remotely using cameras, trap transponders, or other technology. Hazing techniques should not be used directly around bird traps, as active hazing of a confined bird is considered inhumane. It is important to follow all migratory bird permit conditions (i.e., trap check times).

3b. Extracting migratory birds

Birds must be handled with care by personnel who are trained and understand bird physiology. Bird physiology is fundamentally different from mammals. Greater care is needed to prevent damage to feathers, breaking of bones, and to ensure the ability to breathe. To protect yourself and the bird, always wear appropriate personal protection equipment when handling birds, especially raptors. To extract a birds from a trap:

1. Consider wearing gloves (for handler's personal safety from raptor talons and spread of disease). If possible, position your hands along the side of the body and gently press to secure the wings of the captured bird(s).
2. Always be aware of the bird's feet. Use appropriate hold for the particular species (Arent 2007).
3. Ensure the nasal openings remain clear and open. Ensure that trap netting is kept away from the eyes and detangled from the tongue. To aid in calming birds, place clean fabric, such as a towel, pillowcase, or t-shirt to cover the head. Trained personnel may use hoods.
4. Conduct injury evaluation and if authorized banding/marking.
5. For transporting raptors, place the bird feet first into a top-loading carrier. If possible, position the bird on its side and roll the bird into a standing position as you let go to control the lid. This technique will help prevent the raptor from prematurely exiting the container. If placing a raptor into a front-loading structure such as a plastic pet carrier, place the bird head-first to protect its tail feathers.

3c. Evaluating birds for injury or disease

Wildlife professionals regularly interact with raptors in field settings, including live-capturing and handling birds for purposes of scientific collection, banding and marking, depredation mitigation, and other practices. Occasionally raptors may be found with indication of a disease or injury, or they may become injured during these procedures - leaving investigators or wildlife technicians unsure about how to effectively handle the situation and with the question of whether the injury or disease condition such that the bird should be released (with or without minor treatment), transported for veterinary care and rehabilitation, or be euthanized? Beyond compliance with regulatory issues and permit restrictions, wildlife professionals should employ the fate that is in the bird's best interest (i.e., what is most

humane).

The Minnesota Raptor Center and USDA APHIS Wildlife Services have developed a Raptor Trauma Scoring System using both pictures and text to describe the most common traumatic injuries with discriminating criteria for grading the extent of injuries and prognoses. This resource, along with other information in this document, could help personnel triage raptors in the field and allow them to determine whether to release, transport, or euthanize a bird. Coupled with training in the recognition of common injuries and illness, basic wound care and bandaging, and best practices for transportation and euthanasia, wildlife professionals can be better prepared for unforeseen situations, have confidence in their decision making, and overall improve the welfare of raptors.

3d. Banding and auxiliary marking

Banding is the practice of applying a metal U.S. Geological Survey (USGS) issued band (with unique number) or a tag on some part of the bird, usually the leg. Consider banding birds before releasing. Bands and band recovery (reporting a band) allow biologists to learn about bird migration, survival rates, life span, habitat use, and other life history information. When translocating birds for depredation purposes, banding is extremely useful to determine whether relocated birds are returning to the trap site. This can help inform decisions about appropriate relocation distances.

A Federal Bird Banding and Marking Permit (50 CFR 21.70) is required by the BBL whenever someone wants to band or apply a marker on a wild bird protected by the Migratory Bird Treaty Act (MBTA, 16 U.S.C. §§ 703–712) or the Bald and Golden Eagle Protection Act (Eagle Act, 16 U.S. Code § 668c). These federal banding permits can also authorize the use of auxiliary markers (i.e., color leg bands, radio transmitters, flags, and tags) along with federal bird bands to allow for identification of individuals at a distance. Additionally, permit holders can request permission for the collection of blood samples, feather samples, and mouth swabs from birds that are also banded and/or marked. The USGS BBL, Eastern Ecological Science Center, handles all banding and marking applications.

USGS general permit information can be found here: General Permit Information | U.S. Geological Survey (usgs.gov)

Federal bird banding permittees are required to manage their data for banded birds and electronically submit their data to the BBL as soon as data is collected. The BBL provides an application to facilitate the transmission of banding data to the BBL.

Consult the BBL Bander Portal for the application: BBL Bander Portal

3d.1 Reporting bands

If you catch a bird that is already banded, the band should be reported online at USGS Bird Banding Laboratory (www.reportband.gov). Reporting bands helps the BBL populate more complete data sets on bird behavior, ecology, and survival. Effort should be made to report all recovered bands.

3e. Carriers & transport

This section regarding carriers and transport for captured birds applies to all dispositions except release at the capture location and euthanasia.

3e.1 Carriers

The goal when housing live birds is to provide maximum comfort and well-being in a safe and secure manner. Appropriate carrier for transporting birds depends on the duration the bird will be in the enclosure, bird species, and other factors (e.g., environmental conditions, disturbance). Containers must be clean, secure, and allow airflow. Corrugated plastic folding pet crates are an excellent option, as they are properly ventilated, smooth-walled, easy to clean, and fold flat for storage. Other options are smooth-walled pet carriers or properly ventilated cardboard boxes or plastic tubs.

The following is an overview of factors to consider in transport carriers for captured birds. For a detailed description of requirements, see "Chapter 9: Transporting Raptors" in Arent (2007).

1. Size. Transport carriers should be large enough that birds both do not touch any part of the enclosure when wings are closed and can make positional adjustments. Birds should have sufficient head and tail clearance and ability to move without damage to feathers. While enclosures being too small is often the concern, too large an enclosure can result in excessive activity and lead to injury. In general, recommended carrier sizes are as follows:

    a. Small raptors (e.g., American kestrel, sharp-shinned hawk): 12"L x 8"W x 10"H
    b. Medium raptors (e.g., Cooper's hawk; peregrine falcon): 20"L x 12"W x 14"H
    c. Large raptors (e.g., Harris's hawk, red-tailed hawk): 26"L x 14"W x 14"W
    d. Extra Large raptors (e.g.,black vulture, osprey): 30"L x 14"W x 20"H
    e. Eagles (i.e., bald or golden): 34"L x 20"W x 22"H

2. Material. Carriers must have smooth interiors. Tight fitting outdoor carpet can be used to line the bottom of the carrier. This provides the bird something to grasp during transport if perches are not available. Never use wire cages as wire can cause serious injury and/or feather damage. Visual stimulation should be minimized to keep the bird calmer. If a plastic or soft-sided dog carrier is used, cover the door and sides with loose newspaper, dark netting (e.g. mosquito netting), or burlap to allow for air flow.

3. Supplies. Food, water, and perches are not generally recommended in carriers for transporting untrained birds. If a bird is not sitting comfortably and is a perching species, perches may be offered. If transport is more than 8 hours, ensure there is an opportunity for water.

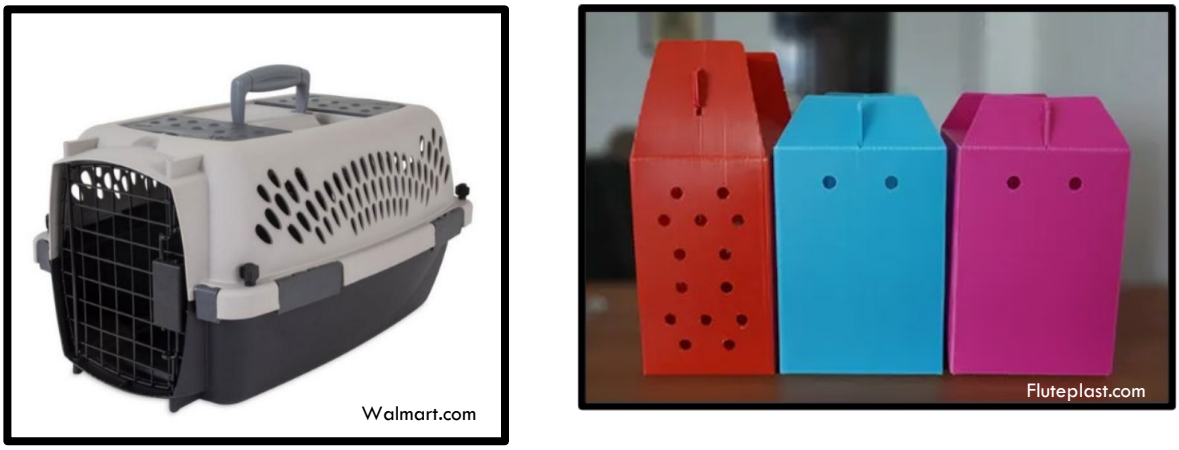


Photo: USDA, Wildlife Services. Examples of carriers suitable for raptor transport. (Left) traditional pet carrier. (Right) Corrugated plastic carriers. These come in a variety of sizes and collapse, making for easy storage. Carriers can also be custom-built for raptors. These name brands are not endorsed.

4. Transport Vehicles. If the carrier has a perch, place the carrier so the bird is perpendicular to the line of motion; this is easier for birds to balance. Birds can easily overheat, especially confined in carriers as air is more stagnant. It is important to ensure the temperature in a carrier does not exceed 80° F. In general, birds in carriers should not be left unattended in uninsulated spaces during warm weather. In warm weather birds should be in shaded, insulated spaces, preferably an air-conditioned vehicle. The use of a thermometer to monitor ambient temperature near where the birds are kept are encouraged.

5. Do not house more than one bird in a single carrier. Exceptions include flocking species and nestlings/non-flighted young; Always have appropriate gloves for handling the birds and contact information of one or more federally permitted rehabilitators in case you have questions.

3e.2 Duration in carriers

It is best to release birds within 24 hours of capture. Birds may remain in transport carriers up to 72 hours. Any birds held longer than 72 hours should be housed in an enclosure as described below.

3e.3 Enclosures

When raptors need to be held longer than 72 hours prior to release, it is best to house them in an enclosure. Any enclosure other than carriers must be approved as part of a federal depredation permit (MBTA, 50 CFR 21.00). Enclosures should be designed and sized in accordance with "Release Conditioning" in Miller and Schlieps (2021), including being predator and vermin-proof and free from disturbance by humans, pets, or other animals.

Enclosures may be constructed on-site, constructed off-site, or loaned from another permittee (such as a falconer or rehabilitation permit). The following information must be listed on the depredation permit if enclosures are used (See section 5b for more details):

1. Location of enclosure (e.g., physical address)
2. Description of enclosure (e.g., dimensions, materials, photographs)
3. Qualified subpermittee(s) who will be providing care for the bird

3e.4 Other Considerations

Subpermittees, including individuals who hold other permits (e.g., rehabilitators or falconers), must be authorized under the depredation permit to care for depredating birds (See section 5b for further details). This can be on the face of the permit or with a subpermittee designation letter. All birds remain under the depredation permit authority until they are released, irrespective of where they are housed. It is the responsibility of the depredation permit holder to appropriately compensate subpermittees for the costs of care (e.g., staff time, food, cleaning, etc.).

Costs, including transport, care, conditioning, and release of birds, should be the responsibility of the depredation permittee. Permittees are also responsible for costs associated with raptors injured during capturing, transport, or translocation.

States may require permits for or otherwise restrict crossing state lines for the purposes of translocating migratory birds. Coordinate with the appropriate state agencies regarding necessary authorizations prior to initiating trapping.

"Any live wildlife possessed under a permit must be maintained under humane and healthful conditions" (50 CFR 13.41). This applies to any bird in hand from the time it is live-trapped to the time of final disposition. The goal when housing live birds is to provide comfort and well-being in a safe and secure manner. When birds are being transported for release, housing requirements differ depending on the duration a bird is in captivity.

4. DISPOSITION OF MIGRATORY BIRDS

When capturing, handling or disposing of a bird is under consideration, the desired outcome for the bird(s) should be determined prior to initiating capture. Personnel in charge of capturing should be familiar with the range of possible dispositions and determine an intended outcome and disposition for the bird(s) given the circumstances that warrant capture. Once an individual bird is captured, key questions should be asked to aid in deciding the most appropriate disposition for that individual. See Section 5.b.2 for guidance on determining disposition. Please note the guidance in Section 4a-4d of this report are specific to raptors.

4a. Non-target species

Non-target birds (birds not listed on the permit) that are captured and not associated with the conflict must be checked for injuries, banded (if a bird bander holding a permit and appropriately sized bands are available), and immediately released on-site. If the non-target individual is associated with a conflict, contact federal and state permitting offices to discuss possible solutions.

4b. Options for disposition

Common types of disposition of birds include releasing on-site, transporting for medical care, temporarily holding (less than 72 hours) and translocating away from the capture location, placing with an authorized entity, or euthanizing the bird.

4b.1 Release

Whenever possible, live-captured birds should be released into the wild. This includes releasing without transport (e.g., on-site of capture) or with transport (e.g., released at a different location). See section 4.c for determining disposition.

4b.2 Medical care

Licensed veterinarians and wildlife rehabilitators are federally authorized to provide medical care to migratory birds. Generally, a licensed wildlife rehabilitator is the best place to take sick, injured, or orphaned birds. The National Wildlife Rehabilitators Association (NWRA) has an online reference to locate a rehabilitator within each state (NWRA Find A Rehabilitator Link). Licensed veterinarians may accept and triage birds if transport to a wildlife rehabilitator is not feasible.

The medical care provider is responsible for determining the fate of the injured bird. If birds are suitable for release within 24-hours, the permittee may release the bird. If birds require care for longer than 24-hours, the bird may be admitted to rehabilitative care. When being admitted for rehabilitative care, the care of the bird is formally transferred from the jurisdiction of the depredation or scientific collection permit to the jurisdiction of the rehabilitation permit and this change in jurisdiction should be noted on the respective annual reports. If the injury to a bird is due to the actions of the permittee, the permittee should off-set the costs of rehabilitative care. Birds transferred to rehabilitative care count toward the lethal take under the appropriate permit (50 CFR 13.41).

Live-captured birds that do not require rehabilitative care (i.e., are not injured) may NOT be transferred to a rehabilitator. However, rehabilitators may provide enclosures and/or care as sub-permittees under a permit (See Section 4e.4).

4b.3 Placement

Releasing a captured bird may not alleviate the conflict or be feasible. One option to consider is placement. Placement is the act of transferring a bird to a permanent captive facility. Authorization is required for placement. The success of transferring a bird or placing a bird in a captive facility varies with certain species and age classes. This option must be discussed with the appropriate USFWS MBP Office prior to conducting any live-capture activities. Birds transferred to placement count toward the lethal take under the appropriate permit (MBTA, 50 CFR 13.41).

4b.4 Educational use

Non-releasable birds may be placed with a federally permitted educator for educational use (MBTA, 50 CFR 21.27). Authorization must be requested from the Migratory Bird Permit Office PRIOR to placing a bird as non-releasable. The USFWS MBP Offices can assist in identifying potential educators.

4b.5 Falconry use

Some states allow the placement of raptors with state-permitted falconers. Placement counts towards the wild take authorization for the falconer. Most states require prior approval before the transfer occurs. Contact your state falconry permit specialist for more information.

4b.6 Euthanasia

Not all individuals birds are suitable for life in captivity. Certain species and temperaments are prone to stress and injury in captivity. In those circumstances, euthanasia may the most humane disposition for a live-captured bird, rather than placement in captivity. To ensure euthanasia methods are humane and properly selected, we strongly recommend following the American Veterinary Medical Association (AVMA) guidelines for the euthanasia of animals: AVMA guidelines for the euthanasia of animals

Birds euthanized count toward the lethal take under the depredation permit (MBTA, 50 CFR 13.41).. All remains of euthanized birds must be disposed of in accordance with the permit conditions. Permits typically authorize donating to an entity authorized to receive migratory birds or their parts (e.g., science, education, or non-eagle repository) as well as destroying in accordance with federal, state, and/or local laws and ordinances. Permittees may request authorization to retain bird remains for training purposes and/or use as effigies.

4c. Determining disposition (in all scenarios)

There are many factors that should be considered to determine the disposition of captured migratory birds. The following list highlights questions to address. The answers will help guide the decision process for disposition. This list is not intended to be all inclusive. There may be additional factors to consider.

4c.1 Resource protected/urgency

What is the resource being protected and the urgency to protect that resource by disposing of a captured migratory bird? It is most important to ensure birds are removed for the following reasons:

- To protect a high value resource, such as human life
- To stop an established pattern with evidence of damage (not just a threat)
- To stop damage when it is extensive relative to others experiencing the same type of damage

4c.2 Species

What is the status of the species being taken? It is important to protect birds that are/have the following status or background:

- Species of national conservation concern or similar state or tribal status
- Species with restricted or declining local, regional, or national populations
- Species of cultural or local significance
- Species that have shown success with mitigation translocation in the past

4c.3 Seasonality

In what season is the individual bird captured? Consider the following factors to make this determination (Bowden et al. 2018, Washburn et al. 2021):

- Migratory seasons – translocation is most likely to be successful during these transition seasons.
- Breeding season – Translocation of sub-adult birds may be successful. Translocation of adults is unlikely to be successful because adults frequently return to the capture location (Pullins et al. 2018). Translocation of a breeding adult that is tending a a nest will likely result in the death of the eggs or chicks.

- Wintering season – translocation of birds outside of migration and breeding season is dependent upon what resource is bringing them to the area and the abundance of that resource elsewhere (e.g., food, shelter, etc.)

4c.4 Age

What is the age of the individual bird captured? Consider the following in determining age of a captured bird:

- Is it possible to assign an age class (e.g., plumage or morphometric measurements)?
- Is it a juvenile or sub-adult?

Published research has shown that the age of the bird often influences the probability that a raptor will return to the capture location following a mitigation translocation event (Schafer and Washburn 2016, Biteman et al. 2018, Pullins et al. 2018). An adult is more likely to have an established territory that would compel it to return to the site of capture than a juvenile (e.g., hatching-year bird). It is essential for permit holders to determine if there is any current research on return rates for each species of interest.

4c.5 Sex

Is the migratory bird a male or female?
Is it possible to correctly assign the individual birds to sex classes (using plumage or morphometric measurements)?

For raptors, published research has shown that the sex of the bird does not influence the probability that it will return to the capture location following a mitigation translocation event (Pitlik and Washburn 2016, Biteman et al. 2018, Pullins et al. 2018), but this might not be true of all migratory bird species. It is essential for permit holders to determine if there is any current research on return rates for each species of interest.

4c.6 The individual

The overall health and disposition of the individual bird should be considered (i.e. welfare). Birds are less likely to be successfully translocated if the following occurs:

- The bird has a pre-existing injury or condition that would limit survival
- The bird sustained an injury during capture that would limit survival

4d. Release considerations

Much remains unknown on how best to release birds that have been capture and the fate of released birds. Agency personnel should balance what is best for the individual bird, the migratory bird resource, and management of the depredation problem (Washburn et al. 2021). There are several tradeoffs that must be considered and require flexibility and adaptive management. Consult appropriate land management and state agencies to concur on release locations to ensure there are no concerns.

4d.1 Distance

Intuition suggests that the further a depredating raptor is taken from the capture location, the lower the probability that the bird would return following a mitigation translocation event. However, published

research with several common raptors demonstrates that is not accurate for many species (Pullins et al. 2018). Examples of the minimal distances to move problematic birds include 50 miles for red-tailed hawks and 15 miles for American kestrels and Cooper's hawks. It is essential for permit holders to determine if there is any current research on return rates for each species of interest. Transporting a bird farther than necessary is not good for the individual, as they spend longer in captivity. In addition, driving longer distances than necessary may take staff away from hazing, trap monitoring, and other activities to protect migratory bird resources.

4d.2 Habitat

Translocated individuals should be released in areas dominated by vegetation communities and landscape features that are known to support the species of raptor being translocated. General habitat preferences for all North American raptor species can be found in the Birds of the World species accounts (Billerman et. al 2022; Birds of the World). Suitable release sites contain plentiful suitable prey and must be distant from risks and activities that can stimulate nuisance behavior (e.g., airports, poultry farms). Release sites are almost always already occupied by conspecifics; however, ideally, release sites should not be occupied by territorial breeding pairs of the same species, as these are likely to quickly displace translocated raptors.

4d.3 Aversive conditioning

Aversive conditioning MUST NOT be used for birds. Aversive conditioning (e.g., "roughing up") a confined animal is a mammal trapping practice that is used and sometimes may be appropriate for mammals. The physiology of birds is fundamentally different from mammals making them more prone to injury. It is easy to break bones or damage talons, eyes, or feathers, all of which impair or prevent a bird from surviving upon release. Additionally, many species of birds are different from mammals in their drive to return to certain sites, such as natal sites. The drive to return cannot be disrupted with aversive conditioning. There is no scientific research demonstrating a benefit to this practice for raptor damage management. Until such time as it is scientifically supported with a humane methodology, aversive conditioning must not be used.

4d.4 Display of birds

Birds may not be displayed to the public unless you are not delaying the release of the bird and use video equipment, barriers, or other methods to reduce noise and human exposure at a level the birds would normally encounter in their habitat (MBTA, 50 CFR 13.41).. Display activities beyond what is described requires additional authorization/permitting from the USFWS. You may not use any equipment or methods that would cause additional stress or harm to the bird. Compliance with the AWA must occur if using live birds for research, teaching, testing, experimentation, or exhibition purposes (AWA, 7 U.S.C. § 2143; U.S. Department of Agriculture, 2013; 9 CFR 2.31).

5. PERMITTING

Most species of native birds are federally protected. Over 1,000 species of birds are protected by the Migratory Bird Treaty Act of 1918 (MBTA, 16 U.S.C. §§ 703-712). The list of migratory birds protected can be found at 50 CFR 10.13 (10.13 list). A bird is protected if the species is listed, no matter if an individual bird is ecologically migratory, raised in captivity, or if it is a mutation or hybrid (50 CFR 21.3). The MBTA prohibits the take, possession, transportation, sale, purchase, barter, importation, exportation, and banding or marking of any migratory bird listed in 50 CFR 10.13. Take is defined as:

to pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt any of these activities (50 CFR 10.12). The MBTA prohibitions extend to live birds as well as all bird parts, nests, and eggs. Additionally, if using birds for exhibition/teaching purposes, these activities must be authorized on the USFWS issued permit(s).

Bald eagles and golden eagles receive additional protection under the Bald and Golden Eagle Protection Act (Eagle Act, 16 U.S. Code § 668c). The Eagle Protection Act prohibits the taking, possession, and transport of eagles and their parts, nests, and eggs. "**Take"** is defined in U.S. Code to mean: "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb." "**Disturb"** is further defined in 50 CFR 22.3 to mean: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

USFWS authorization is required for most activities involving capturing, handling or disposition of wild birds. It is also important to check the state and tribal laws protecting birds to determine their permitting requirements as well (Link to State Wildlife Offices). Federal permit conditions may differ from state, tribal and local government permit conditions. When federal, state, tribal, and local government permits differ, the more restrictive permit conditions must be followed. Consult with your respective agency/contact.

It is important to note that migratory bird depredation permits are intended to authorize a damage management action that targets the individual bird(s) that are causing the conflict. Depredation permits cannot be used for population management.

5a Depredation activities that do not require a permit

5a.1 Harassing migratory birds

A federal permit is not required to harass or scare migratory birds. A federal permit is not required to haze eagles, unless hazing may disturb eagles (as defined by the Bald and Golden Eagle Protection Act). The USFWS does not regulate the methods that may be used to harass migratory birds, except additional authorization may be required if using unmanned aircraft systems (UAS, e.g., drones) under the Airborne Hunting Act (50 CFR 19). Consult with the appropriate USFWS MBP Office for details. For any harassment method, care should be taken to ensure birds are not injured or killed due to harassment methods. The injury or death of a bird due to harassment constitutes take and is prohibited (MBTA, 50 CFR 21). Always check for potential state-specific requirements or regulations.

5a.2 Destruction and relocation of migratory bird nests that are not in-use

A permit is not required to destroy nests which are not in-use. A permit or other regulatory authorization is not required under the MBTA to destroy a migratory bird nest that is not in-use, provided no possession of birds occurs during or after the destruction. A nest not in-use is defined as one that is empty (no viable eggs or birds), contains non-viable eggs, or is being built but does not yet have an egg in the nest. This rule does not apply to bald eagle or golden eagle nests because they are protected under the Bald and Golden Eagle Act (Eagle Act, 16 U.S. Code § 668c). Additional federal authorization may be required for birds on the List of Endangered and Threatened Species (50 CFR

17.11) and/or additional state, territorial, or tribal authorization. There might be state restrictions or regulations regarding the removal of nests not in-use.

A permit is required to destroy an in-use nest (i.e., nest with eggs or birds). If an in-use nest must be removed, consult with the local USFWS MBP Office. This action would need to be written into a permit. A state or tribal permit might be required as well.

5a.3 Depredation, control, and conservation orders

A permit is not required for activities authorized by Depredation Orders, Control Orders, or Conservation Orders (50 CFR 21 Subpart D). However, many orders require submission of an annual report (Form 3-2436). A current list of orders can be found on the USFWS website providing FAQ for the Depredation Permit Application: (Depredation Permit FAQ)

5.b Depredation permits

5b.1 Migratory bird depredation permits - general

The USFWS issues depredation permits to authorize the capture or killing of migratory birds to reduce damage or loss caused by birds (50 CFR 21.100). Efforts must be made to resolve depredation issues prior to requesting a depredation permit, including implementation of non-lethal methods. Depredation permits authorize lethal take and/or capturing as part of an integrated program to resolve a depredation problem while reducing the need to take birds. State or tribal depredation permits might also be required. This may include permits for active nests that have young in them. Depredation includes agricultural damage, private property damage, threats to human health and safety (e.g., airports), and threats to recovery of protected wildlife. For more information, see the following:

Depredation Permit FAQ
Depredation ePermits Forms

The USFWS utilizes the WS Form 37 (USDA APHIS | Step-by-Step Guide to a Migratory Bird Depredation Permit) as part of the depredation permit application process. WS will assess each situation to help determine the need for the permit, the species involved, provide recommendations - both short and long-term to include methods to address the damage - and the number of migratory birds to be listed on the permit. All migratory bird permits issued by the USFWS require a WS Form 37 including those issued to USDA APHIS WS. Applicants interested in obtaining a USFWS migratory bird depredation permit may contact their respective WS state office to discuss information needed on the WS Form 37 (USDA APHIS | Contact Wildlife Services).

5b.2 Airport depredation permits

The USFWS has a specific migratory bird permit type called Airport Depredation (3-200-13 - Migratory Bird – Depredation (servicenowservices.com). These permits are issued under the same regulation and use the same forms as other depredation permits. However, the Airport Depredation permit has permit conditions specific to the activities conducted at airports.

An airport is the area of land or water that is used for the landing and takeoff of civil or military aircraft, including any buildings and facilities. Airport depredation permits are issued to the airport, as the entity experiencing the depredation. Wildlife Services or other individuals or entities may be identified as sub-permittees on an airport depredation permit.

5b.3 USDAAPHIS Wildlife Services statewide depredation permits

The USFWS also has a specific migratory bird permit type called "Wildlife Services Statewide Depredation". These permits are issued under the same regulation and use the same forms as other depredation permits. Wildlife Services State Offices apply through their respective regional USFWS offices for these permits. These permits have conditions specific to the activities conducted by USDA APHIS WS.

USDA APHIS WS may obtain a "statewide depredation permit to cover activities conducted in a particular state, with the exception of control for human safety purposes at airports" (Guidance for Issuing Migratory Bird Treaty Act Permits to Federal Agencies USFWS Memorandum 03 August 2001). Most depredation activities conducted at airports for human health and safety purposes should be conducted under an airport depredation permit issued to the individual airport, although in certain situations the statewide Wildlife Services Depredation permit may be used.

5b.4 Eagle depredation permits

The USFWS issues Eagle Depredation permits to authorize the hazing or capturing of bald eagles and/or golden eagles to reduce damage or loss caused (50 CFR 22.100). Depredation includes agricultural damage (e.g., livestock loss), private property damage, threats to human health and safety (e.g., airports), and threats to recovery of protected wildlife. Permits are required to live-capture eagles or if hazing activities may "disturb" eagles. For more information, see the following:

Eagle Depredation Permit FAQ
Eagle Depredation ePermits Forms

5b.5 Records and reporting

USDA APHIS Wildlife Services and USFWS MBP may request or require record keeping or annual reporting. This information cold be used to help inform future research, guidance, and conditions.

5c Related permits

There are a variety of state, tribal, and federal permits related to migratory birds. This guidance is not intended to be all inclusive.

5c.1 Banding and marking permits

A bird banding or marking permit is required to capture migratory birds for banding or marking purposes (50 CFR 21.70). Permits are issued by the USGS BBL (BBL website). The BBL permits specific capture techniques and tissue sampling (blood and feather) when these activities are done **in conjunction with banding or marking migratory birds only**. The BBL, however, does not permit depredation or transport/translocation activities in association with banding or marking. Permitted bird banders are required to submit their banding data to the BBL bird banding database and all recovered bands should be reported to the USGS website (USGS website) for inclusion in the band encounter database.

5c.2 Scientific collecting permits

A scientific collecting permit is required to take, transport, or possess migratory birds for scientific research purposes (50 CFR 21.73). Permits are issued by the USFWS. Depredation permittees may

apply for scientific collecting permits to conduct research relating to depredation activities, such as researching the effectiveness of methods. Researchers apply for scientific collection permits through their respective regional USFWS offices. State and tribal scientific collection permits might be required as well.

6. TRAINING

Interagency training may be developed by staff and subject matter experts from the USFWS MBP, USGS BBL, and USDA APHIS WS to support the "Humane Capture, Handling, and Disposition of Migratory Birds" guidelines.

Natural resources are held in the public trust and professional management of these resources is central to the wildlife profession. Agency personnel and other wildlife professionals that handle wildlife require a thorough understanding of available techniques, are expected to employ the correct methods, and be proficient in their use. Knowledge and skills training may be developed and offered in a variety of formats to ensure programs are established appropriately and successfully endure.

7. REFERENCES

Arent, L. R. 2007. Raptors in captivity: guidelines for care and management. Hancock House Publishers, Blaine, Washington, USA.

Association of Fish and Wildlife Agencies. 2006. Best Management Practices for Trapping in the United States. AFWA 2006. https://www.wildlife.state.nh.us/hunting/documents/trapping-bmps-intro.pdf

Berger, D. D., and F. Hamerstrom. 1962. Protecting a trapping station from raptor predation. Journal of Wildlife Management 26:203–206.

Billerman, S.M., B. K. Keeney, P. G. Rodewald, and T. S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. https://birdsoftheworld.org/bow/home

Biteman, D. S., D. T. Collins, and B. E. Washburn. 2018. Sunshine, beaches, and birds: Managing raptor-aircraft collisions at airports in southern California. Proceedings of Vertebrate Pest Conference 28:159−163.

Bloom, P. H., W. S. Clark, and J. W. Kidd. 2007. Capture techniques. Pages 221–236 in Bird, D. M., and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House Publishers, Blaine, Washington, USA.

Bowden, A., Hromack, R.J., Loftis, C.H., Spencer, A.D. and B.E. Washburn. 2017. Management of Wintering Short-eared Owls at Airports in the Lower Great Lakes Region.

Bub, H. 1991. (Translated by F. Hamerstrom and K. Wuertz-Schaefer). Bird trapping and Bird Banding; A handbook for trapping methods all over the world. Cornell University Press, Ithaca, New York, USA.

Caudill, D., G. Caudill, K. D. Meyer, G. M. Kent, J. Tarwater and E. Butler. A Pneumatic Net Gun Method for Capture of Great Egrets (Ardea alba), Waterbirds, 37(4), 457-461, (1 December 2014).

Clark, W. 1992. On the etymology of the name *Bal-Chatri*. Journal of Raptor Research 26:196.

Dunk, J. R. 1991. A selective pole trap for raptors. Wildlife Society Bulletin 19:208–210.

Jackman, R. E., W. G. Hunt, D. E. Driscoll, and F. J. Lapsansky. 1994. Refinements to selective trapping techniques: a radio-controlled bow net and power snare for bald and golden eagles. Journal of Raptor Research 28:268–273.

Johnson, R. J. and J. F. Glahn, European Starlings. 1994. The Handbook: Prevention and Control of Wildlife Damage. 72. https://digitalcommons.unl.edu/icwdmhandbook/72

Kenward, R. E., M. Karlbom, and V. Marcström. 1983. The price of success in goshawk trapping. Journal of Raptor Research 17:84–91.

King, D. T., J.D. Paulson, D.J. LeBlanc and K. Bruce. 1998. Two capture techniques for American white pelicans and great blue herons. Colonial Waterbirds 21(2): 258-260.

Meng, H. 1971. The Swedish goshawk trap. Journal of Wildlife Management 35:832–835.

Meredith, R. L. 1943. Methods, ancient, medieval, and modern for the capture of falcons and other birds of prey. Pages 433–499 *in* Wood, C. A. and F. M. Fyfe, editors. The art of falconry. Stanford University Press, Stanford, California, USA.

Meredith, R. L. 1953. Trapping goshawks. Journal of the Falconry Club of America 1:12–14.

Miller, E. A., and J. Schlieps, editors. 2021. *Standards for Wildlife Rehabilitation*. National Wildlife Rehabilitators Association: Bloomington, MN. 419 pages.

North, N. R. and R. J. Hicks. 2017. North American Bander's Manual for Waterfowl (Family – Anatidea). North American Banding Council. 41 Pages.

Prévost, Y. A., and J. M. Baker. 1984. A perch snare for catching ospreys. Journal of Wildlife Management 48:991–993.

Pitlik, T. J., and B. E. Washburn**.** 2016. Non-lethal management of American kestrels: A case study at the Los Angeles International Airport. Proceedings of Vertebrate Pest Conference 27:244−247.

Pullins, C. K., T. L. Guerrant, S. C. Beckerman, and B. E. Washburn. 2018. Mitigation translocation of red-tailed hawks to reduce raptor-aircraft collisions. Journal of Wildlife Management 82:123–129.

Schafer, L. M., and B. E. Washburn**.** 2016. Managing raptor-aircraft collisions on a grand scale: Summary of a Wildlife Services raptor relocation program. Proceedings of Vertebrate Pest Conference 27:248−252.

Stewart, R. E., J. B. Cope, and C. S. Robbins. 1945. Live trapping of hawks and owls. Journal of Wildlife Management 9:99–104.

Tordoff, H. B. 1954. An automatic live-trap for raptorial birds. Journal of Wildlife Management 18:281–284.

Washburn, B. E., C. K. Pullins, T. L. Guerrant, G. J. Martinelli, and S. F. Beckerman. 2021. Comparing management programs to reduce red-tailed hawk collisions with aircraft. Wildlife Society Bulletin 45:237–243.

Appendix 1: Definitions

AWA: Animal Welfare Act. Federal law that regulates the treatment of certain animal species used in research, education, and exhibition.

CFR: Code of Federal Regulations. The rules and regulations published in the Federal Register by the executive departments and agencies of the federal government of the United States; once published they become a permanent part of the federal regulations.

Depredation: An act causing damage or destruction on a specific species of wildlife or property (including livestock). For this policy, "depredation" or "depredating bird" will indicate a bird causing damage or destruction to property, preying upon special-status species.

IACUC: Institutional Animal Care and Use Committee (often required by AWA). IACUC governs the care and use of animals in research and education, and the roles and responsibilities of individuals in institutional animal care and use programs. IACUC is required to be established at all academic institutions that use animals for federally funded research, including but not limited to universities and laboratories (Animal Welfare Act, 7 U.S.C. § 2143; U.S. Department of Agriculture, 2013; 9 CFR 2.31). Institutions must have applicable IACUC coverage, when conducting training with live birds or research.

Inclement weather: Severe or harsh weather conditions relative to the local climate. Examples include periods of extreme temperatures (less than 32°F or more than 90°F) or during heavy precipitation events (i.e., rain, snow).
Lure animal: Any live animal that is used in a humane manner to attract and capture avian predators.

MBTA: Migratory Bird Treaty Act of 1918 codified at 16 U.S.C. §§ 703 – 712.

Relocation: The intentional movement of an animal to another part of its home range. For example, catching a Cooper's hawk within a building and releasing it outside.

Take (MBTA): To pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.

Translocation: The intentional movement of an animal a considerable distance outside of its home range, either to establish a new population or to resolve a conflict.

U.S.C.: United States Code. A consolidation and codification of the general and permanent laws of the United States.

Appendix 2: Web Links and Addresses (in order of appearance)

General Permit Information | U.S. Geological Survey (usgs.gov) : https://www.usgs.gov/labs/bird-banding-laboratory/science/general-permit-information

BBL Bander Portal : https://www.usgs.gov/labs/bird-banding-laboratory/science/bander-portal

USGS Bird Banding Laboratory (www.reportband.gov) : http://www.reportband.gov/

NWRA Find A Rehabilitator Link : https://www.nwrawildlife.org/page/Found_Injured_Wildlife

Birds of the World : https://birdsoftheworld.org/bow/home

10.13 list : https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-10/subpart-B/section-10.13

Link to State Wildlife Offices : https://www.fws.gov/offices/statelinks.html

Depredation Permit FAQ : https://www.fws.gov/migratorybirds/pdf/policies-and-regulations/3-200-13FAQ.pdf

Depredation ePermits Forms : https://fwsepermits.servicenowservices.com/fws/?id=fws_kb_view&sys_id=04ca59181bff14104fa520eae54bcb47

USDA APHIS | Step-by-Step Guide to a Migratory Bird Depredation Permit : https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/operational-activities/Guide-to-Migratory-Bird-Depredation-Permit

USDA APHIS | Contact Wildlife Services : https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/contact-ws

3-200-13 - Migratory Bird – Depredation (servicenowservices.com) : https://fwsepermits.servicenowservices.com/fws/?id=fws_kb_view&sys_id=04ca59181bff14104fa520eae54bcb47

Eagle Depredation Permit FAQ : https://www.fws.gov/migratorybirds/pdf/policies-and-regulations/3-200-16FAQ.pdf

Eagle Depredation ePermits Forms : https://fwsepermits.servicenowservices.com/fws/?id=fws_kb_view&sys_id=30dd95e11b9f10104fa520eae54bcb06

BBL website : https://www.usgs.gov/centers/eesc/science/bird-banding-laboratory?qt-science_center_objects=0#qt-science_center_objects

USGS website : https://www.pwrc.usgs.gov/BBL/bblretrv/

Appendix 3: Using the Raptor Trauma Triage Cards

The Raptor Trauma Triage Cards (RTTC) list the most common injuries or abnormalities noted in free-ranging raptors; it is by no means an exhaustive list. The RTTC relies on your visual and physical exams of the injured or abnormal raptor in order to determine which outcome is most appropriate.

Raptors should first be assessed visually from a distance, even if the bird is already physically contained. It is important to do this before you manually restrain it for the physical exam, as once the bird is in-hand, much of this visual information will be masked. Mentally run through the criteria on the Visual Exam card: age, mentation, respirations, obvious trauma, and behavior. If you have any questions, consult the written material on the flip side. Use this information to guide your physical exam.

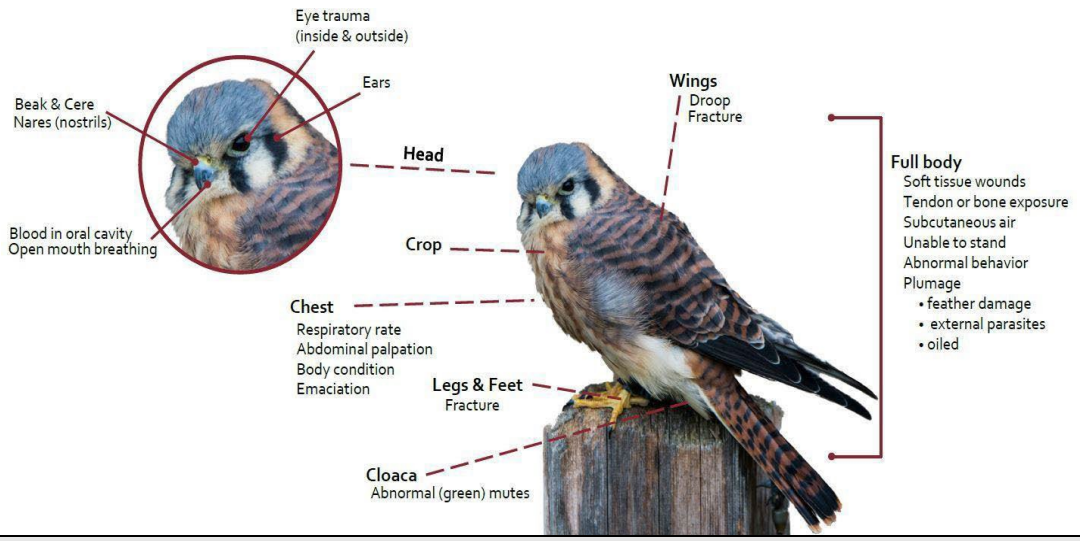
Next, manually restrain the raptor and begin your physical exam. Again, run through the criteria on the Physical Exam card: keel score, eyes, beak/oral cavity, feathers, wings/legs/body, and feet/talons. If you have any questions, consult the didactic material on the flip side and the pictures.

While in the field, your exams will lead you to one of three options - Release back into the wild, Transport to a veterinarian, wildlife rehabilitator, or other facility for further assessment or care, or Euthanize. If you determine that the raptor should be euthanized, do so immediately; it is not necessary to complete the remainder of the exam. A raptor should be released only if you have determined that any injuries or abnormalities do not require euthanasia or transport for further evaluation. If you are in doubt as to which option is best, please transport to a veterinarian, wildlife rehabilitator, or other facility for further assessment.

The RTTC has been developed for use in research efforts and will continue to evolve as necessary. If you have any questions, comments or concerns, please feel free to contact Dr. Brian Washburn of the USDA APHIS WS National Wildlife Research Center (brian.e.washburn@usda.gov).

Raptor Trauma Triage Card

Visual Exam



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Criteria	Outcome
Age – based on plumage	
Nestling - 'blue'/cloudy eyes are normal in some species of young owls	R
Nestling/brancher - absent or muted fear response may be appropriate	*
Second year or older - increased hunting experience may mitigate handicap	*
	*
Mentation	
Alert/interested in surroundings	R
Depressed/lethargic	T
Poorly or non-responsive/exhibiting seizures	E
Respirations	
Minimal respiratory movement (keel or 'chest')/no respiratory sounds	R
Open mouth breathing/increased effort or rate	T
Can hear bird breathing; can see keel/wings/tail moving while breathing	T
Obvious Trauma	
Unable to stand/'tuck' wing(s)/hold head in proper position; or visible wounds/fractures	T
Blind in both eyes; globe deflated/misshapen/missing	E
Missing or requires amputation of wing at the elbow or above (humero-ulnar joint)	E
Missing or requires amputation of a foot or leg	E
Behavior	
Typical species and age-specific behavior	R
Flight/fight/freeze	R
Abnormal behavior due to injury or disease	T

Key: * - influences final decision R – release T – transport E - euthanize in the field

Raptor Trauma Triage Card

Visual Exam

Visually scan the entire bird, ideally from a distance. Once the bird is restrained, its reactions and behaviors will change. Your visual examination can help guide your physical examination.

Age: This is usually based on plumage. It is important to know if this is a first-year bird. Age plays a role in triage such as determining appropriate behavior, what is considered a normal keel score, and the amount of hunting experience the bird has. With some injuries, an older, experienced bird might be rehabilitated and released, whereas a first-year bird might be euthanized. With a bird that is an inexperienced hunter, the injury even when healed, may present too much of a handicap. (For help in aging raptor species see - Pyle,P. Identification Guide to North American Birds, Part 1 (2001) and Part 11 (2008).

Mentation: Is the bird alert and interested in its surroundings and you? Or, is the bird depressed and lethargic (transport) or non-responsive (euthanize)? Any bird that is exhibiting rhythmic movements of its head or body, or seizures should also be euthanized.

Respiration: In general, you should not see obvious respiratory movements (keel or 'chest') nor hear a bird breathing. Does the bird have open mouth breathing or increased movement of the keel, wings and/or tail while breathing? Can you hear obvious wheezing or fluid sounds? These birds should be transported. Note, some individuals will open their mouth and 'stick out' their tongue as a freeze or threat response. Other species may 'tail-pump' for a variety of reasons. These behaviors are not related to respiration.

Obvious trauma: Is the bird unable to stand (needs to be distinguished from a behavioral 'freeze'), unable to 'tuck' one or both wings, or unable to hold its head in a proper position? Is there evidence of trauma such as injuries to the eyes, skin wounds or bone fractures? If confirmed on the physical exam, these birds should be transported. However, USFWS guidelines require the euthanasia of any bird that is completely blind, has sustained injuries that would require the amputation of a leg, a foot, or a wing at the elbow or above (humero-ulnar joint). These birds should be euthanized in the field instead of putting them through the pain and stress of transport. See Physical Exam for more detailed information.

Unless the bird's eye(s) is/are physically traumatized and abnormal in appearance, 'blindness' can be difficult to determine in raptors due to their stoic nature. Note that some nestling owl species have 'blue' or cloudy corneas; this is physiologically normal.

Behavior: Is the bird exhibiting expected behavior for its age and species? For example, some nestlings 'pancake' or some branchers have a muted or absent response to a human presence. Or is it exhibiting atypical behavior, possibly due to injury or potential disease? Again, these abnormalities can help guide your physical exam.

Physical Exam	
Criteria	**Outcome**
Keel score (1-5)	
Score - 1: abnormal except in a pre-fledging or non-flighted bird	*
Score - 2-4	*
Score - 5: well-conditioned/ migratory	*
Keel wound noted	T
Eyes	
Few pox lesions (~warts): providing they do not interfere with eye or eyelids	R
'Almond' eyes (dehydration): check keel score	T
Cloudy cornea/abnormally shaped pupil/cataract/blood in eye	T
Globe deflated/misshapen/missing	E
Beak/oral cavity	
Few pox lesions (~warts): providing they do not interfere with opening/closing of the beak	R
Damaged or misaligned beak	T
Oral cavity - Pale/white or tacky (hydration)/blood/parasites/wounds/exudate	T
Oral cavity - Dark red/purple + tacky/extensive exudates/lesions	E
Feathers	
A few feathers are tipped, frayed or broken	R
Moderate/severe feather damage or missing multiple flight feathers	T
Oiled/heavily soiled feathers	T
Maggots/moderate-heavy external parasites (flies, lice, mites)	T
Wings/legs/body	
Partial or full thickness lacerations with deep tissue, tendon or bone exposure/open or closed fractures	T
Extensive wound areas/fractures or luxations involving joints/dry or discolored tendons/bones	E
Missing/requires amputation of wing at the elbow or above or a foot or leg	E
A wound that penetrates the coelomic cavity (over the abdomen)	E
Feet/talons	
Swelling, wounds or fractures of the toe, or missing toes or talons	T
Missing but healed digit/talon **AND** bird in good body condition	R
Mild to moderate 'bumblefoot'	T
Severe 'bumblefoot'/acute loss of hallux or 2nd digit	E
3 Strike Rule	
Multiple significant injuries/issues	E

Key: * - influences final decision R – release T – transport E - euthanize in the field

Physical Exam

Manually restrain the bird, ensuring that keel movements are not restricted. Lightly cover the bird's head and minimize noise and other stimuli. Complete the exam as quickly as possible. If the bird is severely compromised, consider immediate euthanasia.

Keel score: The keel score is a measure of the amount of pectoral muscle mass present and is a good indication of the general health status. Determining a keel score requires both palpation and visualization; scores range from 1 (thin) to 5 (heavy). Try blowing or moving the feathers off the keel. In general, a healthy bird has a score of 3. A low score can be seen in starving birds (abnormal) or a bird that has not yet fledged (normal); the keel feels very sharp. A higher score can be seen in an over-conditioned (abnormal) or pre- migratory bird (normal); the keel bone is not easily discernible as it is covered by muscles. Any keel wound or keel fracture requires further investigation and the bird should be transported.

Eyes: The eyes and eyelids should appear symmetrical. If the eyeball sits recessed in the orbit, or the eyelids are partially closed ('almond eyes'), the bird may be dehydrated and/or starving (check the keel); depending upon the remainder of the exam, consider transport. The cornea, the outer surface of the eye, should be smooth, moist and clear. If some or all of the cornea is white or cloudy, if the black pupil has an abnormal shape, if a glassy or white density is noted in the black pupil (cataract), or if the chamber in front of the iris has blood or other material visible, the bird should be transported. If the eye is perforated, the globe deflated, misshapen or missing, the bird should be euthanized. A bird with a few pox lesions (look like warts, usually in juvenile birds) is releasable, providing the lesions do not interfere with the eye or movement of the eyelids.

Beak/oral cavity: Look for any trauma or malalignment of the upper and lower beak. In general, birds with damaged or misaligned beaks should be transported. A bird with a few pox lesions (look like warts, usually in juvenile birds) is releasable, providing the lesions do not interfere with the opening/closing of the beak.

Gently open the mouth, keeping a finger in the back soft commissure (corner). The oral cavity should be moist and pink; some species, such as accipiters and merlins, normally have dark pigmented mucous membranes.

Pale coloration indicates anemia; a tacky or stringy appearance indicates dehydration. If there is any significant amount of blood, parasites, wounds, or exudates (often 'cheesy') visible in the oral cavity, the bird should be transported. If the oral cavity is dark red or purple, this could indicate shock. This would likely be accompanied by other clinical signs such as depression and lethargy and field euthanasia should be considered.

Feathers: Feathers serve multiple functions including flight, temperature regulation and protection. A few tipped, frayed, or missing feathers are acceptable, but individuals with significant feather loss or large gaps in wing/tail feather coverage should be transported. Oily or heavily soiled feathers will impact waterproofing and temperature regulation; these individuals should be transported. If maggots are seen, look for wounds; these birds will likely need to be transported. Small maggots are often seen in the ears of nestling birds; generally these birds can be released. Moderate to heavy infestations with

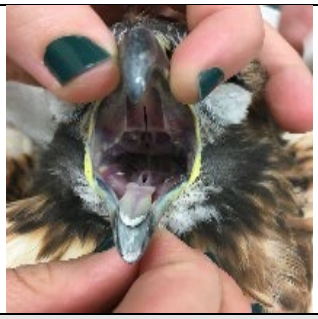
external parasites, including lice, mites, or flat flies can indicate a poor state of health; these birds should be transported depending on the remainder of the exam.

Wings/legs/body: While gently holding either the upper wing (humerus) or upper leg (femur) with your dominant hand, use your non-dominant hand to **slowly** pull/stretch/extend the wing (from carpus or wrist) or leg (from foot - be aware of digits/talons). You should be able to fully extend the wing or leg. Look/feel for any wounds, bone fractures, or joint dislocations. Be sure to check the patagium, the skin between the top of the shoulder and the top of the carpus (wrist), for any signs of trauma. If you cannot fully extend a wing or a leg, the bird should be transported. Any bird with a wound that exposes underlying tendons or bones should be transported. Any bird with evidence of fence/wire entanglement, electric shock or frostbite should be transported due to secondary injuries. In these instances the extremity may be cold to the touch, the skin discolored (salmon to black), and/or have evidence of a burn.

If a bird is missing, or will require an amputation of, a wing at the elbow or above (humero-ulnar joint), or a foot or a leg, it should be euthanized per USFWS policy. A bird should be euthanized if: it has extensive wounds; a fracture or luxation near a joint; and/or, has an open fracture and the exposed tendons and/or bones are dry or no longer white in color. If a bird has a wound that penetrates the coelomic cavity (over the abdomen), the bird should be euthanized.

Feet/talons: Carefully examine the digits and talons. You may be able to open/extend each of the toes; the 'ratchet' sound is normal. Look for any swelling, wounds or fractures of the toes, or missing toes or talons. Also look at the pads at the bottom of the foot and digits for any redness, wounds or trauma ('bumblefoot'). 'Bumblefoot' is rare in free-ranging birds except for prey bites, traps, etc. Given the vital necessity of a functional foot for hunting, birds with foot or talon issues should be transported. If a bird has severe 'bumblefoot' of one or both feet or has recently lost the hallux (back toe) and/or second digits of one or both feet, it should be euthanized. If an adult bird is missing a digit, the site is well-healed, the remainder of the digits and talons on both feet are normal, and the keel score is good, release could be considered depending on the remainder of the exam.

3 Strike Rule: Injured raptors often have concurrent issues, such as a traumatic injury, starvation and an infection. Individually each of these injuries may be treatable, but cumulatively may be unsurmountable. The impact of these abnormalities are not cumulative, they are exponential. The odds of a bird with multiple pathologies being rehabilitated and released are significantly decreased. Consider field euthanasia for these individuals.

Raptor Trauma Triage Card			
Keel Score			
Hatchling/Brancher (normal)	Keel Score = 1	Keel Score = 3	Keel Score = 5
			
Eyes			
'Almond' eyes (dehydration)	Significant globe injury/ deflated	Cloudy/damaged cornea/ Abnormal chamber	Avian pox lesions
			
Beak/oral cavity			
Blood in choanae/ roof of mouth	Oral lesions/plagues	Pale mucous membranes	Stringy saliva; shock mucous membranes
			
Feathers			
Lice infestation	Missing flight/tail feathers	Oiled/tar	Tattered feathers/ missing wing tip
			

Wings/legs/body			
Hole in patagium	Open wing fracture	Leg wounds	Severely abnormal posture
			
Feet/talons			
Avian pox lesions	Missing talon sheath	Minor trap wound	Grade 3 'bumblefoot'
			
3 Strikes (examples)			
Starvation	Injured wing	Patagial Wound	Abnormal pupil
			
Behavior			
'Pancake' behavior	'Flight/Fight' behavior	Depression/Lethargy