

Evolution of Ambassador Bird Selection from Wildlife Rehabilitation

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Abstract: The selection process for ambassador animals emerging from wildlife rehabilitation facilities is continuously evolving. This change is driven by the increasing understanding of the long-term physical impacts that disabilities have on an animal's overall wellbeing. Historically, the welfare of ambassador birds focused primarily on three factors: nourishment, lifespan, and physical safety. These aspects were considered sufficient to ensure the wellbeing of birds serving ambassadorial roles. Recently, there has been a shift in priorities, with more facilities now emphasizing cognitive wellbeing. This includes assessing whether individuals are free from pain, fear, and distress, which are increasingly recognized as essential components of animal welfare. The acquisition of birds with significant, life-limiting disabilities often results in individuals who require ongoing monitoring and frequent medical intervention while in human care. Such circumstances can place a considerable burden on both the facilities and the animals themselves. Cascades Raptor Center has made significant changes to the criteria used for selecting ambassadors. These changes are informed by data gathered from wellness monitoring of the current collection, along with nearly thirty years of detailed necropsy reports. The findings indicate that many disabilities leading to non-releasable status also prevent affected individuals from achieving a high quality of life. Ensuring that ambassador birds can lead lives free from constant pain begins with a careful, informed selection process. The presentation will detail the data that prompted a revision of selection criteria, outline current assessments for identifying suitable candidates, and describe ongoing steps to monitor and treat legacy individuals still under care.

Background and Data Collection

Cascades Raptor Center is a 501(c)(3) non-profit organization in Eugene, OR currently housing 30 avian ambassadors representing native and non-native species. The center also operates a wildlife hospital specializing in raptor rehabilitation. Over the past 35 years, nearly all deceased birds from the collection have undergone postmortem exams by a board-certified avian pathologist. Additionally, the staff veterinarian and rehabilitation team have performed postmortem exams on non-releasable patients to better understand short-term trauma effects. Birds previously considered for ambassador or exhibit roles are now less frequently selected for life-long placement due to increased awareness of the long-term health consequences of certain injuries.

Many zoological facilities rely on non-releasable birds from rehabilitation facilities to fulfill collection needs for native species, especially raptor species. While each animal must be assessed individually for their potential to live a life in human care, we believe that 30 years of data postmortem exams can inform the selection process. Knowing the age, treatment history, the disability which resulted in non-releasable status, and the tractability of certain species can assist in initial assessments to determine if a bird is a good candidate for a life in human care as an animal ambassador or even a life on exhibit.

Historically, the welfare of ambassador birds focused primarily on three factors: nourishment, lifespan, and physical safety. As the zoological field learns and grows, there is a broader examination of overall quality of life. Over our decades of operation, we have broadened our outlook to include the Association of Zoos and Aquarium's wider examination of animal welfare and wellbeing. Animal welfare refers to an animal's collective physical, mental, and emotional states over a period of time, and is measured on a continuum from good to poor. And wellbeing as a state of being comfortable, healthy, or happy. As it is difficult to determine a wild animal's state of being, we believe that results of postmortem exams and behavioral data we can observe perimortem can give us insight into whether an individual may at the very least be comfortable or not.

Through postmortem studies, we have found that many injuries that result in non-releasable status also led to chronic, progressive, painful conditions. Disabilities in normally flighted birds may result in compensatory movements and secondary debilitating conditions. Many disabilities also result in poor balance, inability or unwillingness to perform self-care behaviors, navigation difficulties, and a lack of confidence. In conclusion, physical injuries that result in non-releasable status may have hidden consequences which are not detectable without regular medical monitoring and sometimes are only seen in postmortem exams.

We have increased our understanding of what it means to have birds voluntarily participate in their own care and training. Certain individuals are not tractable (willing to build, or easy to build, a relationship with). Birds that are often not tractable include most parent-raised owls, accipiter and astur species. While it may be more difficult to evaluate a bird's behavioral status, it is imperative that every effort is made to ensure a bird is mentally fit for life in human care.

Case Studies: Secondary Complications from Fractured Wings

We have found that fractures near joints (e.g., wrist, elbow, hock, shoulder) often lead to chronic post-traumatic arthritis. This is due to trauma the joint experiences at the time of the fracture. A male Northern Spotted Owl (*Strix occidentalis*) suffered a fractured ulna

proximal to the elbow. The rehabilitation facility where he was hospitalized immobilized the fracture site and no surgical repair was attempted since the radius was intact. During his life in human care with progressive wellness exams, it was noticed that his elbow continued to lose range of motion and the wing itself drooped more. Radiographs revealed degenerative joint disease (and postmortem exam showed joint fibrosis) even though the joint was never part of the initial injury. His inability to preen the feathers completely on this wing and the increased wing droop indicated discomfort, and a decreased ability to move the elbow joint. While this individual died of lymphosarcoma, the degenerative joint disease in the elbow led staff to look more closely at other birds with healed long bone fractures of the wing.

In a rehabilitation case, a young Great Horned Owl (*Bubo virginianus*) had an ulna fracture proximal to the elbow which was closed and well-aligned. After callous formation (approximately one month) the owl had self-directed physical therapy for an additional month. However, physical therapy did not improve wing extension. The bird had slightly asymmetrical flight and an inability to achieve sufficient gain in loft, which precluded release. Postmortem exam revealed that the distal humerus at the elbow already had signs of degenerative arthritis due to a slight misalignment of the ulna and altered articulation of the elbow joint. This arthritis was present not after years but in a very short window of time – only two months after the initial injury and in a very young bird.

A second rehabilitation case study of a young Red-shouldered Hawk (*Buteo lineatus*) with a compound, mid-diaphyseal fracture of the humerus showed even more secondary pathology post-recovery. The surgically repaired fracture was immobilized for a month, and passive range of motion physical therapy was started after palpable callus formation. After callus formation and two months of physical therapy -the bird was flying but wing extension was inadequate for release. Upon further examination postmortem, it was discovered that the break had not calcified and cartilage was present between bone ends resulting in a non-union. A tendon had adhered to the humerus, and both the shoulder and elbow had altered joint articulation. Inflammation was already present in the shoulder, which would indicate the development of arthritis in only 3 months in human care. Further long-term complication could have also resulted in human care if the non-union deteriorated further.

The speed at which degenerative joint disease develops after orthopedic injury - even injuries not near joints - is relatively immediate. A Barred Owl (*Strix varia*) presented with a closed, comminuted ulna fracture that healed well and the bird achieved an approximate 90% return to full flight. In only 70 days of care, radiographs revealed degenerative joint injury in the elbow.

Finally, a young, post-fledging Turkey Vulture (*Cathartes aura*) with an old, mal-aligned, fractured humerus underwent surgical repair and bone pinning by a board-certified orthopedic surgeon. Complications resulted post-surgery and the bird was humanely euthanized. While we knew the surgical repair of the wing was not successful, we did not appreciate the severity of the complications due to this bird's calm temperament. A necropsy revealed that bone marrow was exposed and periostitis (bone lining inflammation) had developed in the three months post-surgery. Both conditions, it could be assumed, would lead to an extreme amount of pain. However, this bird was eating and appeared "comfortable" and tractable while in care. This could have been the result of a "preservation reflex." Wildlife is conditioned to hide physical pain to survive. We no longer consider a bird eating as an indication of comfort only as an indication of hunger. An individual with this level of disability would certainly not be "free of pain, fear, or distress" while in human care if he had been placed.

These cases illustrate that great care must be taken when adding any bird with limited flight to a zoological collection. Evidence of (assumed) painful conditions must be considered carefully before acquiring these individuals and a medical treatment plan needs to be implemented immediately. The consequences of repeated monitoring (e.g., radiographs, exams), the dispensing of life-long analgesic medications, and the construction of disability accommodations may add additional burden to care staff and still not improve the wellbeing of the individual bird.

In summary, we have found the following: 1) fractures near joints will often signal post traumatic arthritis is very likely 2) fractures that result in misalignment and altered articulation of joints will lead to degenerative joint disease 3) even in the hands of skilled veterinarians, long bone fractures of the wing may have complications that lead to other painful conditions such as bone inflammation or exposed bone marrow.

As the Manual of Ornithology states, "Nothing about the construction of the bird's wing is arbitrary." The bones of the avian wing have been fused and greatly reduced to the point that every bone in the wing serves a complex function, not only for flight but for overall mobility. Altering or removing any part of the wing, therefore, has the potential for serious consequences to the individual's long-term welfare.

Self-Care

Self-care (e.g., preening, bathing, maintaining good feather condition) is essential for a bird in human care. We believe it can also be a measure of confidence and their overall level of physical comfort. Disabilities can often lead to poor balance, reduced mobility, and impede the ability to perform self-care. Feathers may remain unpreened, blood feathers

may break, and other feathers may become damaged due to either the inability to reach the feathers or pain while doing so. While we cannot know that it would be distressing for a bird to be unable (or unwilling) to perform self-care, we do know that feathers are an essential physical aspect of birds, and responsible for flight, thermoregulation, camouflage, and breeding success. Activity budgets for wild birds estimate that up to 10% of the day may be spent preening. Additionally, feathers that are “in-blood” are very sensitive with nerves and blood vessels attached and breaking them is painful and potentially fatal.

As with the previous section, injuries near joints can prevent proper self-care. An adult female Merlin (*Falco columbarius*) with healed fractures of the radius and ulna resulting in a contracted right carpal joint was unable to preen her primaries and some covert feathers on the restricted wing.

An adult Bald Eagle (*Haliaeetus leucocephalus*) was presented for care in our wildlife hospital with a traumatic amputation of the distal 40% of the second phalanges of one wing. While this individual was not particularly fractious, even in a low human-contact setting, he was unable to successfully grow feathers and continued to damage and break nearly all his primary flight feathers as they grew. While a more drastic amputation of the wing tip may have prevented the damage and breaking of feathers in human care, our team felt that quality of life would be so drastically decreased due to amputation that euthanasia was the most humane option.

Shoulder injuries can lead to long-term inability to care for feathers as well. A Golden Eagle (*Aquila chrysaetos*) with a dislocated shoulder was unable to preen feathers on his increasingly immobile wing. As he aged, the occurrence of broken blood feathers increased as his navigation ability decreased. Deficits in his mobility sometimes led to falls, despite rearrangement of enclosure ramps, perching, and platforms to accommodate his condition. Due to his inability to care for himself (and other age-related health concerns), it was determined that the humane course of action would be euthanasia, even though he continued to eat well, build a nest, and interact with trainers.

Finally, self-care is not just about feathers. Iatrogenic injuries (those that occur while an animal is in care) may also occur. In the case of birds who have had any part of their wing amputated, the site of amputation is at increased risk for repeated contact injury, and the bird’s ability to navigate its space is compromised. Therefore, any wing amputation may result in poor balance and falls from perching. An adult Bald Eagle who lost the tip of his wing often fell when attempting to avoid a perceived danger and would injure his amputation site. While not life-threatening, these injuries would certainly be painful, and when considered holistically, led to an overall lower quality of life.

Compensatory Movement Disability

Disabilities that lead to non-releasable status also often decrease the bird's ability to ambulate freely. Such injuries can also lead to compensatory movement disability. Additionally, the lack of the ability to evade perceived threats may decrease an individual's confidence as they are no longer able to adequately move about their environment.

In the case of a Bald Eagle, a traumatic injury to the elbow led to degenerative joint disease and non-releasable status. This individual had come to our facility as a "glove trained" bird; however, when she arrived it was apparent that she was a case of learned helplessness. Her confidence on display and her desire to work with trainers continued to decline, even as we gave her more choice and control over her training. As she aged, her ability to move about her exhibit space also decreased. It was as if she no longer had the use of the wing from the shoulder to the wing tip. Upon taking radiographs, we found that her wrist (in addition to the original elbow injury) had signs of severe degenerative arthritis. This arthritis was possibly due to compensatory movements resulting from her original injury. Her shoulder also had limited range of motion, and she was unable to open the wing fully. Neither the wrist nor shoulder conditions were the result of her initial injury to our knowledge based on her medical records.

A second case was a former resident Burrowing Owl (*Athene cunicularia*) with a healed right ulna fracture which bridged to the radius changing the joint articulation and resulting in immobility of the wing. As she aged, we noticed decreasing use of the left leg and an intermittent limp. While we could appreciate some swelling in the hock joint on physical exam and radiographs, we did not discover until necropsy that her patella had fused to both the femur and tibia due to cartilaginous proliferation. This fusion resulted from compensatory movements she was using to navigate her exhibit enclosure due to her disabled wing.

Finally, a male Northern Harrier (*Circus hudsonius*) with a traumatic amputation of the right wing tip at the mid-metacarpals was noticed to be stiff legged during training sessions. He was also losing pectoralis muscle mass on both sides of his keel and losing the ability to maintain his feather condition as he could no longer preen many areas of his body. Radiographs revealed osteoarthritis of both knees and despite analgesic treatments, his gait and ability to preen did not improve. His necropsy revealed severe bilateral knee osteoarthritis, mild bilateral shoulder osteoarthritis, and severe muscle atrophy of the right pectoralis muscle. These conditions resulted from both the original injury and from compensatory movements. The severity of the osteoarthritis in the knees indicated that he would have been in pain for some time before trainers noticed the change in his gait.

Temperament

Finally, we have found that with our facility's increased understanding of what it means to have birds voluntarily participate in their own husbandry and training sessions, some individuals are simply not appropriate ambassadors or even exhibit candidates. Some birds do not develop the confidence needed to have a high quality of life in human care, despite extended relationship-building and training attempts. At Cascades for all rehabilitation patient cases, the decision to treat a presenting injury is based on that individual's release potential, not their potential to be placed as an ambassador or exhibit animal. Our rehabilitation staff believe that a bird who is terrified, in pain, and in a small enclosure cannot be evaluated for their tractability. We have found that it is very difficult to accurately assess a bird's suitability for the job of ambassador before treatment is complete. Pain, shock, and terror often present as a visually calm, quiet demeanor, especially in species which rely on cryptic camouflage for survival – leading to a sense of false potential for a life in human care. Once a bird has progressed through treatment, severe flight disability may lead to learned helplessness, further perpetuating the idea that the bird is an appropriate candidate.

Additionally, two cases of postmortem results from parent-reared owls showed signs of chronic hypertension which may have been the result of long-term distress from being in human care. These birds had chronic arteriosclerosis lesions which could be a result of long lives but may also have been aggravated by high levels of chronic stress as suggested by the pathologist due to adrenal gland damage. Both birds would sit "calmly" in their exhibit enclosures and did not demonstrate outward signs of distress. However, neither of these owls would voluntarily participate in training sessions.

Finally, we have had two former ambassadors who were deemed non-releasable due to severe traumatic brain injury (TBI). The first case, a young Red-tailed Hawk (*Buteo jamaicensis*) presented with severe TBI including torticollis and difficulty standing. After nearly a year in care, he was deemed non-releasable after a soft release attempt showed he was unable to capture prey. He was considered an ambassador candidate because of calm demeanor and his willingness to engage in training sessions. After nearly two years working as an ambassador, he began behavioral regressions and exhibited stereotypic flying patterns (i.e., continuous flying back and forth to perches not often seen in this species) and self-harm behaviors. While no direct brain changes were observed in a postmortem exam, the pathologist reported that any such changes would be difficult to observe by pathology.

A Barred Owl (*Strix varia*) with TBI had a similar outcome of behavioral regression over a year after joining the ambassador team. This individual also stopped preening body

feathers, exhibiting signs of pica, and began aggressing at trainers after a year. Traumatic brain injury in our opinion may present for a short period of time as a calm and tractable animal that would lead one to believe the bird is a good candidate for a role in human care. Long-term complications of TBI can lead to behavioral changes for years to come after a patient seems to recover which is a similar pattern in human severe TBI patients. It is considered a chronic evolving condition with changes presenting years after initial recovery.

Conclusions

Considering these findings over the last 30 years we believe the following conditions in non-releasable birds result in disqualification as candidates for a life in human care.

- Injuries near joints
- Injuries that result in undue stress on joints by changing joint articulation
- Nearly all amputations
- Nearly all adult, parent-raised owls (see IAATE Welfare of Human-reared vs Parent-reared Owls in Ambassador Animal Programs)
- Disabilities that decrease confidence due to flight limitations
- Severe traumatic brain injury
- Any other condition that may result in or develop into ongoing pain, distress and/or fear

While the term “confidence” may be nebulous when referring to wild animals, we believe that there are a few criteria that we can use to help determine the suitability for life in human care. If the individual can live comfortably and safely in a free-lofted situation and willingly participates with trainers, they may be confident. While tethering is an essential part of working with raptors (see IAATE Tethering Position Statement), we do not believe it should be the primary training tool used during initial training of a raptor if the bird positively anticipates training sessions while at a healthy weight and fit body condition.

- The bird does not engage in avoidance behaviors.
- If the bird is willing to share personal space with the trainer and receives reinforcement for behaviors.

Cascades Raptor Center staff asks the following questions before adding a bird to our collection. (see IAATE Selection Considerations for Non-releasable Birds)

- Is the bird able to move around the enclosure freely and safely?
- Can the bird use the highest possible perching, well out of the physical reach of any trainer?

- Is the bird able and willing to make choices in empowerment-based training environment?
- Is the bird able and willing to perform normal self-care behavior?
- Does the bird have an intact sense of confidence or empowerment (a sense of control)?

Once a bird has (a) progressed through rehabilitation and (b) the disability is determined to (most likely) not cause any on-going pain, distress or fear, and (c) the individual meets our additional criteria for candidacy, training staff begins our ambassador assessment and initial training program. We do not refer to this as “manning” because we feel that term refers to grabbing a bird, putting equipment on it and then holding them on the glove until the animal discovers it cannot get away. Our assessment process goal is to free-loft the bird using the least possible aversive stimuli possible, allowing the bird the choice of interacting with trainers for positive reinforcement.

Although the criteria listed above may seem to offer bleak prospects for most non-releasable wild birds coming through rehabilitation transitioning into life in human care, we feel that humane euthanasia is ethically more appropriate than a life-long potential for pain, discomfort, and fear. If it is felt that a bird, despite demonstrating some of the potential problems listed above, should be considered for placement, facilities should have a rigorous and objective wellness program in place to continually monitor each bird for signs of pain, fear or distress, and be ready to make the always difficult but often necessary decision to euthanize.

Cascades’ current avian collection does have some “legacy individuals” (i.e., individuals whom we would not select as ambassadors under our current selection process). These individuals are closely monitored by our training and veterinary staff members, receive biannual radiographs, receive daily analgesic medication, and have modifications made to their habitats on an on-going basis. The additional pressure on staff time can be arduous to provide the level of care these individuals require and deserve. Staff at Cascades Raptor Center are also interested in researching long-term pain management protocols that might alleviate pain and prolong a life in comfort without causing subsequent problems, like kidney compromise.

Each bird is an individual and must be assessed accordingly. Our facility’s commitment to professionally trained staff to oversee the training, husbandry, and wellbeing of our collection is paramount. We continue to improve our trust- and choice-based training techniques, and we will always evaluate our ability to provide care before considering the addition of any new avian team member through a collection plan.

As with any process, we are learning and growing as we proceed. We are not perfect and we hope that data we have acquired, and lessons learned, will help us – and our professional community to continue to provide the best possible care to our collections today and in the future.

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