

Causes of Mortality in Falconry Raptors

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An Analysis of all mortality records of wild taken and captive bred falconry birds in the state of Washington over a ten-year period.

Several Freedom of Information Act (FOIA) requests were submitted to the United States Fish and Wildlife Service (USFWS) gathering all records of birds that had died while held in captivity under a falconry permit within the state of Washington during a ten-year period beginning January 1, 2000 and ending December 31, 2009. During this time 51 wild taken raptors died and 57 captive bred raptors died. There were a total of 108 birds that died representing the mortality for roughly 215 falconers, over this ten-year period. There are an estimated 4,250 permitted falconers in the United States⁶ making Washington's falconers roughly 5% of all permitted falconers in the nation.

What are the beliefs about what kills falconry birds?

The death rate for everything is 100% at a long enough time horizon, as the adage says, it is inevitable. This point is made to provide the context that every animal, every raptor, will eventually die. It has been shown elsewhere that falconry take of wild raptors has a positive impact on the wild resource. Raptors live longer while in captivity in their falconry arrangement than elsewhere, and so we will not re-try these proven points. They bear repeating only to ensure the proper context that we are examining a minority of the falconry



Wild Swainson's Hawk. Photo by Mike Roper.

population, those birds that actually die while in captivity.

Outside the falconry community, there is a belief among those who are not well informed that the falconers themselves are the cause of death. This is not borne out in either the capture/release data or in the mortality data over a substantial population of falconers and a substantial length of time. In fact, it has been proven that raptor populations actually benefit from falconry take and release of wild raptors. Over the ten year period, the death of two birds might have been due to poor management, however not enough is known as to the actual situation to identify the primary cause. Nearly all other deaths viably appear to be natural causes, and very few could have been postponed through different management. What the data also does not show is the extensive medical care and intervention that falconers provide. This could be demonstrated in the comparison between the captive held falconry birds and wild birds noting the stark differences in their mortality rates. Captive birds held for falconry are at risk from many of the same causes of mortality as those in the wild because they are operating similarly to a wild bird - these birds are released and are free flying, hunting identically to wild birds, and at risk for predation, collision, and many other causes of death.

The causes of death that falconers are most worried about include bumblefoot, aspergillosis, predation, electrocution, frounce, and anemia. The causes that the regulatory bod-



Shawn Wilson training Aplomado Falcon. Photo by Mike Roper.

ies appear to be most concerned about are mishandling and mismanagement including perch design, dehydration, lack of sunshine, and air circulation.

Considering the general sensitivity of all avian species, the variety of valid management techniques, and the misconceptions of falconry practices, this paper examines the reality of raptor management and the fallacies that are commonly held against reality.

What are the real causes of falconry bird deaths?

No cause of death was listed for 17 of the raptor deaths, and another 2 listed that the death was from unknown causes. The cause of death listed was classified into categories as follows.

Table 1. Reported causes of mortality

Cause	Wild Taken	Captive Bred	Total
Age	0	2	2
Aspergillosis	6	1	7
Asphyxiation	1	2	3
Collision	6	4	10
Congenital defect	2	3	5
Electrocution	2	3	5
Euthanasia	0	2	2
Frounce	1	1	2
Medical error	2	2	4
Other	4	1	5
Perforation	1	1	2
Pneumonia	1	0	1
Poison	3	0	3
Predator	10	17	27
Secondary complications	3	1	4
Sour crop	1	1	2
Stroke	1	0	1
Infection	1	3	4
Unknown / Not Listed	6	13	19
TOTAL	51	57	108

What stands out in the data as being significant causes of death are predators and collisions, while disease of any sort is a minor cause. Predators and collision accounted for more than 42% of all deaths over the ten-year period. These are two of the largest causes of death for wild birds and they are not within the control of falconers. Although not all falconers provided context for the predation, it was clear that this commonly occurred while out hunting and while training in free flights. When electrocution and age are added to this, these four causes account for half of all falconry bird deaths.

There are not many truly preventable deaths listed, and in some cases medical intervention caused the death of the bird. These mortality figures must be kept in the context of the total number of falconry birds held by falconers, and the natural risks of free flight and hunting that these birds engage in, whether wild or captive.

It must be noted that the precise age of each bird is almost never known. Wild birds may hatch at various times during the spring. It was decided to use the same technique as many others employ which is to consider all birds to have been hatched on January 1 of the year stated. This makes it normalized, and since often the month was not stated on various events the age could not be accurately determined anyways. Because of this there is some level of inaccuracy is talking about a bird that "is one-year-old" as it may have hatched in March of one year then died in February of the next year, or in September. Both of those cases will consider the bird to have been one-year-old. Where this matters most is in the January after a bird's hatch year where the bird is still immature, but the year has rolled forward. Where this discrepancy is of greater interest it has been called out.

How do the categories break down, and what do they mean?

Most categories mirror the causes of death in wild raptors, although some have no analog. Age is relatively rare as a cause of death in wild birds with studies estimating that some raptor species experience a 90% mortality rate before they are one year old. Mortality due to old age is simply rare in the wild where there are so many other causes of death. There is no analog for euthanasia or medical error for wild birds. It should be noted, though, that both of these are the result of management, diagnosis, and best efforts to prolong the life of these birds. Aspergillosis, asphyxiation, collision, congenital defect, electrocution, frounce, perforation, pneumonia, poisoning, predator, secondary complications, sour crop, stroke, and infection are all likely causes of death for wild raptors. Because many of these are soft tissue injuries leaving no forensic trace to diagnose later, the rate of mortality for wild birds for many of these causes is not exact.

Age

Two falcons are reported as having died from age related causes. No further details are available on these. Both were captive bred birds.

Table 2. Mortality due to age related causes

Species	Wild Taken/Captive Bred	Age
Gyr Falcon-Peregrine Falcon	C	9
Peregrine Falcon	C	Not specified



Screech Owl. Photo by Mike Roper.

Aspergillosis

Aspergillosis, or asper, most often struck young wild taken birds. Of the seven deaths due to asper, representing 6.5% of all deaths, three were in the hatch year, two were just one year old, and one was two years old. The ages are slightly misleading as the deaths all happened in the winter months, and so even the “one year old” birds were just under one year old being in the January of the year after they hatched. All of those were wild taken birds, and all but one died prior to being 12 months old. This would bring the question as to how many wild birds are carriers of asper, and how many have some level of infection prior to take. The one captive bred bird that succumbed to asper was a seven-year-old Harris’ Hawk. One specified the asper had attacked the liver noting “Asper - hepatic”.

It is notable that all of the asper deaths occurred during the winter months. This may be due to the stresses of being an actively hunted hawk, the lack of sunshine in winter months (particularly in Washington state), the shorter winter days, reduced weathering opportunities, increased moisture present in the environment increasing the growth of spores, or many other factors. It would further the understanding of sickness and the pattern of asper infection to know which of these birds was actively hunting, which were being daily conditioned and exercised, and which were managed in a way that encouraged the asper infection. This is the only category that is heavily weighted towards one source, in this case wild taken birds. More than half of the birds involved were Red-Tail Hawks. This may indicate that these were birds held by apprentice falconers, although that cannot be determined from the data at this time. There is certainly enough interesting data to create several hypotheses in this area that is hoped to spur others to investigate.

Table 3. Mortality due to aspergilosis

Species	Wild Taken /Captive Bred	Date of Death	Age
Goshawk	W	11/12/2004	1
Gyr Falcon	W	1/30/2001	1
Harris' Hawk	C	1/4/2007	7
Red-Tail Hawk	W	11/8/2000	Hatch year
Red-Tail Hawk	W	12/15/2003	Hatch year
Red-Tail Hawk	W	12/21/2001	Hatch year
Red-Tail Hawk	W	12/26/2006	2

Asphyxiation

Asphyxiation caused three deaths, all in young birds. One died in the year it was hatched, and two died at one year old, one of which was a wild taken bird. One falconer specified that the bird choked on a large bone. Another specified that the bird died from a blocked airway. It is impossible to tell how many wild birds succumb to similar injuries each year, however it would be thought to be relatively common.

Table 4. Mortality due to asphyxiation

Species	Wild Taken /Captive Bred	Age
Harris' Hawk	C	Hatch year
Kestrel	W	1
Peregrine Falcon	C	Hatch year



Prairie Falcon incubating. Photo by Mike Roper.

Collision

Collision caused ten deaths, four of which were captive bred birds. Collisions represent 9.3% of all deaths during this time period. Five of these were one-year-old birds, while the others were slightly older, showing that it was primarily younger, or less experienced birds, that died from collisions. This may be of interest for further study reflecting less coordinated young birds, less experienced at judging distances and maneuvering, or related to the larger and softer feathers of immature birds.

The collisions were with various objects. Some falconers simply mentioned a collision while others noted that the bird struck a window, a fence, or a wire. Some falconers identified that the collision broke the bird's neck, broke a leg, or severed another body part. Collisions are one of the major causes for wild bird deaths, so it is not surprising that it is significant here. Collisions with cars on roadways kills an estimated 50 to 100 million raptors every year,^{2, 3} collision with buildings claims up to 980 million,^{2, 3, 4} and collision with

wind turbines kills another 10,000 to 40,000 raptors per year.^{1, 5}

Table 5. Mortality due to collision

Species	Wild Taken/Captive Bred	Age
Goshawk	C	1
Goshawk	W	Not specified
Great Horned Owl	W	8
Harris' Hawk	C	1
Harris' Hawk	W	1
Harris' Hawk	C	5
Merlin	W	1
Peregrine Falcon	W	3
Peregrine Falcon	C	4
Red-Tail Hawk	W	1



Golden Eagle. Photo by Mike Roper.



Red-tailed Hawk. Photo by Alan D. Wilson.

Congenital defects

Five birds died due to congenital defects. Two of these, one Harris' Hawk and one Goshawk, specified that the problem was the heart. As expected, all of these died in the same year that they hatched, usually within weeks of hatching.

Table 6. Mortality due to congenital defect

Species	Wild Taken/Captive Bred	Age
Goshawk	W	Hatch year
Harris' Hawk	C	Hatch year
Harris' Hawk	C	Hatch year
Peregrine Falcon	C	Hatch year
Prairie Falcon	W	Hatch year

Electrocution

Electrocution claimed five birds total, one captive bred Goshawk, two wild taken Goshawks, and two captive bred Peregrine Falcons. Electrocution is also a significant cause of death for wild birds. Electrocution claims up to 174 million raptors per year.^{2, 3, 5}

Table 7. Mortality due to electrocution

Species	Wild Taken/Captive Bred	Age
Goshawk	C	Hatch year
Goshawk	W	Hatch year
Goshawk	W	4
Peregrine Falcon	C	1
Peregrine Falcon	C	6

Euthanasia

Two birds were euthanized during the ten years. One of these was a two-year-old Gyrfalcon-Peregrine Falcon with a broken wing. The other was a ten-year-old Peregrine Falcon with no other details provided. The Gyrfalcon-Peregrine Falcon with the broken wing may be better categorized as a collision as the cause of death, but the cause of the broken wing is not certain. The only certainty that can be stated is that the bird was euthanized. Since there is no medical care to wild birds in general, there is no corresponding category for wild bird deaths.



Prairie Falcon on quarry. Photo by Mike Roper.

Table 8. Mortality due to euthanasia

Species	Wild Taken/Captive Bred	Age
Gyr Falcon-Peregrine Falcon	C	2
Peregrine Falcon	C	10

Frounce

Frounce is well known among falconers, however it only claimed two birds during this ten-year timespan. One was a captive bred Gyr Falcon-Peregrine Falcon hybrid that was two years old. The other was a wild taken Peregrine Falcon that died in its hatch year. As the Peregrine Falcon was a wild taken bird, it is uncertain if infection occurred prior to take, particularly as this bird died in the same year it hatched.

Table 9. Mortality due to frounce

Species	Wild Taken/Captive Bred	Age
Gyr Falcon-Peregrine Falcon	C	2
Peregrine Falcon	W	Hatch year

Infection

Four total birds were killed by general and unidentified infection, three of which specified a viral infection.

Table 10. Mortality due to infection

Species	Captive Bred/Wild Taken	Age
Gyr Falcon	C	2
Gyr Falcon	C	3
Kestrel	W	1
Peregrine Falcon	C	2

Medical error

Medical errors were cited as the cause of four deaths during this period. One bird died during a veterinary operation, one died due to an overdose that was prescribed, one died due to a reaction to anesthesia, and one died in the care of a rehabilitator. Since there is no medical care to wild birds in general, there is no corresponding category for wild bird deaths.

Table 11. Mortality due to medical error

Species	Wild Taken/Captive Bred	Age
Goshawk	C	4
Kestrel	W	1
Peregrine Falcon	C	3
Prairie Falcon	W	1

Other

There were other causes of death that did not amount to any significance for a grouping, or the group would not have been anticipated as a significant cause of death. One bird died from low condition. Underlying medical issues may have been the cause although that is not stated. One bird died from mid-winter anemia. It is not possible to determine what classification of falconer was caring for each of these. It is possible these were apprentices as the Kestrel and the Red-Tail Hawk were the only birds allowed for apprentice falconers during this time period. Others in this category are a Goshawk that died from a brain lesion, a Peregrine-Prairie Falcon that died of a neoplastic tumor on the liver, and a Cooper's Hawk that died of hypoglycemia.

Table 12. Mortality due to miscellaneous causes

Species	Wild Taken/Captive Bred	Age
Cooper's Hawk	W	Hatch year
Goshawk	W	7
Kestrel	W	1
Peregrine Falcon – Prairie Falcon	C	Not specified
Red-Tail Hawk	W	1

Perforation

Two birds died from complications of eating something that punctured internal organs. One falconer specified that the bone punctured the proventriculus, the other just identified that the bird ate a bone that then punctured her internally. As these are soft tissue injuries, it is impossible to tell how many wild birds succumb to similar injuries each year, however it would be thought to be relatively common.

Table 13. Mortality due to perforation

Species	Wild Taken/Captive Bred	Age
Goshawk	W	11
Peregrine Falcon	C	6



Passage Northern Goshawk. Photo by Alan D. Wilson.

Pneumonia

One Red-Tail Hawk died from pneumonia. Pneumonia often is seen in raptors that also have an active Aspergillosis infection. As this is a young, wild taken Red-Tail Hawk, this bird may have had Aspergillosis as a secondary, or even primary, cause of death that was masked by the pneumonia.

Table 14. Mortality due to pneumonia

Species	Wild Taken/Captive Bred	Age
Red-Tail Hawk	W	1

Poisoning

Poisoning can come from many different sources. Three birds died from poisoning of some sort. Two of these were identified as poisoned through their prey source, and one was poisoned by carbon monoxide. The carbon monoxide poisoning may have been preventable, although that cannot be stated with certainty. Agricultural poisoning in general claims an estimated 67 million wild raptors per year.²

Table 15. Mortality due to pneumonia

Species	Wild Taken/Captive Bred	Age
Merlin	W	1
Red-Tail Hawk	W	1
Red-Tail Hawk	W	1



Tiercel American Kestrel. Photo by Mike Roper.

Predation

Overwhelmingly predators were the most likely cause of death killing 27 falconry birds representing 25% of all deaths during the ten years of mortality data. Many specified what the bird was doing when it was killed and the predator that killed it such as, "Killed by owl while hunting". Raptors are susceptible to predation by both aerial and ground-based predators. They are often attacked while in flight, chased off and then attacked, or attacked on the ground as they capture their own prey. Slightly more captive bred birds than wild taken birds were killed by predators, however it is not statistically significant. It

may be random, it may be due to a bird that attracts local predators, or it may be due to a bird that is less fit for the ecosystem that it is flown in.

Table 16. Mortality due to predation

Species	Wild Taken / Captive Bred	Age	Predator
Aplomado Falcon	C	1	Predator
Gyr Falcon-Barbary Falcon	C	10	Owl
Gyr Falcon-Peregrine Falcon	C	Hatch year	Eagle
Gyr Falcon-Peregrine Falcon	C	Hatch year	Predator
Gyr Falcon-Peregrine Falcon	C	2	Red-Tail Hawk
Harris' Hawk	C	2	Owl
Harris' Hawk	C	7	Goshawk
Goshawk	C	2	Eagle
Goshawk	C	2	Coyote
Goshawk	C	3	Wild raptor
Goshawk	C	5	Hawk
Goshawk	W	Hatch year	Owl
Goshawk	W	8	Owl
Kestrel	W	Not specified	Cooper's Hawk
Kestrel	W	Not specified	Wild hawk
Peregrine Falcon	C	Hatch year	Wild raptor
Peregrine Falcon	C	1	Pair of Bald Eagles
Peregrine Falcon	C	2	Falcon
Peregrine Falcon	C	2	Predator
Peregrine Falcon	C	4	Owl
Peregrine Falcon	C	6	Owl
Prairie Falcon	W	1	Hawk
Prairie Falcon	W	2	Owl
Prairie Falcon	W	7	Hawk
Prairie Falcon	W	15	Peregrine Falcon
Red-Tail Hawk	W	Hatch year	Owl
Red-Tail Hawk	W	1	Bobcat

Secondary complications

Four birds died from a cause secondary to something else. One bird developed a disease due to an injury, however it is not known what caused the injury or what disease developed. A second bird developed anemia following an injury. A third developed Bumble-foot after a bite wound. The fourth was a transfer from a rehabilitator as the bird had a head injury, the complications of which eventually killed the bird. All of these birds appear to have been medically diagnosed and in some form of treatment for the primary cause when they succumbed.

Table 17. Mortality due to secondary complications

Species	Wild Taken/Captive Bred	Age
Goshawk	C	1
Goshawk	W	1
Prairie Falcon	W	4
Red-Tail Hawk	W	Hatch year



*Aplomado Falcon, Laguna Atascosa National Wildlife Refuge
Photo by Elaine R. Wilson.*

Sour crop

Sour crop killed two birds.

Table 18. Mortality due to sour crop

Species	Wild Taken/Captive Bred	Age
Gyr Falcon	C	1
Kestrel	W	Hatch year



Harris' Hawk. Photo by Mike Roper.

Stroke

Stroke killed one bird. This was confirmed as the cause of death on necropsy.

Table 19. Mortality due to stroke

Species	Wild Taken/Captive Bred	Age
Goshawk	W	Hatch year

Unknown

Nineteen birds had no discernible details about the cause of death. This comprises 17.6% of all deaths during this time period.

Table 20. Mortality without a known cause

Species	Wild Taken/Captive Bred	Age
Barbary Falcon	C	1
Cooper's Hawk	W	3
Cooper's Hawk	W	4
Gyrfalcon-Peregrine Falcon	C	2
Gyrfalcon-Peregrine Falcon	C	3
Gyrfalcon-Peregrine Falcon	C	7
Harris' Hawk	C	5
Harris' Hawk	C	7
Harris' Hawk	C	Not specified
Goshawk	W	1
Goshawk	W	1
Goshawk	W	2
Goshawk	C	4
Peregrine Falcon	C	1
Peregrine Falcon	C	1
Peregrine Falcon	C	3
Peregrine Falcon	C	7
Red-Naped Shaheen	C	1
Red-Tail Hawk	W	Hatch year



Ferruginous Hawk. Photo by Mike Roper.

Which species die?

Without knowing the total number of each species in possession during this period, we cannot say anything about the likelihood of any species to die, or the likelihood of any particular cause being more common in any given species. However, from other studies we do know that 118 Red-Tail Hawks were taken from the wild during this time, the most popular of all species for take. There were 13 Red-Tail Hawks that died during this time. Although these were not necessarily the same individuals, the time window is large enough to claim roughly an 11% mortality rate for wild-taken Red-Tail Hawks over a ten-year period.

Table 21. Number of deaths per raptor species

Species	Wild Taken	Captive Bred	Total
American Kestrel	7	0	7
Aplomado Falcon	0	1	1
Barbary Falcon	0	1	1
Cooper's Hawk	3	0	3
Goshawk	14	9	23
Great Horned Owl	1	0	1
Gyr Falcon	1	3	4
Gyr Falcon-Barbary Falcon Hybrid	0	1	1
Gyr Falcon-Peregrine Falcon Hybrid	0	9	9
Harris' Hawk	1	11	12
Merlin	2	0	2
Peregrine Falcon	2	20	22
Peregrine Falcon-Prairie Falcon Hybrid	0	1	1
Prairie Falcon	7	0	7
Red-Naped Shaheen	0	1	1
Red-Tail Hawk	13	0	13
TOTAL	51	57	108

What are the patterns of death per species?

Overall there are not enough bird deaths to identify a pattern, and certainly not enough when divided by species. There are some hypotheses that may arise from looking at this data along a different slice, and so it is provided in this context for further exploration by others.

Table 22. Causes of mortality in **American Kestrels**

Cause	Number of Deaths
Asphyxiation	1
Medical error	1
OTHER – Low Condition	1
Predator	2
Sour crop	1
Infection	1
TOTAL	7

Table 23. Causes of mortality in **Aplomado Falcons**

Cause	Number of Deaths
Predator	1
Total	1

Table 24. Causes of mortality in **Barbary Falcons**

Cause	Number of Deaths
Unknown	1
Total	1

Table 25. Causes of mortality in **Cooper's Hawks**

Cause	Number of Deaths
OTHER – Hypoglycemia	1
Unknown	2
Total	3

Table 26. Causes of mortality in **Great Horned Owls**

Cause	Number of Deaths
Collision	1
Total	1



Passage Northern Goshawk with prey. Photo by Alan D. Wilson.

Table 27. Causes of mortality in Gyrfalcons

Cause	Number of Deaths
Asper	1
Sour crop	1
Infection	2
Total	4

Table 28. Causes of mortality in Gyrfalcon/Barbary Falcon Hybrids

Cause	Number of Deaths
Predator	1
Total	1



Prairie Falcon. Photo by Mike Roper.

Table 29. Causes of mortality in Gyr Falcon/Peregrine Falcon Hybrids

Cause	Number of Deaths
Age	1
Euthanasia	1
Frounce	1
Predator	3
Unknown	3
Total	9

Table 30. Causes of mortality in **Harris' Hawks**

Cause	Number of Deaths
Asper	1
Asphyxiation	1
Collision	3
Congenital defect	2
Predator	2
Unknown	3
Total	12

Table 31. Causes of mortality in **Merlins**

Cause	Number of Deaths
Collision	1
Poison	1
Total	2

Table 32. Causes of mortality in **Northern Goshawks**

Cause	Number of Deaths
Asper	1
Collision	2
Congenital defect	1
Electrocution	3
Medical error	1
OTHER – brain lesion	1
Perforation	1
Predator	6
Secondary complications	2
Stroke	1
Unknown	4
Total	23

Table 33. Causes of mortality in Peregrine Falcons

Cause	Number of Deaths
Age	1
Asphyxiation	1
Collision	2
Congenital defect	1
Electrocution	2
Euthanasia	1
Frounce	1
Infection	1
Medical error	1
Perforation	1
Predator	6
Unknown	4
Total	22

*Merlin eggs and chicks in nest. Photo by Doyle Roe, US Fish and Wildlife Service.*

Table 34 Causes of mortality in Peregrine/Prairie Falcon Hybrids

Cause	Number of Deaths
Other – Neoplastic tumor on liver	1
Total	1

Table 35 Causes of mortality in Prairie Falcons

Cause	Number of Deaths
Congenital defect	1
Medical error	1
Predator	4
Secondary complication	1
Total	7

Table 36 Causes of mortality in Red-Naped Shaheens

Cause	Number of Deaths
Unknown	1
Total	1

Table 37 Causes of mortality in Red-Tailed Hawks

Cause	Total
Asper	4
Collision	1
Other – Mid-winter Anemia	1
Pneumonia	1
Poison	2
Predator	2
Secondary complications	1
Unknown	1
Total	13

Whose birds are more likely to die?

It cannot be determined from the data what experience level of falconer each of the raptor deaths is associated with. It is possible that one class of falconer accounts for a significant amount of the falconry raptor mortalities, or that mortalities are evenly spread across

all classes and levels of experience. It should be noted that during this time apprentices were only allowed to have American Kestrels and Red-Tail Hawks. There are just 20 of these species listed representing 18.5% of all deaths. What we can tell is that even our most unskilled and least experienced falconers have sufficient skills to successfully manage a bird's health and condition.

How old are captive held raptors when they die?

Six birds had no hatch date listed or it could not be deciphered from the information provided. Table 38 describes the remaining 102. This breaks down to 21.6% of the birds

Table 38 Age of raptors at death

Age	Wild Taken	Captive Bred	Total
Year of hatch	14	8	22
One year old	20	12	32
Two years old	3	11	14
Three years old	2	5	7
Four years old	3	4	7
Five years old	0	3	3
Six years old	0	3	3
Seven years old	2	5	7
Eight years old	2	0	2
Nine years old	0	1	1
Ten years old	0	2	2
Eleven years old	1	0	1
Fifteen years old	1	0	1
TOTAL	48	54	102

that died during this ten-year time period died in the same year that they hatched. Without knowing the total number of birds a mortality rate cannot be calculated definitively, however it is less than 21.6% as there were at least 102 birds total.

Conclusions

A total of 288 raptors were taken from the wild in Washington during this time, during which 51 wild taken birds died. While these are not always the same individuals, we can rough out a mortality rate of 17.7% over a ten-year period. Compared to a conservatively estimated 70% first year mortality rate for raptors in the wild, and a 90% five year rate, this is an extraordinarily low number showing the protection that the falconry relationship grants to the raptor. To make some other comparisons with the data, we could look to the

USFWS Environmental Assessment. The model for all prior Environmental Assessments assumes that once a bird is taken from the wild it is biologically dead, that is that there is a mortality rate of 100% immediate upon take. This is a safe and conservative way to model impact to wild bird populations, however it does not do justice to the actual practices and impact of North American falconers.

This study is not to examine the impact of these deaths on the wild populations, but to examine the mortality records to understand opportunities for falconers to further lengthen the lifespan of captive raptors where possible, or shed light on what a specific individual may be encountering. As a community that is constantly exploring new techniques, new ways to partner with our birds, and integrate their natural history into the falconry relationship, understanding the more likely causes of death may help to diagnose and treat individuals sooner, or may lead to changes in management practices of individual falconers. It would be interesting to ask what institutions can learn from falconry management



Haggard Cooper's Hawk. Photo by Alan D. Wilson.

practices, at the same time that we are examining what falconers can learn from their own practices to prolong the productive life of their falconry partner.

Resources

¹**Cato Institute study.** <http://www.defenders.org/habitat/renew/wind.html>

²**Curry and Kerlinger, LLC** <http://www.currykerlinger.com/birds.htm>

³(Erickson et al. 2001)

⁴**“Kenetech Windpower Avian Research Program Update,”** 1994, p. 3. Kenetech Windpower, Washington, D.C.

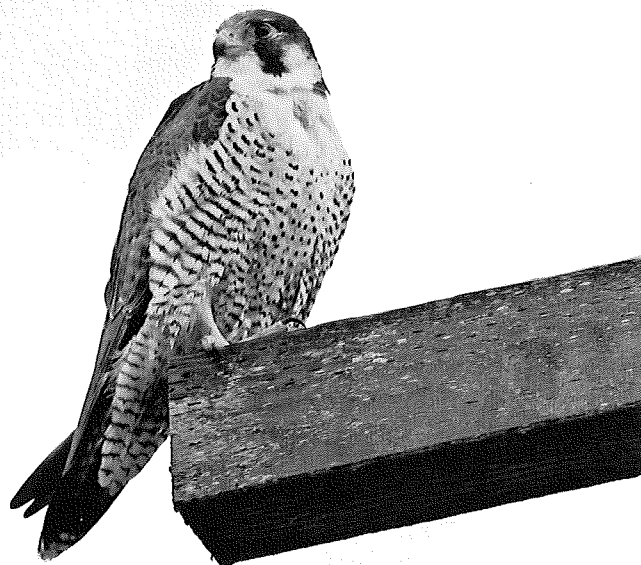
⁵**“Policy and Practices to Protect Raptors during Development of Wind Farms.”** Raptors on the Prairie, November 11, 2006. Dr. David Haukos.

⁶**Allen, George.** “Take of raptors from the wild under the falconer and the raptor propagation regulations.” 2007. Department of the Interior, US Fish and Wildlife Service.

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Haggard Peregrine Falcon Photo by Alan D. Wilson.