Spring 2020

Impacts of Inappropriate Human Possession of Wildlife on the Animal's Well-being

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Honors Thesis

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Abstract: Wildlife rehabilitation is the temporary intervention by humans on sick or injured wild animals, who would not otherwise survive, with the goal of release. Individual states have their own guidelines for how to become a licensed rehabilitator with extensive standards in place for how to keep such wildlife. The standards help to keep the animals wild for their eventual release and to avoid side effects of Inappropriate Human Possession or IHP. IHP is when an unlicensed person attempts to rehabilitate a wild animal or to keep it as a pet. This study examines the effects of IHP on wildlife patients by comparing length of time in care and final disposition of patients by using an existing wildlife rehabilitation database. Overall, there was no difference between cases involving IHP and cases not involving IHP. Since there is anecdotal knowledge in the rehabilitation field that IHP does influence the animal, there are many reasons that this could not be reflected in this study. The main reason is that this study only looks at while the animals are in captivity and not after release. Release is also thought to be influenced because IHP cases often have clinically healthy animal at admission resulting in quick and frequent release as there is no underlying illness or injury as well as not knowing how long an animal is in Inappropriate Possession before being brought into a rehabilitation center. Further studies should focus on specific species that are more susceptible to imprinting and habituation as well as examining data on how long inappropriate captivity lasts before they are admitted to a wildlife center as that may have proportional effects.

Introduction:

Wildlife rehabilitation is the temporary intervention by humans on sick or injured wild animals, who would not otherwise survive, with the goal of release (Hashem 2019; Mullineaux 2014; Miller 2012; Molina-Lopez et. al. 2017; Ress and Guyer 2004). The goal of wildlife rehabilitation is for the animal in care to eventually be released back into the wild in a condition that enables them to survive equally as well as wild individuals (Molina-Lopez et. al. 2017; Miller 2012; Mullineaux 2014). It is understood that rehabilitation itself does not have much of an impact on populations of animals since it only focuses on individuals (Hashem 2019; Kirkwood and Best 1998). However, some

Historically, wildlife rehabilitation has existed for a very long time beginning simply with individuals who cared for wildlife and acted as stewards (Miller 2012). It has now become a common and expected practice when wildlife is in need, particularly when caused by humans (Williams 1990). Modeling has shown that restricted populations due to large scale events such as oil spills, benefits from the larger rehabilitation effort (Ryan 2003; Ratz and Lalas 2010). In fact, the rallying point for much of rehabilitation occurred in response to oil spills, bringing to light the many hazards caused to wildlife especially at the hands of humans (Miller 2012). At this point in time, the practice of wildlife rehabilitation has become a full blown profession and field, continuing to grow and constantly developing newer and better techniques and standards (Miller 2012; Nicholson et. al. 2007)

There are a multitude of subliminal uses for wildlife rehabilitation besides helping to heal individual injured or ill animals Some animals can be used as a captive resource when the situation is appropriate such as for breeding, educational purposes, or even as resources for

companionship and surrogacy of other animals in rehabilitation (Miller 2012; Nicholson et. al. 2007; Ratz and Lalas 2010). Most of the alternative uses for rehabilitation are coming to light with record keeping.

Record keeping of wildlife facilities can provide a ton of useful information. There is a responsibility of rehabilitators to collect and share records of the wildlife they interact with especially for use with local, state, and federal wildlife services such as the US Fish and Wildlife service (Miller 2012). These records can help to provide information on the usefulness and success of rehabilitation itself on individuals (Miller 2012), but beyond that it can start to provide unique information on a species that otherwise would not be available. One study looked at how wildlife rehabilitation data can be used for disease monitoring if a particular species is seen in abundance at a particular center (Camacho et. al. 2016). It can, and has, also been used in many other ways for research purposes, such as monitoring the effects humans have on wildlife (Ratz and Lalas 2010). Since rehabilitation has become so common, there are now thousands of rehabilitation centers worldwide to provide massive wealth of raw data to be used by researchers, but access to this data is limited and comparison of data between centers is complicated due to a lack of standardization (Molina-Lopez et. al. 2017).

There are many considerations to be made when caring for wildlife. Being in care for any length of time may induce stress in wild animals, caused by the close proximity to humans and novel stimuli of being in captivity, which may affect survival (Boissy 1995; Molony et. al. 2007; Wingfield et. al. 1997). Chronic stress may also affect the recovery process due to harmful immunological consequences (Carlstead 1996; Molony et. al. 2007), so it is important to follow

protocols. Standards have been put in place to ensure the well-being of an animal in rehabilitative care. This includes ensuring their wildness remains intact and giving them the most natural captive experience as possible allowing for smooth transition from the wild to rehabilitation and then back to the wild. Ultimately, animals can be successfully rehabilitated but will never be in as good of shape as if they remained wild in the first place (Trumble et. al. 2013). Not just anyone can provide care to a wild animal; a person must become licensed.

The steps to becoming a rehabilitator differ by state but usually include an application process which includes some age requirement, a state examination, apprenticeship, and review by the state either of facilities, veterinary collaboration or the individual (Department of Energy and Environmental Protection 2020; Division of Fisheries and Wildlife 2020; Maine Department of Inland Fisheries and Wildlife 2020; NH Fish and Game Department 2020; NJ Division of Fish and Wildlife 2020). Once someone has become a rehabilitator, there are also set standards they are required to abide by from the National Wildlife Rehabilitators Association (NWRA) in the United States (Miller 2012)..These standards come from a plethora of sources which are compiled and reviewed every few years for new additions to the best practices for keeping wildlife. Beyond these standards, there are countless studies that have more in-depth suggestions for specific species. Some standards are in place for the protection of the rehabilitator, especially against zoonotic diseases and the occurrence of compassion fatigue (Miller 2012, Englefield et. al. 2019) Most standards, however, are in place for the well-being of the animal in care.

Standards were designed specifically to increase the likelihood of animals to be released after rehabilitation, as well as to increase the success of their life in the wild post-release (Miller 2012; Hashem 2019).Many of these standards ultimately relate back to understanding a species' life history. It is of extreme importance for a rehabilitator to be familiar with the life history of an

animal. This could be related to the type of enclosure they are housed in (Miller 2012), the diet they should be fed (Miller 2012), the location and timing of their release (Hashem 2019; Rosatte and MacInnes 1989; Rosatte et. al. 2010; Mosillo et. al. 1999), or their well-being based on both behavioral and physical condition (Hashem 2019; Mcphee and Carlstead 2010). One such example is the importance of group-housing for young animals, especially birds, to avoid imprinting on humans (Miller 2012). Standards can even include regulation of release. Release location is important to decrease the spread of disease, decrease effects on resident animal populations as well as decrease the amount of animal movement due to these pressures (Rosatte and MacInnes 1989; Rosatte et. al. 2010; Mosillo et. al. 1999; Fritzell 1991) which could, in turn, decrease animal stress as well as human animal interaction.

Unregulated captivity may affect the recovery process, especially when it comes to the release. The standards set for rehabilitation are structured in a way to avoid habituation of the wild animal patients to humans (Hashem 2019). Habituation to humans can negatively affect animals in many ways by increasing human animal interactions/conflict (Hashem 2019) and decreasing reproductive success through social development disruption and imprinting (Carlstead 1996). Imprinting on humans, rather than learning from other conspecific animals, means the animal won't learn the proper social behaviors and peer recognition (Bateson 1966).

A study done in 2019 analyzed the effects of human interaction during rehabilitation on the success of black bears. It found that limiting the amount of interaction was essential in the increased success rate when comparing the bears that were treated by multiple rehabilitators and viewed by the public to the bears that were subject to stricter protocols of only working with a few rehabilitators with very limited contact (Hashem 2019).

With release as the goal, keeping an animal in its wild state should be a key component of any rehabilitation plan (Miller 2012). Although rehabilitators have taken measures to ensure that animals are properly cared for to ultimately be released back into the wild, there are still cases where humans try to care for wild animals without the knowledge of what is appropriate for them. A center in Catalonia, Spain which assessed all the cases encountered, found that captivity was the highest admission circumstance with 40% of total admissions being due to illegal confiscation of protected species (Molina-Lopez et. al. 2017).

When an unlicensed person attempts to rehabilitate a wild animal or keep it as a pet; it is called inappropriate human possession. The purpose of this study is to examine the effects of inappropriate human possession (IHP) on wildlife rehabilitation patients by comparing the length of time in care and final disposition of the patients.

Methods:

Data for this research was obtained from WILD-ONe, the Wildlife Incident Log/Database and Online Network. This is a database run by The Wildlife Center of Virginia in attempts to standardize aspects of wildlife rehabilitation data collection. It is used by over 100 organizations in 5 countries.

Some useful terms defined by this database are final disposition, which is the final state of the animal whether it is released, euthanized, dies, transferred, or kept as a captive "animal ambassador" or educational animal, and circumstance of rescue which is the reason that an animal is admitted to a rehabilitation center. For the results it is also important to know the difference between primary circumstance of rescue and non-primary, or what I will call any secondary circumstances. Primary circumstance is the main reason an animal came in. Most

times, the primary circumstance for an animal coming to a rehabilitator will be due to illness or injury and IHP is a secondary circumstance because it is necessary knowledge for their care.

For the purposes of this research data was selected from the year 2012-2017 using only non-active cases, meaning they have been fully concluded with a final disposition established. Small mammals were defined as anything fox or beaver sized and smaller. Cases were also restricted to the Northeastern portion of the United State: Maine, New Hampshire, Vermont, Massachusetts, New York, Rhode Island, Connecticut, Pennsylvania and New Jersey.

The cases utilized in the paired analysis consisted of 2 sets. The first set of cases were ones where IHP was involved in the case but was not the only reason an animal was brought in (ie: there was an underlying illness or injury). If there was no circumstance of rescue besides IHP, they were not included in the paired analysis. The second set were cases of similar surrounding circumstances but where IHP was not involved. The similar surrounding circumstances were restricted to the same season, same species, and same general age (juvenile vs.adult) or as much as possible Nine cases were excluded from the paired analysis because they were not the same species in the same season. The 2 parameters that were evaluated were the length of time at the rehabilitation facility and the final disposition of the patient.

Results:

Out of the 13,354 cases that fit the parameters of this study, 832 had IHP equating to 6%. Table 1 has a species breakdown of all the IHP cases included in this study. Of the 6%, 4%, or 588 cases, had IHP as the primary rescue circumstance and 2%, or 244 cases, had IHP as a secondary circumstance of rescue as can be seen in Figure 1.

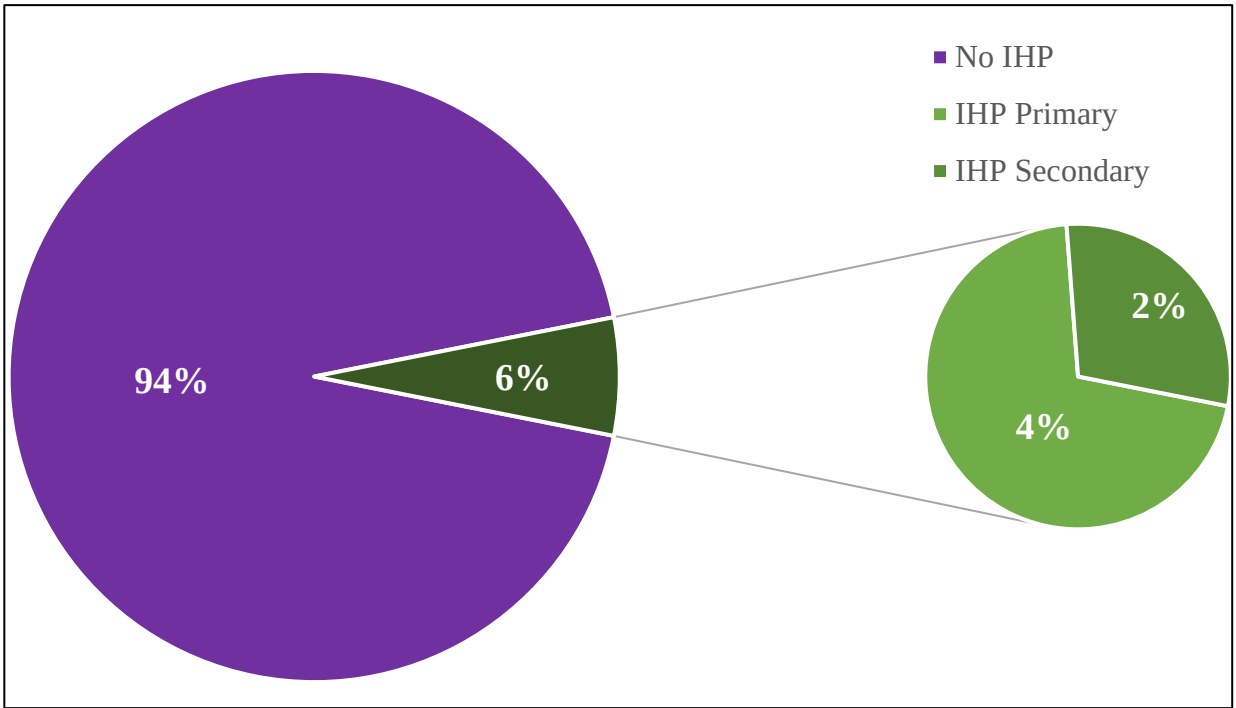

Figure 1: Percentage of cases where IHP was involved and comparison of when it was listed as the primary circumstance of rescue or a secondary circumstance.

There was no difference seen in the days in care. Cases with IHP and without both had an average of 19 days in care. Within the IHP category, cases where IHP was the primary circumstance of rescue were in care for an average of 20 days, slightly higher than when IHP was a secondary circumstance which were in care for an average of 17 days.

There was a difference in the percentage of clinically healthy animals in either circumstance. In cases of IHP the percentage of cases that were clinically healthy was 58%. In non-IHP cases, only 38% of cases were considered clinically healthy upon examination.

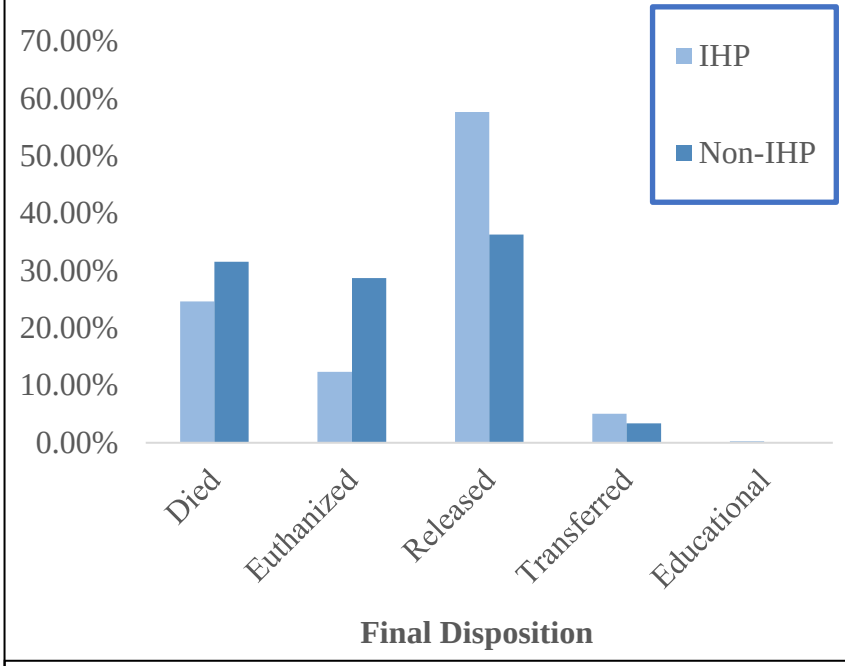

Figure 2: Comparison of IHP versus non-IHP percentage of disposition types.

Figure 2 shows a comparison of the percentages of disposition for animals of IHP and non-IHP. The highest percentage for both categories was seen for the release disposition with 57.69% of IHP cases and 36.30% of non-IHP cases. Most percentages were around the same amount except for the euthanasia disposition which had an over 15% difference. IHP cases had a final disposition of euthanasia 12.38% of the time and non-IHP cases had euthanasia as a final disposition 28.70% of the time, a 16.32% difference. There was a higher percentage of educational animals in IHP cases (0.24%) than there were in non-IHP (0.06%). There was also a higher percentage of transfers in IHP (5.05%) than there were in non-IHP (3.39%). Finally, non-IHP had a higher

percentage of deaths (31.54%) than IHP did (24.64%). Figure 3 shows a breakdown of the final disposition of IHP cases only with the distinction of whether IHP was the primary or secondary circumstance of rescue. This graph shows individuals rather than percentages. The highest number of IHP cases (480) ended with release with 378 primary (79%) and 102 secondary (21%). The next highest disposition was death seen in 205 cases total, 134 primary (65%) and 71 secondary (35%). The third highest disposition was euthanasia with 103 cases, 56 of which were primary (54%) and 47 of which were secondary (46%). The second to lowest amount were transfers to a different facility. This made up 42 cases with 18 or 43% being primary and 24 or 57% being secondary. The lowest seen disposition was the animal being used as an educational animal and this was only seen when IHP was the primary cause and in 2 cases.

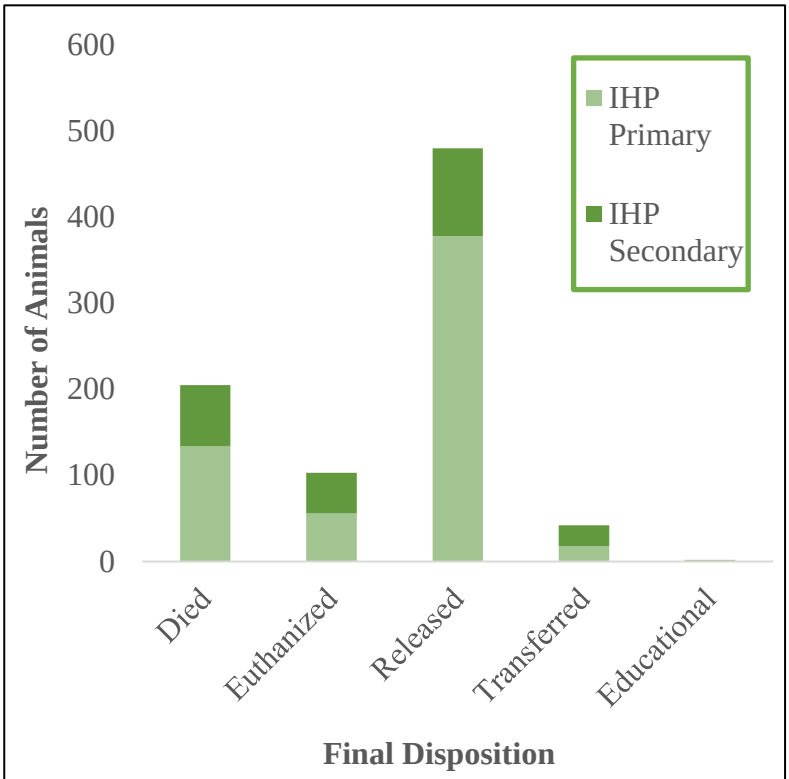

Figure 3: Breakdown of final disposition of IHP Cases by Primary or Secondary circumstance of rescue.

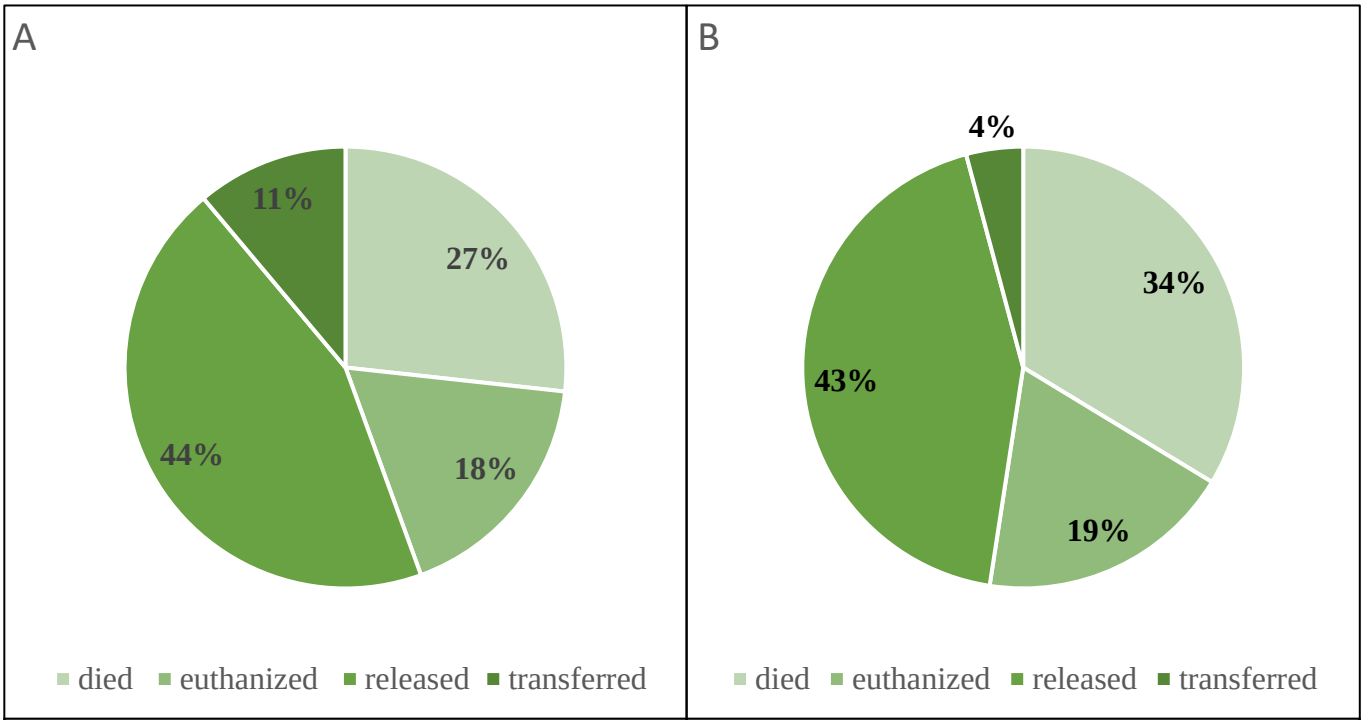

Figure 4: Results of the paired case comparison. (**A**) Percentages of the final dispositions of paired IHP cases. (**B**) Percentages of final dispositions of paired non-IHP cases.

The paired case comparison showed few differences as well. 288 animals were included in both IHP and non-IHP. Figure 4 shows the results of both dispositions analyse. The highest percent for both IHP and non-IHP is release with 44% and 43% respectively. The next highest disposition for both was death with 27% of IHP cases and 34% of non-IHP. Next was euthanasia with 18% in IHP cases and 19% in non-IHP cases. Finally, the disposition seen least was transfer at 11% for IHP and 4% for non-IHP. None of the cases included in the paired case comparison resulted in the educational animal disposition. Comparing average days in care of these cases, IHP had an average of 18 days and non-IHP had an average of 20 days. When looking at the percentage of clinically healthy patients, IHP cases had 41% of animals being clinically healthy (118 out of total 288). Non-IHP cases had 45% of cases as clinically healthy (131 out of 288 total cases).

Common Name	Scientific Name	# of Animals	% of IHP Mammals
eastern cottontail	Sylvilagus floridanus	296	35.58%
eastern gray squirrel	Sciurus carolinensis	284	34.13%
Virginia opossum	Didelphis virginiana	54	6.49%
white-footed mouse	Peromyscus leucopus	48	5.77%
common raccoon	Procyon lotor	47	5.65%
red squirrel	Sciurus vulgaris	26	3.13%
new england cottontail	Sylvilagus transitionalis	13	1.56%
striped skunk	Mephitis mephitis	12	1.44%
big brown bat	Eptesicus fuscus	10	1.20%
eastern chipmunk	Tamias striatus	9	1.08%
northern flying squirrel	Glaucomys sabrinus	8	0.96%
north American porcupine	Erethizon dorsatum	4	0.48%
woodchuck	Marmota monax	4	0.48%
house mouse	Mus musculus	3	0.36%
eastern woodrat	Neotoma floridana	3	0.36%
red fox	Vulpes vulpes	3	0.36%
meadow jumping mouse	Zapus hudsonius	2	0.24%
northern short-tailed shrew	Blarina brevicauda	1	0.12%
southern flying squirrel	Glaucomys volans	1	0.12%
snowshoe hare	Lepus americanus	1	0.12%
meadow vole	Microtus pennsylvanicus	1	0.12%
ermine	Mustela erminea	1	0.12%
gray fox	Urocyon cineroargenteus	1	0.12%

Table 1: Species breakdown of all IHP cases.

Discussion:

There are many considerations to be made when thinking about these results. One consideration is the honesty of the rescuer. When people bring an animal into a rehabilitator they may not share all the information about the rescue situation of the animal, especially if they think it may be considered "wrong". This means that in some cases IHP could have been involved but was not reported or was not obvious to the rehabilitator admitting the animal. Also along these lines, the database used in this study is not employed by all rehabilitators. It is mostly geared toward larger rehabilitation centers instead of individual practioners. This means that any animals cared for by these personally licensed individuals is not included in this type of data. In addition, there is not always a way to know how long an animal was in the possession of an unlicensed individual before being brought in. It would be expected that longer time in improper captivity would contribute to more of an impact. There is no way to know how long an animal was with a rescuer before being brought in unless the rescuer provides that information and, again, there is no guarantee that they will so this would be hard to track. This is an important limitation of the current analysis, as comparing all cases of IHP could be comparing an animal with 2 days of IHP to one with 2 months of IHP. There could very well be a proportional effect that is not evident in this study.

A study on Wildlife Rehabilitation Centers in Catalonia attributed the high rate of release in animals where there is human possession to the high proportion of animals that were actually healthy (Molina-Lopez). If an animal is healthy and has no illness or injury they can be released right away and do not need to stay in the care of a rehabilitator. One of the categories of IHP is when humans try to keep wildlife as pets and in these cases there is usually no injury or illness to

the animal. These differences could explain the varying percentages of dispositions of euthanasia and death as well.

Another important consideration is the fact that some centers categorized events slightly differently than other centers. This made it difficult to make meaningful comparisons between data points, as they could mean different things in different places. Overall, the database is a great start toward the compilation and standardizationof wildlife rehabilitation information but, as with any system there are still discrepancies to be addressed. . Similar studies haverestricted their analysis to a single rehabilitation center in an attempt to circumvent this limitation. For example, Molina-Lopez (2017) did not use the WILDOne database but instead only considered cases in their "IHP" if they had been in unauthorized captivity for a certain amount of time

One specific instance where this became evident is with the use of IHP versus confiscation. This study only focused on IHP and did not consider cases of confiscation in that category. IHP could have 3 added specifications to it which are: abduction with intent to rescue, unauthorized rehabilitation, or pet. There is no defining factor for when an animal is put in the confiscation category or if they are categorized as IHP/Pet. Other research looking at human influence on wildlife rehabilitation did include confiscation with IHP in their studies (Hashem 2019).

Another important aspect of evaluating an animal's success occurs after rehabilitation. The current study looked at the time an animal is in care. There is no way to examine their post release success with this data set. Other studies have found that post release results of IHP cases do vary and show different levels of success by looking at factors including human contact and survival. One study on otters found significantly different results between different rehabilitation strategies that were only seen because they looked at post-release success - the

immediate release success between all strategies was equal (Nicholson 2007). Another study on black bears determined that rehabilitated bears with successful releases had more incidence of human interactions post-release. This led them to implement new rehabilitation practices that were followed by a decrease in post-release human/animal interactions due to the new protocol (Hashem 2019).

It would be expected that future studies will try to gather more pre-admission data on IHP animals to look at potential proportional effects. They would also look further into species that may be more susceptible to human contact and the post-release conditions of IHP patients.

Acknowledgments:

I would like to thank Dr. Janet Anderson, my honors thesis advisor, for her continued support throughout my senior year as I was doing this project. I would not have been able to do it without her. I would also like to thank the Center for Wildlife of Cape Neddick, ME for hosting me as an intern and volunteer. This was where I was able to be introduced to the world of wildlife rehabilitation and gain preliminary idea and knowledge. Finally, I would like to thank the Wildlife Center of Virginia for access to their database and Dr. Ernesto Dominguez for his role in the data acquisition as well.

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