

### Literature Review #3: Annotated Bibliography

I organized my annotated bibliographies first by putting the secondary sources first to give background information on both bears and bear rehabilitation. Then the primary sources were organized by organized by year of publication.

**Kemmerer, L. (2015). Bear basics. In L. Kemmerer (Eds.), *Bear Necessities: Rescue, rehabilitation, sanctuary, and advocacy* (pp. 15–34). Brill. [https://doi.org/10.1163/9789004293090\\_003](https://doi.org/10.1163/9789004293090_003)**

This article discusses the diversity of bear species across the globe as well as their history, morphology, and ecology. All bears species, from giant pandas to American black bears have stemmed from the same ancestral bear, Dawn bear. American black bears along with six other species diverged from the group called “True Bears” which excludes giant pandas. Canada and the United States are home to three types of bears including brown, black, and polar bears, which all vary in the climates they reside in. Black bears can reside in a variation of climates such as tundra, prairies, forests, and urban environments. Black bears have typically short tails, legs, and neck with long non-retractable claws. Most of a bear’s time is spent foraging, collecting foods which are typically dependent on the season and food availability. They have been labelled with the title as easily food conditioned which is why habituation to humans can be more detrimental to them that possibly other species. Other behaviours include denning which is an evolutionary adaptive trait to adjust to food shortages and cold weather. The largest threats to black bears are hunting, trapping, poaching, vehicular accidents, and government animal control with 80% of the Pacific Northwest’s hunted black bears being killed due to forestry interest. This article gives informative background details about black bears including its morphology, behaviours, and endangerment. It really highlights the impact humans have begun to have on black bear populations and why rehabilitation may become more widespread in the future.

This article is included in this literature review because it gives background information on black bear behaviours. It gives examples of foraging and denning behaviours which are both included in this literature reviews topic. Rather than presenting new ideas it gives baseline information that can be used for comparisons for the primary articles. This background information helps give comparable aspects to wild-reared bears and that of the bears that have been released from rehabilitation.

**Cressey, C. L. (2015). 9,540,000 Square Miles, 800,000 American Black Bears, 3 Rescues. In L. Kemmerer (Eds.) *Bear Necessities: Rescue, rehabilitation, sanctuary, and advocacy* (pp. 90–98). Brill.**  
**[https://doi.org/10.1163/9789004293090\\_010](https://doi.org/10.1163/9789004293090_010)**

As bear and human contact becomes more prominent as we increase urban development, we need to also increase support for rehabilitation centres and education about black bears to better suit this animals' survival. This chapter of "Bear Necessities" discusses the importance of rehabilitation centres for black bears in North America. This article uses different sources to look over the history and the different organizations that help with this rehabilitation. There are only three organizations across North America that focus on the rescue, rehabilitation, release, and relocation of black bears. BWU, Bear with us, founded in Ontario, acts as both a rehabilitation/rescue centre, as well as a permanent home for bears who were unable to return to the wild. There is also IBRR, Idaho Black Bear Rescue, who have helped with the rehabilitation of over 200 cubs in the United States. Lastly ABR is the Appalachian Bear Rescue, who work to rescue black bears using a variety of enclosures to help rehabilitate the bears and work on habituating them to as close to wild-life as possible. This ensures the bears do not get used to human contact or condition them to associate food with humans. This would hopefully help the bears when released to not seek out anthropogenic resources and keep them and humans safe. Increasing support for rehabilitation centers is important. It also becomes more imperative to research more about

the behaviour and fitness of rehabilitated animals through tracking these bears and understanding if their behavior is like those of wild-raised bears, and if the rehabilitation has affected their fitness in anyway.

This article was chosen for this literature review as it explores the importance and different associations within North America that focus on the rehabilitation of black bears. This article helps understand how the black bears are rehabilitated and includes case studies of bears that have gone through the rehabilitation process. This article summarizes work on the topic and provides important information to why black bear rehabilitation is important and needs to become more prominent. This study opens the opportunity to study bears that come out of these organizations to help solidify the effectiveness of these associations and the rehabilitation process.

**Pyke, G.H., & Szabo, J.K. (2017). Conservation and the 4 Rs, which are rescue, rehabilitation, release, and research. *Conservation Biology*, 32(1), 50-59. [https://doi-org.ezproxy.lib.ucalgary.ca/10.1111/cobi.12937](https://doi.org.ezproxy.lib.ucalgary.ca/10.1111/cobi.12937)**

When animals get injured or becomes involved in human conflict wildlife rescue steps in. The rescue process involves three steps- rescue, rehabilitation, and release. The rescue phase includes removing the animal from their native environment and being taken into care. The rehabilitation stage consists of helping the animal recover or keeping them within a simulated environment, so they can continue to develop. When the animal is evaluated as fit to return to the natural environment, they will be released back into the wild during the release stage. This article looks through the literature to understand how much information, limitations, and research potential there is for wildlife rehabilitation studies. These reviews were categorized as opportunistic or targeted rescues. Opportunistic rescues are rescues where the search for animals was random compared to targeted rescuers where searches occurred at particular locations and times. For opportunistic rescues it was found that most rescues were a result of

anthropogenic causes such as traffic accidents, hunting, etc. It was found that there were few studies that focused on the success of opportunistic rescued animals once released. It was found that for targeted rescues there was very little focus on rehabilitation or experimental approaches to the studies. The studies primarily focused on the post release of the targeted animals following events such as oil spills, wildfires, storms, etc. These results show that there are still gaps within the literature about the rehabilitation of rescued animals and studying the success of these animals once they've been released. The importance of this study is to identify the gaps within the scientific knowledge of animal rescue and determine the next steps that can be taken to fill them, such as widening the scope of studies, focusing on the effects of rehabilitation and the success of animals being released.

This article is included in this literature review as it focuses on the gaps within the literature knowledge of animal rehabilitation and the success of animals once released from rehabilitation. This article presented an overview of the type of research that is still needing to be done such as looking at the post release success of opportunistic rescues and the rehabilitation of targeted rescues. This article gives background knowledge on the research done on rehabilitated animals and shows the limitations that may occur during my literature review.

**Clark, J.E., Pelton, M.R., Wear, B.J., & Ratajczak, D.R. (2002). Survival of orphaned black bears released in the Smoky Mountains. *Ursus*. 13, 269-273. <http://www.jstor.org/stable/3873207>**

Baby black bears can become orphaned when their mother is killed or abandons her cubs in different ways due to anthropogenic or environmental disturbances. Black bear cub self sufficiency is not matured until five to six months, meaning if they are left without a mother before that, they have a lower chance of survival. Non-profit rehabilitation organizations such as the Appalachian Bear Center (ABC) work to rehabilitate these cubs and other bears in need to get them ready to be released into the

wild. When this article was published very little studies evaluating orphaned black bear survival after rehabilitation were available. This study investigated the survival of 11 orphaned bears that were rehabilitated and released back into the wild. These bears were all rehabilitated at ABS and released into the Smoky Mountains of Tennessee and North Carolina. The bears were equipped with radio collars to monitor survival of the bears between January 1998 to October 1998. The point of this study was to determine if a bears survival rate in the wild would be impacted by the rehabilitation process. Of the 11 bears nine remained alive during the study and two were unknown due to the loss of the collar. These results showed that the rehabilitation of these bear cubs did not have a negative impact on the bears survival when they were released into the wild on a short-term basis. These results offer up a successful wildlife management practice of rehabilitating bears who have been orphaned, hurt, or encounter humans instead of killing them. A question that could be built from this study is what results would be seen if the bears were evaluated for longer, would the short-term survivor results match the long ones as well?

This article is important for my literature review because it helps us understand the fitness of bears that have been through the rehabilitation process. To better understand how these processes may affect their lives after their release will help gain support for more rehabilitation centers to be funded rather than bears being exposed of. New questions to potentially explore would be how these results are being shown to the public or to governments to help gain support for black bear rehabilitation. This article also only explores survival of these bears so other behaviours would be good to explore as well.

**Beecham, J.J., Hernando, M.D.G., Karamanlidis, A.A., Beausoleil R.A., Burguess, K., Jeong D., Binks, M., Berezky, L., Ashraf, N.V.K., Skirpova, K., Rhodin, L., Auger, J., & Lee, B. (2015). Management implications for releasing orphaned, captive-reared bears back to the wild. *The Journal of Wildlife Management*, 79(8), 1327-1336. <https://doi-org.ezproxy.lib.ucalgary.ca/10.1002/jwmg.941>**

While rehabilitating black bears has been going on for more than 30 years, tracking the fates of released bears has not been well documented. The purpose of this study was to track post-release cubs and explore factors such as human conflict, reproduction, mortality, and movement. This article looked at three different bear species, in total 550 bears, across different locations using GPS collars and ear tags. For my literature review. Orphaned bears were kept in captivity 2-14 months in a variety of enclosures dependent on their age, temperament, etc. They were released into varying locations across the United States within areas that were already inhabited by their species. Reproduction age and rate was found to be similar to that of wild black bears, and bear movement did not converge towards human resources or captive rearing facilities. It was found that humans, age, and weight had the largest impact on bear mortality, with humans being the main cause of mortality due to hunting. The bear's weight was shown to have an impact with human conflict as the heavier the bear weighed when released the less likely it was to search for human resources. No evidence was found that bears with mothers who had human conflict histories were anymore likely to behave in human conflict interactions. Overall, the mechanisms behind conflict behaviour within black bears is still unknown and still presents questions for further research to explore. These results of significant because they show that the rehabilitation process did not create a negative impact on the bears fitness once sent out into the wild. This research also opens ideas about how weight may act as a factor to a bear's success after rehabilitation and how rehabilitation centers could use this information when re-establishing the bears

This article was chosen to be in my literature review because it helps show the behaviour and causes of mortality of the rehabilitated bears after their release. This type of article allows for more evidence that bear rehabilitation is not detrimental to a bear's survival after release or will pose a greater threat to humans. This article focused more on mortality of the bears than previous articles studied and looks at

hunting being a primary cause of death within the bear population. This article brings up important points about hereditary implications that cause human conflict.

**Smith, W.E., Pekins, P.J., Timmins, A.A., & Kilham, B. (2016) Short-term fate of rehabilitated orphan black bears in New Hampshire. *Human-Wildlife Interactions*, 10(2), 258-267.**

<https://doi.org/10.26077/grqp-ty92>

One concern revolving around rehabilitation is that bears will become habituated with humans leading to more nuisance behaviours. Nuisance behaviours occur when bears no longer fear humans and begin to pose a threat as they seek out human resources. This study analyzed the dispersal, survival, and nuisance behaviour of released black bears in New Hampshire. Bears were kept in rehabilitation until the spring following their capture after attaining sufficient body mass and self sufficiency. One set of bears were released in 2011 and another in 2012. The bears were fitted with GPS radio collars that recorded coordinates every two hours and would fall off in November. Six of the ten from the 2011 sample survived the hunting season while all three bears from the 2012 sample did not. It was concluded that all deaths were caused by humans. There was no obvious pattern for dispersal direction, possibly due to a small sample size, but none of the bears returned to the rehabilitation facility. There were also no reports of nuisance behaviour in the 2011 sample however the 2012 sample were all involved in events such as destruction of beehives. The results of this study showed that while most of the rehabilitated bears dispersed away from human resources, some bears still displayed nuisance behaviour. These results were attributed to availability of resources between the two years the samples were conducted. This article concludes that there while rehabilitation may increase some habitation to humans, there is no correlation between rehabilitation and nuisance behaviour. Longer duration of the study and a larger sample size is a potential addition to this research in the future to better understand

long term behaviour, survival, and movement. This study also shows that one of the biggest factors in rehabilitated bear mortality is hunting by humans.

This article is included in this literature review because it focuses on how rehabilitation of black bears affects their dispersal and nuisance behaviour once released. This study uses the same methodology as other studies however it focuses on a shorter time span to concentrate on when bears are most vulnerable as they adapt to the environment. This article gives a clear definition of nuisance behaviour and provides evidence that there is no correlation between rehabilitation and the behaviours. Future research could be done using the same methods but with a larger sample size to give additional support for these results.

**Myers, P.J., & Young, J.K. (2018). Post-release activity and habitat of rehabilitated black bears. *Human-Wildlife Interactions*, 12(3), 322-337. <https://doi.org/10.26077/jnft-5796>**

While there have been articles written about the rehabilitation process of black bears, *Ursus americanus*, very few look at the post release behaviours of these bears. This study focused on the behavior and fitness of rehabilitated black bears, when released back into the wild in comparison to wild-raised bears. For this study researchers investigated the following behaviours- resource use, chronology, and need for anthropogenic resources differed. During this study researchers took six orphaned bears who had been rehabilitated and released into specifically chosen release zones in Utah and tracked their behaviour using GPS collars. Resource use was measured using RSF (Resource Selection Function) models to estimate how much resources were used by an individual compared to how resources were available. For denning chronology, they were also able to see when the released bears entered their den and could compare that to wild-raised bears timing. The results of the study



showed that the bears did not immediately seek out human resources, and den chronology and resource selection were very similar to wild-raised bears. The overall study showed that human interference in the form of rehabilitation does not have a negative effect on the bears behavior or fitness. They found that bears didn't immediately seek anthropogenic resources, meaning after rehabilitation they didn't automatically rely on human resources and were able to provide for themselves. The study also found that the rehabilitated bears mass was larger than the estimated mass of wild-raised bears of the same age. This could mean that the state that they were released in, physically, gave them an advantage over other wild bears when getting ready for entering their den.

This research is included in this literature review because it focuses on how the rehabilitation of black bears effects their behaviour. The results showed that rehabilitating bears doesn't decrease their fitness or impact their behaviors significantly when comparing them to wild-raised bears. This study is important because it use methods that hadn't been used before for this type of study such as analyzing their behaviors using GPS tracking. It is important to use this method because researchers tracked these bears for up to 2 years and made sure their rehabilitation was successful and analyze their behaviors and fitness.

**Blair, C.D., Muller, L.I., Clark, J.D., & Stiver, W.H. (2019). Survival and conflict behavior of American black bears after rehabilitation. *The Journal of Wildlife Management*, 84(1), 75-84. <https://doi-org.ezproxy.lib.ucalgary.ca/10.1002/jwmg.21783>**

As urban development continues to impede of wildlife habitats, the demand for action for incidents of injured or orphaned black bears continued to increase. While rehabilitation of black bears is well documented during their time in rehabilitation facilities, there has been poor documentation of their survival once released. Post-rehabilitation survival and other behaviours is still unknown which doesn't

provide evidence if rehabilitation is successful or not. Without proper evidence rehabilitation of black bears will likely not be used as much as it should due to worries of disease transmission and human-bear conflict. This article looked at the survival and conflict of 42 post release black bears coming from the Appalachian Bear Rescue (ABR) using GPS collars. All bears were housed at the ABR facility in enclosures that resembled a forest setting and limited human presence and feedings to encourage natural foraging behaviour. The results found that the annual survival rate of the released cubs was like that of wild black bear cubs. The conflict rates within the bears being studied also showed similar results to that of wild bears. While other studies had not found a link between cubs being more conflict prone if they had come from known-conflict mothers, this research found that cubs did have a great chance of being involved when their mother had known-conflict histories. This is an important finding as it provides greater context into previously known information and could allow for different rehabilitation measures to be taken when dealing with cubs who come from known-conflict mothers. Like other research, this article shows that there are no significant negative implications to black bear rehabilitation and release when it comes to conflict and survival. A question that arises from this article is what influences cause the conflict behaviour to be passed down from cub to mother.

This article was chosen to be a part of my literature review because it explores new findings that other articles within my review do not such as advancing the knowledge that there may be a link between conflict issues within cubs who come from a known-conflict mother. The results of this article also reinforce the results seen in other research that show that rehabilitation and release of black bears does not have negative connotations to their survival and does not increase human-bear conflict. Research looking into proximate and ultimate influences of conflict behaviour could be advantageous in the future.

**Hashem, B. J. (2019). Evaluating the success of an orphaned American black bear (*Ursus americanus*) rehabilitation program in Virginia. *Journal of Wildlife Rehabilitation*, 39(2), 7–12.**

[https://thewrc.org/wp-content/uploads/2019/05/39\\_2\\_F.pdf](https://thewrc.org/wp-content/uploads/2019/05/39_2_F.pdf)

Black bear rehabilitation has been a process going on for 30 years and the research put into this process has identified many elements of creating successful releases. These elements include not habituating bears with humans, selecting habitats with abundance of food availability and specific time of release. The success of the bears release is measured in different ways such as not being involved in human conflict and adopting similar behaviours such as denning and dispersal behaviours. This article looks at the collection of post-release data done on black bear cubs following their rehabilitation. This data included survival, dispersal, breeding success, and human conflict. This data was also compared to data collected from wild reared bears to describe any negative implications seen from the rehabilitation process on the released bears. The results showed that different rehabilitation programs saw different success rates due to factors during the rehabilitation process. It was shown that bears produced higher human conflict after release if there were more human interaction during rehabilitation and a shortage of natural food in the release site. The results also showed that there was a higher probability of human conflict within released bears if they were released as cubs. Overall, most releases were classified as success allowing the conclusion to be made that rehabilitation is a viable form of wildlife protection and management. This study shows the importance of how the rehabilitation and the release process is carried out and how more research on producing successful releases is an important step to take.

This article is included in my literature review as it focuses on the success of post-release black bears after rehabilitation. Unlike other studies it compared different rehabilitation programs and focused on elements that could render the rehabilitation less effective. It also found that cubs were more likely to be involved in human-conflict once released which is a result that hadn't been noted before. This research is important because it gave a measurable and solidified account of what constitutes a

successful release. Like other studies it did conclude that black bear rehabilitation was a valuable form of wildlife management.

**Gillikin, M.N., Urbaneck, R.E., Olfenbuttel, C., & Dukes, C.G. (2021). Spatial analysis of rehabilitated American black bears to assess conflict potential. *BioOne Complete*, 32(15), 1-11. <https://doi-org.ezproxy.lib.ucalgary.ca/10.2192/URSUS-D-20-00025.2>**

Orphaned black bear cubs are becoming more prevalent with the increase in human-bear interactions due to direct and indirect human activities and influences. Human-bear conflicts are different from human-bear interactions, as conflict contains negative connotations, where human health, safety, or economic damage to property is involved. Public perception of bear rehabilitation has unfortunately become synonymous with human-bear conflict and past studies have shown that this conflict can be influenced by length of time in captivity and accessibility to human resources. This study's objective was to determine if rehabilitated bears created a home range after release and if a difference was seen between males and females. This study also looked at if bears who displayed transient behaviour, meaning they did not set up a permanent home range, were more likely to seek out anthropogenic resources. Rehabilitated bears were fitted with GPS collars and used ArcMap to calculate distance the bears travelled. The results found that male bears travelled farther than female bears do and weighed more than they did, however no correlation was found between weight and transient behavior. Only a small number of bear-human conflict was seen, evidence that rehabilitation of black bears does not habituate the bears to human resources. For management implications these results show that bears should be released in areas with abundant resources, so they are more inclined to create a home range. The results also provided evidence that rehabilitation programs did not increase the likelihood of human-bear conflict once bears had been released.

This article in my literature review because it discusses the impacts that rehabilitation has on the spatial movement of black bears after they have been released. This article presented a different study inquiry than other articles included as it focuses on the creation of home ranges and is also the first to define human-bear conflict compared to human-bear interaction. Like other studies is showed that rehabilitation did not habituate the bears to humans and could create home ranges much like wild bears. One question that can be studied further is the effects of rehabilitated bears weight on creating home ranges.