Annotated Bibliography

Du, Y., Huang, Y., Zhang, H., Li, D., Yang, B., Wei, M., Zhou, Y., & Liu, Y. (2012). Innate predator recognition in giant pandas. *Zoological Science*, *29*, 67-70.

Captive giant pandas have some level of innate predator recognition, or the ability to detect predators primarily through their olfactory sense. Field studies show that giant pandas face a high mortality risk during their encounters with wild dogs and leopards due to inexperience; thus, training in predator avoidance should be implemented in reintroduction programs. Du’s article is somewhat contradictory; it also says that predator recognition training should be of little concern in reintroduction programs and we should focus on foraging and social behavior. Other articles do not mention predators, so predation may or may not be a significant challenge to the pandas. Du’s focus is on improving the reintroduction system of captive pandas rather than to address issues of habitat loss, although he agrees that habitat loss is the greatest threat to pandas. This recent study was backed by the Centre for Conservation and Research for the Giant Panda.

Qi, D., Zhang, Z., Hu, Y., Yang, X., Wang, H., & Wei, F. (2011). Different habitat preferences of male and female giant pandas. *Journal of Zoology*, *285*, 205-214.

Female pandas have a narrower distribution of habitat preferences than male pandas. Both sexes prefer high-altitude conifer forests with gentle slopes (10⁰ ≤ 20⁰) away from villages. Conifer forests are an important ecological requirement for giant pandas, and conservation strategies should consider the habitat preference differences between male and female pandas, especially in reintroduction. Like Du, Qi addresses the issue of the reintroduction of captive giant pandas. However, Qi also acknowledges that forest exploitation, fragmentation, and degradation are the major threat to pandas, while Du does not. This research was supported by the National Nature Science Foundation and the China Postdoctoral Science Foundation.

Ran, J., Du, B., & Yue, B. (2009). Conservation of the endangered giant panda ailuropoda melanoleuca in china: successes and challenges. *Fauna & Flora International*, *43*(2), 176-178.

Although reserves and other conservation implications are in place, giant pandas face a variety of challenges and they remain an endangered species. Ran agrees that habitat fragmentation is the greatest threat to pandas and believes that it is caused by anthropogenic expansion in agriculture and infrastructure development. While the survivorship of pandas in captivity has increased significantly since the 1970s, panda reserves are short of funds and lack the capacity for effective protection. Additionally, the giant panda is dependent on the availability of bamboo which is not reliable due to the flowering cycle of bamboo. Ran objectively provides a good summary of challenges facing the giant panda and provides background of the issue. His goal is to spread awareness of the challenges facing the panda and to emphasize the importance of the panda as a flagship for conservation. However, he does not suggest methods for conservation.

Swaisgood, R., Wei, F., Wildt, D., Kouba, A., Zhang, Z. (2009). Giant panda conservation science: how far we have come. *Conservation Biology*, 6, 143-145.

Recent advances in panda conservation research since 2000 help to conserve giant pandas, but there is still a lot of progress to be made. Old growth forests were discovered as a determinant of habitat suitability rather than forest slope as previously thought. This development builds off previous studies that advocated protection of habitat; conservation efforts should focus primarily on the conservation of old growth forests. Climate alterations can cause the loss of 35-40% of panda habitat in next 80 years; other sources did not examine effects of climate change. In his analysis of the state of the field, Swaisgood calls for an updated estimate of population size, which is crucial for future research. The outdated figure on panda population size limits the application of growth models. Additionally, a new survey will determine the efficacy of recent conservation strategies and dictate future efforts.

Zhang, W., Hu, Y., Chen, B., Tang, Z., Xu, C., Qi, D., Hu, J. (2007). Evaluation of habitat fragmentation of giant panda (Ailuropoda melanoleuca) on the north slopes of Daxiangling Mountains, Sichuan province, China. *Animal Biology*, 57(4), 485-500.

The giant panda population has decreased in recent years. The amount of suitable habitat for giant pandas has been steadily decreasing due to human activities since 2000, and only 3.5% of the total bamboo area available is optimal. Zhang agrees that habitat fragmentation is the major cause of species extinction. This article is useful for understanding habitat fragmentation and its effects on giant panda populations. Zhang recommends the establishment of a corridor between panda populations to increase genetic diversity, reducing the number of people who comes into mountains, and developing the local economy to prevent the exploitation of the forests. Like Ran, Zhang touched on the conflict between economic harvesting of bamboo and the conservation of pandas. The scope of this study may be limited because only one province was observed. This study was backed by the National Natural Science Foundation of China and the World Wide Fund for Nature.

Zhou, Z., Pan, W. (1997). Analysis on the viability of a giant panda population. *Journal of Applied Ecology*, 34, 363-374

In recent decades, the giant panda population has decreased rapidly due to habitat destruction and fragmentation. A projected model indicates that the subpopulation in the Shuidonggou Valley will be stable for 200 years and that carrying capacity is the most important factor restricting population increase. Zhou suggests that poaching will greatly decrease the population survival; however, this conclusion may be a result of the small sample size of the study and the implications may not be as significant in larger populations. This model was based on stable conditions and is outdated; rapid growth and expansion has rapidly degraded panda habitats since this study was conducted. Due to simplifications and assumptions in the model, results of this study should be interpreted broadly. However, suggested conservation efforts are similar to those of other studies and include prevention of further habitat loss and degradation.

Zhu, L., Zhan, X., Wu, H., Zhang, S., Meng, T., Bruford, M., & Wei, F. (2010). Conservation implications of drastic reductions in the smallest and most isolated populations of giant pandas. *Conservation Biology*, *24*(5), 1299-1306.

Major policy changes during the Qing Dynasty led to human population explosion, land use changes, deforestation, and habitat fragmentation in China over the past 300 years. The sharp decrease in panda populations is concomitant with the increase in the human population in the Xiaoxiangling Mountains. Poaching is another possible reason for population collapse, but has not occurred recently due to social development and conservation awareness. Translocation, or the relocation of pandas to reserves, is the proposed protection method of this species. Zhu agrees with other studies that habitat loss and fragmentation are the biggest threats the pandas face. Limitations to this study include small sample size and assumption error in the models. This article is useful for understanding the history that led to the reduction of giant pandas. This research was supported by the National Basic Research Program of China and the National Natural Science Foundation of China.