The Plight of the Panda: A critical examination of the criticisms of captive panda breeding programmes

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A critical examination of the criticisms of captive panda breeding programmes

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Panda Xing-Ya eating bamboo at Ouwehands Dierenpark

Photo credit: Margot van Rijn

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Abstract

China's approach when it comes to giant panda conservation has been the target of criticism ever since the moment the first animal and habitat protection policies were enacted by China in the 1960s. Both the domestic- and international panda breeding programmes have been controversial at times. A recent series of investigative reports by the New York Times has reignited the debate on whether or not these programmes actually contribute anything to wild panda conservation. In this thesis, I take the reader on a trip through the history of developments around panda conservation, and highlight what critics have had to say about Chinese policies throughout the decades before weighing these criticisms against the developments that have been made because of these breeding programmes. I then look at the future of panda conservation in China and finally critically examine whether or not the criticisms are justified, and if the programmes have actually led to tangible results for giant pandas in the wild.

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Glossary

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRBGPB	Chengdu Research Base of Giant Panda Breeding
CRCCGP	China Research and Conservation Centre for the Giant Panda
FWS	The US Fish and Wildlife Service
GPNP	Giant Panda National Park
IUCN	International Union for Conservation of Nature and Natural Resources
MOF	China's former Ministry of Forestry (Now the SFA)
RLTS	The IUCN's Red List of Threatened Species
SFA	China's State Forestry Administration
WWF	World Wildlife Fund

Introduction

A general introduction to the giant panda

The giant panda (*Ailuropoda melanoleuca)*, also known as the panda bear or just panda for short, is one of the most well-known and recognizable animals on the planet. Its distinctive black and white fur gives it a unique and cuddly appearance, which undoubtedly contributes to its popularity among people all over the world.[1] Despite their popularity today, giant pandas were actually not at all known in the West until 1869, when a French Jesuit named Armand David became the first westerner to ever lay eyes on panda furs.[2] His report on this exotic discovery led brothers Kermit and Theodore Roosevelt Jr. (the sons of former United States (US) President Theodore Roosvelt) to set out on an expedition deep into China's jungles find and hunt a giant panda that they could then bring home to the US. Their expedition would prove to be a success, and the two panda skins they brought back with them were the first that were ever displayed in the West. Memoirs of the expedition were recorded by the two brothers in the book *Trailing the Giant Panda.*[3] The panda as a species gained mass popularity a few years after the Roosevelts' expedition, and in 1936, American socialite Ruth Harkness brought a panda cub called Su-Lin to the US from China. This was the first ever time that a live panda was seen in the West.[4] From the moment the giant panda entered the public consciousness in the first half of the 20th century, the animal has continued to intrigue people around the world.

Long ago, the giant panda had a much larger range than it does now, and their remains have been discovered in areas ranging from southern and eastern China to Myanmar and Vietnam.[5] These days however, its habitat is confined to a number of isolated habitats in China,[6] making it endemic to the country. The giant panda's diet consists almost entirely of bamboo, but because of the plant's low

[1] ''Giant Panda,'' WWF, accessed on July 1, 2025, https://www.worldwildlife.org/species/giant-panda.
[2] ''Giant Panda,'' Britannica, accessed on July 1, 2025, https://www.britannica.com/animal/giant-panda.
[3] Kermit Roosevelt and Theodore Roosevelt Jr., *Trailing the Giant Panda*, (Charles Scribner's Sons, 1929).
[4] BBC World Service, ''Ruth Harkness and Su Lin: The First Panda to Leave China,'' *BBC*, December 2, 2013, https://www.bbc.com/news/magazine-25136118.
[5] Melissa Songer, Melanie Delion, Alex Biggs and Qiongyu Huang, ''Modelling Impacts of Climate Change on Giant Panda Habitat,'' *International Journal of Ecology* 1 (2012): 1–12.
[6] ''Habitat of the Panda,'' WWF, accessed on July 1, 2025, https://wwf.panda.org/discover/knowledge_hub/endangered_species/giant_panda/panda/where_panda_lives_habitat/.

nutritional value pandas have to eat a lot of it every day to maintain their bodies, as an adult panda is around 90cm tall and can weigh up to 150kg.[7] Though their diet is mostly vegetarian, they are able to digest meat, and giant pandas are known to sometimes hunt for small rodents when in need for calories.[8] Giant pandas are mostly solitary animals, though they interact through vocalization and scent marking, and each adult panda has its own defined range that it roams.[9] For this reason, stable and protected habitats are very important to the giant panda's survival.

Threats to the panda

Degradation of habitats and habitat destruction are therefore also the biggest threat to panda welfare in the wild today. In the past, panda bears were sought after and hunted for their furs, but the hunting of pandas was prohibited by the Chinese government in the 1960s.[10] Later, in January of 1981, China acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which brought the trade in panda products under surveillance as well.[11] In 1984, the panda was moved from Appendix III to Appendix I of CITES, and this meant that it would also be illegal to buy or sell any panda-derived products from then on.[12] These are just small examples of efforts by organizations like the World Wildlife Fund (WWF) and the Chinese government throughout the years to conserve wild giant pandas and their habitats. Several panda reserves were established during the 1960s, and in 1980, the China Research and Conservation Centre for the Giant Panda (CRCCGP) was established in Wolong National Nature Conservation, one of these reserves.[13] This centre has been

[7] ''Physical Description,'' WWF, accessed on July 1 2025, https://wwf.panda.org/discover/knowledge_hub/endangered_species/giant_panda/panda/size/.
[8] ''What do Pandas Eat?,'' WWF, accessed on July 1 2025, https://wwf.panda.org/discover/knowledge_hub/endangered_species/giant_panda/panda/what_do_pandas_they_eat/.
[9] ''Life Cycle,'' WWF, accessed on July 1 2025, https://wwf.panda.org/discover/knowledge_hub/endangered_species/giant_panda/panda/panda_life_cycle/.
[10] ''History of the Giant Panda,'' WWF, accessed on July 1 2025, https://wwf.panda.org/wwf_news/?13588/History-of-the-Giant-Panda.
[11] ''List of Contracting Parties,'' CITES, accessed on July 1 2025, https://cites.org/eng/disc/parties/chronolo.php.
[12] WWF, ''History of the Giant Panda.''
[13] ''About,'' Wolong China, accessed through Wayback Machine on July 1, 2025. https://web.archive.org/web/20061201172138/https:/www.chinawolong.com/doce/about.htm.

instrumental in the creation of panda research and breeding programmes in China. In part thanks to the adoption of the giant panda as the WWF's logo, and also due to the seemingly successful efforts made to conserve them, the panda has now become the global face of the wildlife conservation movement.[14]

Because of the apparent success of the giant panda's conservation, the International Union for Conservation of Nature and Natural Resources (IUCN) moved the species down from ''endangered'' to ''vulnerable'' on its' Red List of Threatened Species (RLTS), a list that tracks the status of endangered species in the wild, in 2016.[15] Although this seemed like great news for the giant panda as a species, the positive change on the RLTS did not reflect some of the threats that still plague pandas in the wild. Some of these threats are even at risk of getting more serious in the coming years. Researchers have found that since 1988, the year in which the giant panda was first listed as endangered, the amount of suitable habitat to sustain wild panda populations has actually shrunk.[16] Habitat loss is currently the greatest threat to panda welfare. After a recent analysis of giant panda habitat suitability evaluations from 2013 to 2022, it was found that some the biggest dangers to panda habitats are threats that are created by humans like livestock grazing and infrastructure development near habitats,[17] leading to fragmentation and degradation of these habitats in combination with a mismanagement of nature reserves.[18] Additionally, wild panda populations are seriously threatened by climate change, as it will negatively impact fragile bamboo habitats and species diversity, which could lead to a significant loss in available foods for giant pandas in many areas.[19]

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[14] ''Our Logo is One of the Most Powerful Symbols on the Planet,'' WWF, accessed on July 1 2025, https://wwfbrand.panda.org/logo/.
[15] ''Giant Panda No Longer 'Endangered' But Iconic Species Still at Risk,'' WWF, accessed on July 1 2025, https://wwf.panda.org/wwf_news/?277170/Giant-panda-no-longer-endangered-but-iconic-species-still-at-risk.
[16] Helen Briggs, ''Panda's Habitat 'Shrinking and Becoming More Fragmented','' *BBC*, September 25, 2017, https://www.bbc.com/news/science-environment-41366274.
[17] Ke He, Qiang Dai, Xianghui Gu, Zejun Zhang, Jiang Zhou, Dunwu Qi, Xiaodong Gu, Xuyu Yang, Wen Zhang, Biao Yang and Zhisong Yang, ''Effects of Roads on Giant Panda Distribution: A Mountain Range Scale Evaluation,'' *Scientific Reports* 9, no. 1 (2019): 1–8, doi:10.1038/s41598-018-37447-0.
[18] Guanyu Mu, Xiaotong Shang, Han Pan, Tao Ruan, Biao Yang and Li Zhang, ''Synthesis of Giant Panda Habitat Suitability Evaluations,'' *Heliyon* 10, no. 17 (2024): 1–11, https://doi.org/10.1016/j.heliyon.2024.e37398.
[19] Renqiang Li, Ming Xu, Michelle Hang Gi Wong, Shuai Qiu, Qingkai Sheng, Xinhai Li and Zenming Song, ''Climate Change-Induced Decline in Bamboo Habitats and Species Diversity: Implications for Giant Panda Conservation,'' *Diversity and Distributions* 21, no. 4 (2015): 379–391, doi:10.1111/ddi.12284.

To prevent further habitat degradation and species extinction, policies have been enacted and programmes have been established to protect and study the giant panda. Perhaps the most unique and also the most controversial of these has to be the international panda breeding programme. This programme, along with different panda conservation efforts, has been criticised throughout the years and has been called ineffective, for-profit and politicized. A recent series of critical reports by the New York Times (NYT) have once again sparked discussion about the effectiveness of panda conservation efforts both domestically and internationally.

Thesis structure and methodology

In this thesis I will examine whether or not the criticisms made recently by the NYT and others in the past are justified. This is done by comparing these criticisms to past, present and future developments in panda conservation efforts. For the international panda breeding programme specifically, I will also look at if the money that is made from panda loans to zoos outside of China is actually spent protecting wild populations of the species back home. After this chapter where I introduce the topic and describe the methodology I used for my research, the next chapter will provide the reader with a timeline of panda conservation efforts through the decades. This part consists of a chronological timeline of Chinese panda surveys and panda policies. The next chapter explains the history and stated goal of the domestic breeding programme, as well as the creation of the international breeding programme and its goals. The chapter after that will go over the many criticisms these policies and programmes have received in their time, before I will contrast these criticisms to actual important developments made in panda conservation efforts that would not have been possible without the domestic- and international breeding programmes. This chapter also takes the reader through the planned improvements to panda habitat protection and research infrastructure that are set happen in the future. In the chapter after that I will attempt to answer my research question of whether or not the criticisms are justified by analysing what I have found in the literature and have laid out in the prior chapters. In the final chapter of this thesis I will provide the reader with policy recommendations that I believe will benefit the future of panda conservation based on my findings and conclude this thesis.

Throughout my research on this topic I have fully devoted myself to clearly understanding every aspect of panda conservation. Though it was sometimes hard to find specific information because it is not easily accessible online or because the information is simply too old, my search led me to books, essays, papers, journals and websites that have been very valuable in understanding the nuances of panda conservation and the panda breeding programmes. As an addition to my desk-research I also reached out to journalists, experts and a zoo in an attempt to set up interviews, but sadly none of the individuals I contacted agreed to my requests. Using the resources I had at my disposal I provide the reader of this thesis with a history of the most important developments in panda conservation and with the foremost criticisms panda conservation efforts and the breeding programmes have received in their decades-long history before critically examining them by looking at how they weigh against the developments that have been made in the field only because of these programmes and by looking at what the future holds for panda conservation.

A history of panda conservation

How have conservation efforts been developed through the decades?

In order to understand the criticisms of current day policies that are in place for panda conservation efforts and the domestic- and foreign breeding programmes, it is important to first understand how these policies came to be in the first place. In this section, I will provide an overview of these developments in chronological order by focusing on the four National Panda Surveys conducted by the Chinese government from the 1960s until the 2010s as they laid the groundwork for what today's policies and the breeding programmes would eventually become.

In the 1960s, the Chinese government first established a number of nature reserves with the intention to preserve wild giant panda populations.[20] Around the same time, the hunting pandas was

[20] Eric Dinerstein, Colby Loucks and Zhu Lü, ''Biological Framework for Evaluating Future Efforts in Giant Panda Conservation,'' in *Giant Pandas: Biology and Conservation*, ed. Don Lindburg and Karen Baragona (University of California Press, 2004), 228.

made illegal in an effort by China's government to protect the animal's wild populations. About a decade later in 1972, then-US President Richard Nixon famously visited China. During his travels in the country, Chinese Premier Zhou Enlai offered to send two pandas to the US as a token of their newfound friendship,[21] which then prompted Premier Zhou to want to find out exactly how many pandas existed in the wild in his country at the time. In order to achieve this goal, the First National Panda Survey was conducted from 1974 to 1977. Covering traditional panda habitats in China's Sichuan, Gansu and Shaanxi provinces, over 3,000 people were deployed in a search for any signs that the animals were active in the surveyed areas,[22] and their findings on panda distribution and population densities were later used to estimate how many pandas existed in total in China.[23] At the time, the estimated number of giant pandas living in the wild was between 1,050 and 1,150.[24]

This first survey laid the foundations for the ones that were conducted after it. The second survey was a collaborative effort between China's former Ministry of Forestry (MOF) and the World Wildlife Fund (WWF).[25] Unlike the previous survey — which in addition to the giant panda also aimed to estimate the number of other rare wildlife in the area like similarly endemic and endangered golden snub-nosed monkey (*Rhinopithecus roxellana*) and the endangered Alpine musk deer (*Moschus chrysogaster*)[26] — the second survey was the first to focus exclusively on the giant panda. The survey was carried out between October 1985 and November 1988,[27] and new methods were used in an attempt to calculate the total number of pandas. This new and improved second survey led to an adjusted estimate of between 872 and 1,352 pandas living in the wild.[28] The second survey would be instrumental in the creation of a national conservation management plan for the giant panda,[29] which itself would form the basis of conservation policies in the years that came after. The conservation

[21] Robert B. Semple Jr., ''Washinton Zoo to Get 2 Pandas,'' *New York Times*, March 14, 1972, WASHINGTON ZOO TO GET 2 PANDAS - The New York Times.
[22] China Daily, ''Researchers Recall Their First Two Field Trips,'' *China Daily*, August 21, 2002, http://english.china.org.cn/english/features/panda/39999.htm.
[23] Dinerstein, Loucks, and Lü, ''Biological Framework,'' 234.
[24] China Daily, ''Researchers Recall.''
[25] Changqing Yu (于长青), ''大熊猫保护的那些事儿,'' ScienceNet Blog, July 24, 2010, Accessed July 1, 2025, https://perma.cc/ELL2-WYXW.
[26] Dinerstein, Loucks, and Lü, ''Biological Framework,'' 234.
[27] Yu, Changqing, ''大熊猫''
[28] China Daily, ''Researchers Recall.''
[29] Dinerstein, Loucks, and Lü, ''Biological Framework,'' 234.

management plan was implemented between 1991 and 1995, and it promised to improve 13 existing panda reserves, as well as to build 14 wholly new ones and to create corridors between them to facilitate the roaming of pandas between different reserves. The MOF, along with provincial governments, also set up offices and management stations in the designated protected areas.[30] Sadly, logging activities still continued to tear into panda habitats throughout the 1990s, until the Chinese government banned logging in natural forests in 1998.[31]

Almost ten years after the second national panda survey, new questions about the conservation plan's effectiveness arose,[32] and in 1998 the MOF and WFF agreed once more to collaborate for the third national panda survey.[33] At first, a small-scale survey was held in Pingwu county and in 1999 the WFF and the newly formed State Forestry Administration (SFA) (the successor to the MOF) agreed to conduct a pilot survey in Qingchuan country in 2000. The government treated the third national survey as something very important, and the goal of the survey was once again to create a database on the giant panda population that could be used to inform new conservation efforts and policies.[34] Fieldwork for the third survey concluded in late 2001. Because of the use of new and more accurate technologies like GPS,[35] the results of this survey would be the most accurate to date. It resulted in the number of estimated pandas left in China's wild to be increased to just under 1,600 pandas. This growth in population was not only because the survey quality had increased since the last time and because better technology was used during the survey, but also because the land area covered in the third survey was a lot larger than the area covered in the second. It was found that around 61% of pandas were living in protected reserves at the time, and 12 new panda reserves and 5 new corridors were designed as a result of the third survey.[36]

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[30] Yu, Changqing, ''大熊猫''
[31] Erik Eckholm, ''Stunned by Floods, China Hastens Logging Curbs,'' *New York Times* September 27, 1998, https://www.nytimes.com/1998/09/27/world/stunned-by-floods-china-hastens-logging-curbs.html.
[32] Dinerstein, Loucks, and Lü, ''Biological Framework,'' 234.
[33] Yu, Changqing, ''大熊猫''
[34] Dinerstein, Loucks, and Lü, ''Biological Framework,'' 234–235.
[35] Yu, Changqing, ''大熊猫''
[36] ''Giant Panda Survey 2004 – Q&A's,'' WWF, June 10, 2004, Accessed July 1, 2025, https://wwf.panda.org/wwf_news/?13625/Giant-Panda-Survey-2004-QAs.

A decade after the third national panda survey, and a few years after the devastating 2008 Sichuan earthquake which affected millions of people and over 60% of wild pandas,[37] the SFA conducted a new panda survey between 2011 and 2014 with financial support from the WWF.[38] The results of this fourth survey indicated that the wild panda population had once again increased. This time by 268 individuals, or around 16% of the estimated population, bringing the counter up to an estimated 1,864 pandas in the wild, of which 1,264 lived in areas that fell under protected nature reserves.[39] The fourth survey once again employed an improved methodology compared to the previous one, and large-scale habitat disturbances (such as tourism or infrastructure construction) and DNA analysis were factored in as new survey elements.[40] The results of the fourth survey and the increase in pandas painted a very positive picture, and a year after the survey's results were published the giant panda's status was moved from 'endangered' to 'vulnerable' in the IUCN's RLTS. At first, Chinese officials disputed this status change, fearing that it could lead people to believe that — since the panda was no longer endangered — conservation efforts could be toned down from then on. Climate change was also cited as a reason by the Chinese government to not downgrade the panda's endangerment status just yet,[41] but eventually they also changed the giant panda's endangerment status on their own lists in 2021.[42] According to the SFA, the rise in the number of pandas could be attributed to the implementation of conservation policies and nature protection laws. However, it was clear that even though the wild panda population might have grown, their habitats were still under continued and increasing stress. The survey indicated that the number of isolated panda populations (populations whose habitats are not connected to other populations' habitats) had gone up by 15 to a

[37] Ecological Society of America, ''Sichuan Earthquake Caused Significant Damage to Giant Panda Habitat," July 27, 2009, Accessed July 1, 2025, https://esa.org/blog/2009/07/27/sichuan-earthquake-caused-significant-damage-to-giant-panda-habitat/.
[38] ''China's Panda Population on the Rise as Habitat Preservation Efforts Continue," WWF, February 28, 2015, Accessed on July 1, 2025, https://wwf.panda.org/wwf_news/?240270/Chinas-panda-population-on-the-rise-as-habitat-preservation-efforts-continue.
[39] WWF, ''China's Panda Population on the Rise."
[40] National Forestry and Grassland Administration, ''第四次全国大熊猫调查主要结果（2011-2014 年）," National Forestry and Grassland Administration Website, March 2, 2015, Accessed on July 1, 2025, http://www.forestry.gov.cn/search/38173.
[41] Na Chen, ''Conservation Org: Pandas Downgraded from ''Endangered" to ''Vulnerable''," Chinese Academy of Sciences, September 7, 2016, https://perma.cc/Y2UJ-CNMN.
[42] BBC, ''Giant Pandas No Longer Endangered But Still Vulnerable, Says China," *BBC*, July 9, 2021, https://www.bbc.com/news/world-asia-china-57773472.

total 33 in the years since the previous study, and that 22 of these isolated populations risked extinction due to their small population sizes and a lacklustre genetic diversity.[43] At the time of writing this thesis, it has been over a decade since the fourth national panda survey was conducted, and at the time there seem to be no plans for a fifth survey.

History and goals of the captive breeding programmes both domestically and internationally

History and goals of the domestic programme

Up until the late 20th century, it was considered quite rare to spot a giant panda outside of its natural habitat in the wild. There had been the occasional poached animal put on display of course, and a few pandas had been caught alive to be sent abroad. But in general, the animals were left alone to keep to themselves in the jungles they call home. However, this changed when in the 1980s bamboo species in the Minshan and Qionglai mountain ranges started flowering and dying off en masse. When bamboo flowers, its seeds fall to the ground, and in order to give the new bamboo the space and resources it needs to grow, the old bamboo dies off suddenly. These flowering episodes occurred a few years from each other and in different provinces, but the two serious incidents of bamboo populations dying off in giant panda habitats caused researchers to believe that the panda's food supply might be disappearing fast. A report later estimated that 138 pandas had died of starvation following the first flowering episode,[44] and the MOF set up a controversial rescue operation as a response to the incidents.[45] In the years between 1983 and 1987, over 30 wild panda cubs were 'rescued' from the wild an brought into captivity at conservation centres. The rescuers probably had the best of intentions, as they believed that the cubs had been abandoned by their mothers. But in

[43] Jane Qiu, ''Experts Question China's Panda Survey,'' *Nature*, (2015): https://doi.org/10.1038/nature.2015.17020.
[44] Henry Nichols, ''Born Free,'' in *The Way of the Panda The Curious History of China's Political Animal*, (Profile Books Ltd, 2010), 187.
[45] Yu, Changqing, ''大熊猫''

reality, the cubs they took with them likely were not abandoned at all, as later research showed that mother bears often leave to go look for food and that panda cubs can be left alone for up to 50 hours.[46] To add insult to injury, more than half of the cubs that had been rescued in the MOF's operation died in the few years following their capture.[47]

Ever since these events in the 1980s, captive breeding at conservation centres has become more the norm. The Wolong China Conservation and Research Centre for the Giant Panda (CCRCGP) was opened in 1983, but it took until 1986 for the first panda in captivity to be born at the centre. A year after the CCRCGP opened its doors, the Chengdu Research Base of Giant Panda Breeding (CRBGPB) was also established. It was at the Chengdu centre where in 1990 a pair of twin cubs was successfully kept alive after pregnancy.[48] Largely because to the MOF's rescue efforts, there was now a significant number of pandas living in captivity at these centres. And in 1996, the Chinese Association of Zoological Gardens met with the IUCN's Conservation Specialist Group, and a plan was created in order to develop a self-sustaining population of pandas born in captivity that could eventually also be released to help support wild panda populations. Starting the following year, biometrical surveys on captive pandas' breeding behaviours began.[49] The results of these surveys have been of great importance to the science surrounding captive panda breeding, and have also been credited for leading to a more integrated approach between research centres allowing them to maintain genetic diversity within their captive panda populations.[50] The domestic breeding programme eventually got an international companion which maintains mostly the same goal of breeding a population of pandas that is fit to be released into the wild.

[46] WWF, ''History of the Giant Panda."
[47] Nichols, ''Born Free,'' 201.
[48] Henry Nichols, ''Captive Subjects," in *The Way of the Panda The Curious History of China's Political Animal*, (Profile Books Ltd, 2010), 204.
[49] Nichols, ''Captive Subjects,'' 205–208.
[50] Nichols, ''Captive Subjects,'' 212–213.

History and goals of the international programme

In the past, pandas were gifted to friendly nations by the Chinese government as a token of their friendship. In later decades, they were often sent abroad on short-term loans in order to cash in on the species' worldwide popularity. This all changed in the 1990s, and now (nearly) all pandas abroad are there on research-loans between Chinese research centres and zoos outside of China. These days, all pandas abroad remain Chinese citizens, and there are only two pandas left outside of China that are not officially 'Chinese'. The first of those is the female Xin-Xin living in a zoo in Mexico. She was born in 1990 from two pandas that had been gifted to the country by China in 1975 before the international breeding programme had been established.[51] Her situation is unique in the world, as there are no other pandas alive outside of China that have been born two previously gifted pandas. The only other 'foreign' panda is Yuan-Yuan, who is the only remaining panda from a pair that was gifted to Taiwan in 2008. Yuan-Yuan's companion, Tuan-Tuan, passed away in late 2022.[52] The case of Tuan-Tuan and Yuan-Yuan represents an often criticized part of China's policy regarding sending pandas abroad, namely that of panda diplomacy. I will touch upon this later in the criticisms section.

The goal of breeding captive panda populations remains to perform research on the animals' behaviour in order to breed sustainable and strong offspring that can eventually be released into the wild to supplement dwindling populations there. To achieve this goal, research centres like the CCRCGP and the CRBGPB were established in China. In 1993, the US Fish and Wildlife Service (FWS), in conjunction with the Zoological Society of San Diego which operates the San Diego Zoo, struck a deal with the CCRCGP. The San Diego Zoo wanted to have pandas sent on a long-term loan instead of a short-term one so that they could perform research on the animals in the US. The CCRCGP was happy to help. The San Diego Zoo would pay the MOF $500,000 per year per panda for the opportunity to host the animals. This led to Wolong sending two pandas to San Diego in 1996, and the US FWS later announced that from 1998 onwards, the US' national policy would be modelled

[51] Nina Strochlich, ''Meet Mexico's 'Forgotten Panda.' She's the Last of Her Kind,'' *National Geographic*, March 29, 2023, https://www.nationalgeographic.com/premium/article/mexico-last-panda-china-diplomacy.
[52] Jeremy Gahagan, ''Giant Panda Gifted to Taiwan by China Dies,'' *BBC*, November 19, 2022, https://www.bbc.com/news/world-asia-63688385.

on this research-loan model.[53] This meant that this new research-based loan became the norm for zoos in the US and later also for zoos across the world.

The first example of an international breeding programme was first initiated in 1994, when the CRBGPD set up a cooperation with a Japanese amusement park and zoo called Adventure World.[54] Throughout the years, more international breeding collaborations have been established, but this first one is still the most successful out of all of them. In total, 21 cubs were born at Adventure World up until 2023, and a total of 17 also survived their most vulnerable years. It is common for female pandas to give birth to two cubs in the wild, with one of the cubs usually not making it to adulthood. Because of this, the success rate of the Chengdu-Adventure World cooperation is quite impressive, and the results are touted proudly on the CRBGPB website. Over time the international breeding programme has grown and currently 26 relations between Chinese research centres and zoos outside of China have been established in over 20 countries.[55],[56] According to the CRBGPB's website, as of 2023, a total of 37 pandas have been born from these combined programmes.

What sets the international breeding programme apart from the domestic programme is that the international programme raises a lot of money that is redirected into domestic wild panda conservation efforts in China. According to the terms of these programmes, all giant pandas remain the property of the Chinese government, and zoos are required to pay a hefty price to hose the animals in their respective countries. Pandas are exclusively sent abroad in pairs because the main goal of these collaborations remains for the pandas to produce offspring. This means that a year's panda lease costs a zoo $1,000,000 per year ($500,000 per panda, twice). Should the pandas successfully procreate, regardless of where they give birth, their new-borns will automatically hold a Chinese passport. The hosting zoo is then required to pay a $400,000 fee to the Chinese government and is

[53] Nichols, ''Captive Subjects,'' 214–215.
[54] "International Cooperation," Chengdu Research Base of Giant Panda Breeding, Accessed on July 1, 2025, https://www.panda.org.cn/en/cooperate/international/.
[55] Dongjie Yan, ''International Giant Panda Conservation Ties to Build on Successess,'' *China Daily*, October 24, 2024, https://www.chinadailyhk.com/hk/article/596112.
[56] David Goldstein, "Pandas on Loan Around the World," Mekko Graphics, December 18, 2020, Accessed on July 1, 2025, https://www.mekkographics.com/pandas-on-loan-around-the-world/.

allowed to keep the panda cub for a few years, after which the young animal is to be repatriated.[57] The expensive nature of these loans has led some critics arguing that they are for-profit rather than for research and the overall benefit of the species.

Criticisms of the programmes

Criticisms of the domestic programme

Ever since the Chinese government first started implementing policies on giant panda conservation, there have been those who criticize the policies. If you recall, the first National Panda Survey estimated that there were between 1,050 and 1,150 pandas living in China's wild, but critics say that actual survey statistics more than likely indicated results closer to a total of 2,462 pandas instead.[58] Although the second survey was an improvement compared to the first one, its results have also been scrutinized by those who participated in it in an interview with China Daily years after the survey took place.[59] According to the participants, some local authorities would falsely claim a lack of pandas in their administrative areas for fear that the presence of the animals and the subsequent government efforts to protect them would interfere with logging operations, which in turn would have a negative economic impact on their jurisdictions. These forms of administrative neglect led to blind spots in the survey. Because of this, some forests where panda presence was later proven were destroyed, which lead to the dying off of some giant panda population pockets.[60] This is only one example of how the implementation of logging policies backfired, as some researchers claim that up until the logging ban of 1998, areas getting designated as nature reserves actually would see accelerated logging within them. When the areas were marked to be protected under the new logging law, loggers actually hurried to take whatever they could before logging was no longer allowed in those forests, leading to

[57] Kun Li, ''Opinion: The Economics of Pandas Explained,'' *CGTN*, April 11, 2017, 2025, https://news.cgtn.com/news/3d67544d79517a4d/share_p.html.
[58] Yu, Changqing, ''大熊猫''
[59] China Daily, ''Researchers Recall.''
[60] Yu, Changqing, ''大熊猫''

a spike of logging activity in nature reserves.[61] Critical voices continue to point out issues with panda conservation policies, and even the most recent National Giant Panda Survey got criticized in 2015. According to critics, the results of the fourth survey were probably not properly comparable to the results of the third survey, citing the much larger search area and the dissimilar methods in estimating panda numbers in the fourth survey as factors that skew the data, which make it harder to compare the two.[62]

Other aspects of domestic giant panda conservation policies also received criticism. Following the proposed plan by the MOF to rescue panda cubs following the bamboo flowering episodes in the 1980s, biologist Pan Wenshi, who is a leading figure in wild panda research, wrote a letter directed to the Chinese government in which he expressed his concerns about the plan.[63] His concerns were not misplaced, as it would later be made clear that there were numerous issues with the panda rescue programme. It was said for example that the plan did not put the focus on the right problem. The 'rescuing' of wild panda cubs did not target the actual issues threatening wild panda populations like logging or poaching, and the plan did not actually do anything to mitigate the long-term systemic threats to wild pandas. Additionally, at the time a system was created in which people received a reward for every panda cub rescued. Again, the good intentions of the MOF led to a worse situation for the local panda populations, as this 'panda rescue reward system' inadvertently encouraged people to capture wild panda cubs in the name of species conservation, even if the cubs did not need to be rescued in the first place. All this was exacerbated by the way that the number of captured pandas in any particular area was used as a direct measurement for conservation success. As a result of this well intended policy, many perfectly healthy young pandas who were not in any actual danger were taken from their mothers to be brought to panda research centres. Instead of being released back into the wild later, most of the pandas captured during this period would remain living in the research centres indefinitely.[64]

[61] Yu, Changqing, ''大熊猫''
[62] Qiu, ''Experts Question,'' 2.
[63] Nichols, ''Born Free,'' 189.
[64] Yu, Changqing, ''大熊猫''

It was in these centres, and mainly because of the captured pandas, that the domestic panda breeding programme was established. This programme has also been at the receiving end of a lot of criticism since its inception. When captive breeding efforts were still in their infancy, it was not uncommon for the research centres to force pregnancies through artificial insemination. In order to get a female panda pregnant, a procedure called electroejaculation was first performed on the male pandas. This procedure was far from perfect, as the pandas would often lose their appetites after, and in some case it had even led to the animals getting wounded.[65],[66] The stated goal of breeding pandas to be released back into the wild has also had its fair share of problems throughout the years, and the release of captive pandas into the wild is not currently recommended[67] because of prior unsuccessful attempts. Take for example the case of Xiang-Xiang. Born at the CCRCGP in 2001, he was released into the wild in 2006 after receiving a few years of training at the research centre. Not even a year after his release, it was found that Xiang-Xiang had been wounded and had later died from his injuries. From the nature of his wounds, it is believed that Xiang-Xiang had died after an altercation with another male, possibly as a part of a territorial dispute.[68] Other rewilding efforts in the past have had similarly bad results, which made it clear that further research needs to be done before pandas can be successfully released among their wild peers.

Criticisms of the International Programme

The international breeding programme is not without criticism either, and one aspect in particular that has received a lot of criticism throughout the years has to do with the use of giant pandas in diplomatic relations for China. Giant pandas have been explicitly used for political gain before the current programmes were established, but today's programmes have been criticised in similar ways. Take for example the case of Tuan-Tuan and Yuan-Yuan, the pair of pandas that was sent to Taiwan in

[65] Nichols, ''Captive Subjects,'' 205.
[66] Mara Hvistendahl and Joy Dong, ''The Panda Factories,'' *New York Times*, October 15, 2024, The Panda Factories - The New York Times.
[67] Henry Nichols, ''Into the Future,'' in *The Way of the Panda The Curious History of China's Political Animal*, (Profile Books Ltd, 2010), 232.
[68] Nichols, ''Into the Future,'' 238–239.

2008. The transfer was seen as a 'domestic transfer' between zoos by the Chinese government,[69] which of implies a certain way in which China views its relationship with Taiwan. This is also why the Taipei zoo was not required to pay the hefty renting fees connected to hosting pandas. There are other examples of pandas falling victim to political whims, as since they are technically all Chinese, the Chinese government has the right to recall them from any country at any time. This happened in 2023, when pandas in the National Zoo in Washington DC were recalled following an increase in diplomatic tensions between China and the US.[70] They have since been returned to the zoo after tensions died down again a few years later, and the National Zoo has recently signed a new 10-year cooperation agreement with China.[71] This is not the only way in which the international breeding programme is negatively tied to politics by critics. For example, in 2011, two pandas named Tian-Tian and Yang-Guang were sent to the Edinburgh Zoo in the United Kingdom on a lease that was projected to last for at least ten years. Animal right's activists criticised the move, calling it a way in which the Chinese government could win political goodwill in the UK, and by saying that the agreement between China and the Edinburgh Zoo was nothing more than a commercial deal.[72] Given the panda's charm and popularity, they would provide an enormous boost to the Edinburgh Zoo's visitor numbers if they were to host pandas. With pandas finding themselves being used as pawns on the political battlefield like this, it is only fair that critics question these decisions, as it is hard to see how these political shifts can benefit panda conservation in any way. Pandas sell, and that truth is not limited to just tickets. Zoos across the world often offer an array of panda-themed everything to visitors, and this has led to critiques of the panda and its struggle being commercialized to make money for the zoos instead of benefitting pandas in the wild, putting profits over conservation. The pandas that were sent to live in the UK were sent back to China in 2023, and had produced no cubs during their stay in

[69] Yan-Chih Mo, ''ANALYSIS: The Politics of the Pandas,'' *Taipei Times*, November 12, 2008, https://www.taipeitimes.com/News/taiwan/archives/2008/11/12/2003428356.
[70] BBC, ''Sad Farewells for US Pandas Heading Back to China,'' *BBC*, November 8, 2023, https://www.bbc.com/news/av/world-us-canada-67363702.
[71] Ashraf Khalil, ''The Pandas Have Landed! Here's What You Need to Know,'' *AP News*, October 16, 2024, https://apnews.com/article/pandas-national-zoo-washington-3fd7a2aecb3c9e395daf9a15072afde1.
[72] BBC, ''Edinburgh Zoo Pandas: Just 'Commercial Deal','' *BBC*, December 2, 2011, https://www.bbc.com/news/uk-scotland-edinburgh-east-fife-16000633.

Scotland despite several attempts by zoo staff at achieving just that.[73] Could it really be that these pandas were only sent overseas for profit?

Not long ago in 2024, the NYT published a series investigations in which they examine the effectiveness of the international breeding programmes in zoos in the US. These investigations played a big role in my initial interest in this research topic. Flashy reports on the investigations by NYT reporter Mara Hvistendahl were published over the course of a few months, and in her research she worked closely together with the Smithsonian's National Zoo in the US. Around the turn of the millennium, staff from the National Zoo were invited to collaborate in the construction of the CRBGPB in Chengdu. The NYT interviewed (former-) National Zoo employees and read through a great number of documents they accessed through the Smithsonian Institution Archives.[74] The investigations bring together a lot of information, which provides some very valuable insight into the inner workings of the early stages of the research-loan programmes between Chinese parties and US zoos. If we look at the finances involved in the international breeding programme, in particular the money that is paid by zoos to host pandas that is supposedly helping to pay for conservation efforts in China, it is hard to clearly connect the money coming from individual zoos to where it is eventually spent in China. This is because all funds coming from foreign zoos are first pooled together before they are then allocated to and spent by (local-) governments.[75] According to experts, the money coming from these international breeding programmes has indeed aided in achieving a lot of tangible good things for wild pandas in China, like the implementation of the logging bans and the creation and expansion of research centres. However, the NYT reports raise questions about how trustworthy those reports on how the funds are spent actually are. For example, the lack of transparency that surrounds the transactions could be a reason as to why they should not be blindly trusted, and the NYT points to several moments in the history of the programmes in which the US FWS froze funding

[73] BBC, ''Edinburgh Zoo Pandas Take Off for Return to China,'' *BBC,* December 4, 2023, https://www.bbc.com/news/articles/c032qg0p3rmo.
[74] Hvistendahl and Dong, ''Panda Factories.''
[75] Mara Hvistendahl, ''US Zoos Gave a Fortune to Protect Pandas. That's Not How China Spent It,'' *New York Times*, November 29, 2024, Millions of Dollars to Protect Pandas Was Spent by China on Roads and Buildings - The New York Times.

coming from zoos to China because of the lack of proper documentation. Any such payment freezes have not happened again since 2010, when the FWS relaxed their oversight on transactions between zoos and the Chinese authorities, with them now not needing FWS approval to go through to China. The investigators also found that sometimes, funds that were to be allocated for panda conservation efforts were sometimes spent on matters that seemingly do not benefit the giant panda directly, such as the construction of roads through and outside of panda habitats, the construction of office buildings far from protected areas, and the spending of money on captive populations instead. The NYT implies that the Chinese government is actively placing profits above conservation efforts as profits made from panda tourism continue to soar.

A different NYT investigation points to the growing number of pandas in captivity not as a conservation success, but rather as proof that the Chinese government only sees the captive breeding programmes as a way to make money from pandas.[76] According to the report, the captive breeding programmes only serve a monetary purpose as they generate tourism in both domestic and foreign zoos by displaying pandas. It also implies that pandas born in captivity are not important or useful in conserving or strengthening wild panda populations. In their report 'The Panda Factories', the NYT points to several problems with outdated techniques like the ones used for artificial insemination to illustrate their point. Though it is true that there have been a lot of issues with the breeding programmes in the past as I have illustrated earlier in this thesis, it is unfair to ignore the advancements made in breeding and wilding techniques in the recent past, or the plans that are in place to completely overhaul the way in which giant panda conservation is handled in the near future.

[76] Hvistendahl and Dong, ''Panda Factories.''

Benefits and future

What have the panda breeding programmes brought domestic conservation?

How do these criticisms compare to the actual achievements that have been made thanks to the captive breeding programmes? It's true that a lot of invaluable research on giant pandas has come from these partnerships, and some findings have contributed significantly to improvements made in captive panda breeding techniques. For example, the diet served to captive pandas had not changed much for a long time since the earliest days of giant panda conservation. Instead of bamboo, the pandas were given a diet consisting mainly of a nutrient-dense mush. This diet often caused captive pandas to suffer from issues like chronic vomiting and digestion issues. In fact, diseases related to these poor diets were the lead cause of death for pandas in captivity for a long time.[77] The pandas in the San Diego in the US were the first to be given a 'natural' diet of purely bamboo spread throughout the day, and it turns out that this had a majorly positive effect on the animals' wellbeing. Another important development stemming from the cooperation between the CCRCGP and the San Diego Zoo is the improved treatment of cubs born in captivity. Up until the early 1990s, standard procedure was to feed panda cubs cow- or yak-based formula. Then, when the cubs were around six months old, bamboo would be introduced into their diet. This turned out to be really bad for the young animals, as cubs wean until they are around 18 months old when living in the wild. This bad feeding method directly caused the death of a lot of cubs in the early years of the captive breeding programme. When the switch was made to human- and puppy formula and cubs were weaned until they were 18 months old, this changed for the better.[78] Other breakthroughs regarding the early stages of a the panda's life were made, and it is now believed that the first 18 months of a male panda's life are connected to its capacity to successfully breed later in life when the animal reaches maturity.[79] Behavioural research on captive pandas has also led to a better understanding of how pandas communicate with each other in the wild. In the wild, pandas roam around hard to reach forested mountain regions and live a mostly

[77] Nichols, "Captive Subjects," 216.
[78] Nichols, "Captive Subjects," 218.
[79] Nichols, "Captive Subjects," 226–227.

solitary lifestyle. This understandably makes them very hard to study, and it has proven much easier to research these behaviours in captivity. As it turns out, the ways in which pandas communicate with each other are crucial to their mating process. Pandas can identity a lot about each other solely through scents, and they often use their secretion and urine to leave messages in the wild. In addition to smell, researchers also discovered that pandas communicate through vocalizations. It was found that individual pandas each have their own 'sound', and that pandas can communicate and learn a lot about each other based on just these sounds alone.[80] These findings have proven to be tremendously helpful in captive breeding programmes: when smell-based rituals were artificially applied in a captive breeding setting, the success rate went up exponentially — from less than a third of all mating attempts being successful to over 90% being successful. At Wolong, where these techniques were first used, the captive population exploded from 25 to over 70 pandas in just a few years.[81] US scientists were also invited to conduct work at research centres in China. For example, Ron Swaisgood's research on the effects of enrichment for captive pandas at Wolong research base led to the standard for giant panda enclosures getting bigger and more engaging, something that also had a large positive impact on captive pandas' overall wellbeing.[82]

Aside from research collaborations between scientists across the world and Chinese panda research centres, the international breeding programme is also a source of monetary funds for these centres. It is difficult to tell for certain how much money the Chinese government spends on giant panda conservation programmes annually. Due to the involvement of a large number of local governments the finances regarding these programmes and policies are, like the habitats that they are spent protecting, very fragmented. This, in combination with the general difficulty involved in accessing Chinese financial government documents, makes it very hard to make a proper estimation from a desk-research setting. Additionally, it is similarly difficult to find out precisely how much of those funds come from zoos involved with the international panda breeding programme. And since those funds are all first pooled together centrally before being distributed among various local

[80] Nichols, "Captive Subjects," 227–228.
[81] Nichols, "Captive Subjects," 221–223.
[82] Nichols, "Captive Subjects," 219–221.

governments, it is also quite hard to track down exactly where these funds are going. Thankfully, a 2018 report on the value of ecosystem services from giant panda reserves can help us estimate the costs a bit better. In the report, researchers provide an estimated cost for wild panda conservation efforts based on data from 2010.[83] Based on four different scenarios, the report estimates the costs of conservation for the Chinese government to lie somewhere between $228 million and $292 million per year. Though this discrepancy is quite big, the lower estimate is based on a scenario in which the total habitat suited for giant pandas degrades by 20% and investments by the Chinese government go down, and the higher estimate is instead based on a scenario in which the protected habitats and the money going to conservation efforts overall are increased by 15%. But which of these estimates fits the current budget most realistically? Based on the trend that China has been making significant efforts in expanding the total protected panda habitats significantly since 2010, after the Fourth National Panda Survey for example, and more recently with the establishment of the Giant Panda National Park (GPNP) (which I will touch upon in the next section), the report's higher estimate seems to be a more likely scenario than the lower estimate. In any case, China does not see giant panda conservation as an afterthought.

But how much of this money is coming from zoos outside of China that are participating in the international breeding programme? It is actually not that hard to estimate this amount since all pandas abroad are on loan for a fixed price. There exist around 60 pandas outside of China that are a part of the panda-loan system[84] (that makes a total of 62 pandas outside of China if we count Xin-Xin and Yuan-Yuan in Mexico and Taiwan respectively). If we take this number and multiply it by $500,000, the yearly lease cost per panda, we can estimate the total amount of money coming from panda loans to zoos outside of China to add up to around $30 million per year. This means that of the total amount the Chinese government spends on panda conservation efforts domestically annually,

[83] Fuwen Wei, Robert Constanza, Qiang Dai, Natalie Stoeckl, Xiaodong Gu, Stephen Farber, Yongang Nie, Ida Kubiszwekski, Yibo Hu, Ronald Swaisgood, Xuyu Yang, Michael Bruford, Youping Chen, Alexey Voinov, Dunwu Qi, Megan Owen, Li Yan, Daniel C. Kenny, Zejun Zhang, Rong Hou and Wen Zhang, ''The Value of Ecosystem Services from Giant Panda Reserves,'' *Current Biology* 28, no. 13 (2018): 2174–2180, https://doi.org/10.1016/j.cub.2018.05.046.
[84] Mekko Graphics, ''Pandas on Loan.''

10% or 15% is coming directly from foreign zoos participating in the research-loans. This amounts to a significant part of the total amount spent every year. Seeing as how around 90% of the money coming from zoos outside of China is said to be spent directly on conservation efforts and research facilities,[85] it can be said that the international breeding programme does play a significant role in funding the conservation of the species in the wild.

Looking ahead: Giant Panda National Park and the future

Most of the things I have discussed in this thesis so far have been about the past. But what does the future of panda conservation policy in China look like? Because wild panda populations have been separated and spread across different reserves in different provinces, the lack of standardization in conservation management and legal mechanisms have led to difficulties in the past.[86] This problem has been plaguing the giant panda since the first policies for its conservation were first drafted up decades ago, and in order to mitigate these problems, China has recently proposed a plan[87] to establish the GPNP. According to the plan, the GPNP would span an area three times the size of Yellowstone National Park in the US and incorporate most of the protected areas and wild pandas (in addition to some newly proposed protected areas that are to be established as part of the plan) under one central authority with the aim of improving management and conservation efficiency.[88] This ambitious plan aims to alleviate some of the issues with habitat connectivity and genetic diversity in panda populations[89] by bringing them all together under one umbrella. Additionally, the GPNP will receive increased funding from the central government instead of relying mostly on local or provincial sources, as was the case in some protected areas before.[90] The GPNP provides a lot of opportunities in

[85] Hongbo Yang, Qoingyu Huang, Ruishan Chen, Weihua Xu, Desheng Li, Xiao Yan, Liangyu Liu and Anna Lake Zhu, ‘’Global Breeding Programme Benefits Wild Panda Conservation,’’ *Nature Ecology and Evolution* 9, (2025): 883–884.
[86] Qiongyu Huang, Yuxiang Fei, Hongbo Yang, Xiaodong Gu and Melissa Songer, ‘’Giant Panda National Park, a Step Towards Streamlining Protected Areas and Cohesive Conservation Management in China,’’ *Global Ecology and Conservation* 22, (2020): 2, https://doi.org/10.1016/j.gecco.2020.e00947.
[87] Huang, Fei, Yang, Gu and Songer, ‘’Giant Panda National Park,’’ 2.
[88] Huang, Fei, Yang, Gu and Songer, ‘’Giant Panda National Park,’’ 2.
[89] Huang, Fei, Yang, Gu and Songer, ‘’Giant Panda National Park,’’ 3.
[90] Huang, Fei, Yang, Gu and Songer, ‘’Giant Panda National Park,’’ 4.

the conservation of wild panda populations. For example, a more centralized governance of the entire area will make enforcing regulations against logging and mining activities in and around the park a lot easier. Critics have pointed some challenges with the plan, highlighting monetary costs and the impact the GPNP might have on the people living within its proposed borders. The structural changes that are needed for a project such as the GPNP, wherein several small- and medium-level authorities would be consolidated into one large central authority would require a significant amount of (economic-) resources and political will. Also, the people that are currently living in what would become a 'core protection zone' in the GPNP might be forced to switch livelihoods as certain practices would become outlawed, which could pressure local economies in the short term. The establishment of the GPNP may also lead to an increase in tourism in these areas, which could put communities under increased stress, but which could also provide the people in these communities with new and sustainable employment opportunities.

Another major planned investment is the expansion of the Chengdu Breeding Centre. The centre, which hopes to attract as many visitors as Disneyland in the near future, is being expanded significantly to facilitate and attract droves of new visitors. The project developer's website provides details on the planned expansions.[91] The new centre is planned to consist of three main locations around the city of Chengdu: Beihu Panda Park, which would serve as the main tourist attraction; Longquanshan Panda Village, which is planned to be built near the airport and would function as a museum on local culture and on giant pandas; and Dujiangyan Panda Wilderness, which is planned to primarily be a research centre for research on breeding techniques and the assimilation of captive-born pandas back into the wild. If done correctly, Dujiangyan Panda Wilderness could serve as an important stepping stone in the development of panda rewilding techniques. The practice is still in its infancy, and previous attempts have not yielded great results, with pandas getting malnourished or even attacked after their release. Until today, only twelve pandas have been released back into the

[91] ''Chengdu Panda Reserve,'' Projects, Sasaki, Accessed on July 1, 2025, https://www.sasaki.com/projects/chengdu-panda-reserve/.

wild after spending their whole life in captivity, but the techniques are slowly improving.[92] Currently, the Chinese government already spends over $1.2 million on rewilding research and reintroduction efforts every year, and Panda Wilderness could prove instrumental in developing new and improved techniques for panda reintroduction, which in turn could lead to major developments in wild population conservation efforts. Pandas born in captivity could be set free to roam in habitats where they no longer exists in the wild, and captive-born females could be released into thinly populated habitats to breed with wild males to prevent the genetic denegation of the group or to prevent the group from dying off entirely.

The research Centre at Panda Wilderness would be funded in part by funds money coming in from tourists visiting the Panda Park and Panda Village. This is an example of how panda tourism can fund conservation efforts, and examples like these are the rules rather than the exception. Pandas are an incredible money maker to zoos both inside and outside of China, but rather than seeing this as a bad thing, where the giant panda and its problems are being exploited by zoos to make a quick buck, examples like the proposed new Chengdu Breeding Centre show that panda tourism and panda conservation can go hand in hand. Much of the research done at these centres around the world relies (in part) on money coming in from curious zoo visitors, which shows that the issue might not be so black and white.

Answering the research question

In order to answer the question of whether or not the criticisms of panda breeding programmess are justified, I have taken you on a journey through the history of panda conservation efforts in China and abroad. It is crucial to understand the whole story of panda conservation before attempting to answer a question like the one posed in this thesis. I have laid out the main threats to wild pandas and their

[92] Zhisong Yang, Xiaodong Gu, Yonggang Nie, Feng Huang, Yan Huang, Qiang Dai, Yibo Hu, Yi Yang, Xiao Zhou, Hemin Zhang, Xuyu Yang and Fuwen Wei, ‘’Reintroduction of the Giant Panda Into the Wild: A Good Start Suggests a Bright Future,” *Biological Conservation* 217, (2018): 182, https://doi.org/10.1016/j.biocon.2017.08.012.

habitats (climate change, habitat fragmentation and human interference through logging, poaching and infrastructure construction near habitats) and highlighted several key moments in which policy was successfully enacted to tackle these problems to the benefit of panda populations. I also went over the history of captive breeding programmes both domestically and internationally and I have explained the main goals these programmes pursue, and provided an overview of the main criticisms of these programmes. To answer the research question, I will compare these criticisms to the status quo and future prospects of panda conservation

The criticisms of panda breeding programmes can be separated into two categories, namely those regarding the domestic breeding programme and those regarding the international programme. Domestically, the criticisms mostly fall into one of the following four categories: (1) the survey data being used to base policy upon is lacklustre and has been of questionable quality for decades, (2) the start of captive panda breeding was based on the abduction of healthy cubs because of a lack of understanding of how reliant giant pandas are on bamboo populations in the wild, (3) the situation inside research centres being quite bad for the pandas with them often suffering from ailments and not being able to breed properly, (4) and the way in which these breeding programmes have failed to meet their stated goal: breeding pandas to be released into nature to support wild populations that have come under increased stress. And internationally, the criticisms can be split up into the following three categories: (1) the way in which pandas are used as political pawns in diplomatic relations that does not seem to benefit conservation efforts in any way, (2) the way in which the Chinese government spends the money it makes from these panda loans, and, tying in to this last criticism and the criticism about pandas not getting released into the wild successfully, (3) the supposed factory-like nature of these research centres where pandas are bred not for conservation purposes, but instead to make profit of tourism and panda-loans.

Looking at what the international breeding programme has actually done for giant panda conservation, we see that a lot of invaluable research has been done on topics like captive panda breeding, which has led to amazing developments in breeding efficiency and a better experience for pandas overall. The research, that is often done in conjunction with international researchers, has also

led to a much improved understanding of the way in which panda sociology works and the way in which they communicate. Not only is this very valuable for improving conditions for pandas living in captivity, it has also meant a lot for researchers studying wild panda populations, since researchers get the chance to observe rare phenomena in captivity that would be much harder to witness, let alone research, in the wild. Additionally, captive panda research has led to improved living conditions for the animals living in captivity both domestically and abroad, which of course is of great value to the animals themselves. Aside from providing ample opportunities for research collaborations that would otherwise not have happened, the international breeding programme also makes a lot of money, much of which is spent directly on research or improving facilities that house and research pandas. By displaying giant pandas in zoos outside of China the story of the need for species conservation is brought to the attention of a global audience. This means that more people will become aware of the importance of nature conservation. Perhaps even not just for the panda, but for all species in general.

Most criticisms presented in this thesis are based on how the situation regarding panda conservation has been handled in the past. But, as I have also shown, significant strides are being made currently and are planned to be made in the near future when it comes to panda protection. New policies like the creation of the GPNP and the establishing new authorities that would manage the fragile, newly protected habitats indicate that the Chinese government is taking the issue of panda conservation very seriously, and that panda conservation it is not just about the money to them. A significant amount of money is spent by the government each year on conservation efforts, and a portion of this comes from the international breeding programme. New plans like the proposed expansion of the Chengdu Research Centre also show that efforts are being made to further integrate panda tourism with education and research. The money that Panda Park and Panda Village make can go directly to important research that would allow us to release pandas into the wild successfully in the future. Advancements made in this field would help achieve the stated goals of the domestic- and international breeding programmes, and help take on the problems facing wild panda populations today at the root instead of just fighting symptoms.

To finally answer the question of whether or not criticisms of the domestic- and international breeding programme are justified, I think it is important to stay nuanced. While most criticisms like those on the survey data quality, the early breeding programmes and the issues with releasing pandas born in captivity into the wild are valid, it is also important to point to the improvements made in these areas precisely because of the breeding programmes. Real progress has been made, and I think that plans for the near future like the establishment of the GPNP and the expansion of the Chengdu Research Centre show that this trend will most likely continue in the future. On the other hand, there are the criticisms about how the money that is made from international breeding loans is being used. While my research indicates that most of the money is most likely going to places that actually benefit wild panda populations (whether that be through research, policy implementation or through habitat protection) it would not be a terrible thing if there was a higher level of transparency into the way in which the funds are allocated. Finally, criticisms about how pandas are sometimes used as leverage by the Chinese government on the field of international diplomacy are fair. The shipping of pandas from and to different countries depending on how the political wind blows does nothing for the species, and most likely is harmful to the individual pandas involved. Even though all pandas may be 'Chinese' in the sense that they are endemic to the country and fall under the Chinese government's control, the conservation of the species is something that transcends the country's borders and is something that is of value to the entire world. Some criticisms are more valid than others, but it is important to also keep the bigger picture in mind. Looking at how far panda conservation efforts have come since just a few decades ago and at how the future will likely still improve on the current status by a lot, I think it is fair to say that overall, panda conservation is on the right track and that while some criticisms are certainly valid, there are also some that are exaggerated.

Conclusion and policy recommendations

To conclude my thesis, it is impossible to say that the domestic- and international panda breeding programmes are wholly perfect. Critics raise valid points like how politics sometimes seem to trump conservation efforts and pandas can get caught in the diplomatic crossfire of trade wars and political disputes. I believe that the pandas involved in these programmes, or any animal for that matter, should not be subject to the whims of international politics, and this is an area in which the international breeding programme can still be massively improved. Another issue with the programmes that critics rightfully point out has to do with the programmes' bookkeeping. As the NYT points out in their investigation reports, China's (local-) governments are not at all transparent when it comes to providing receipts for how the money that comes from panda-loans is spent domestically. Considering how the situation is now, any improvements made in spending transparency would provide a lot more insight into how the programme's funds are managed and whether or not the money is spent in ethical ways. Regardless of what comes to light, the situation would be beneficial to the conservation programmes. If it turns out that funds do get mismanaged by local authorities, this will shine a light on the issue and allow for pressure to be put on the government for better spending in the future. And if it turns out that the money was spent on panda conservation efforts all along, this will only create more goodwill and trust in the programme.

Although wild panda conservation efforts in China have (had) their fair share of problems and have yet to be perfectly refined, I argue that the Chinese government has proven to have good intentions when it comes to the topic over the past decades when taking all developments into account. Giant panda conservation is being taken more seriously as time goes on, and improvements in panda survey methods, the living- and breeding conditions of captive pandas and the expansion and mutual integration of protected panda habitats are proof that this is indeed the case. I am curious what the future may hold and look forward to seeing what the effects of the GPNP will be on panda conservation, and if it will be successful in levelling protective policies across what are now 67 different protected areas spanning three provinces and many authorities. If implemented correctly, it could be instrumental in saving the species' wild population and the habitats that they call home, and

the GPNP could serve as a blueprint for species conservation efforts worldwide. Combined with the potential research that could be done at Dujiangyan Panda Wilderness in Chengdu on rewilding techniques, the future of the wild giant panda can prove to be sunny after all. A species saved from the brink of extinction, facing a potential future of only being kept alive in captivity flourishing again in the wild, imagine that.

Policy recommendations

Further improvements to panda conversation can and should still be made by the Chinese government. First of all, a Fifth National Panda Survey is long overdue. Climate change has had a huge impact on fragile panda habitats since the last survey took place in 2014, and the leaps in technological advancements since the last decade have been amazing. A new survey would provide researchers with a renewed and deeper understanding of the status of the wild panda populations and their habitats, as well as a better understanding of the threats that face them. If the fifth survey would take into account the main threats to panda habitats, then research on these fragile ecosystems could make them more resilient to future developments. Second, I propose that the Chinese government increases spending on panda conservation research in general, focusing on research on releasing pandas born in captivity to aid with the problem of genetic diversity in the remaining fragmented pockets of wild populations. Safely releasing and integrating pandas born in captivity into wild communities is the main goal of the breeding programmes for a good reason: it is imperative to the species' survival. If the plans for the Chengdu Research Centre are fully implemented, this could spell great things for research in this area. With improved knowledge on successfully releasing and integrating pandas into the wild, the increased effectiveness of captive breeding programmes can start truly benefitting wild populations. Third, it would greatly benefit both the individual pandas as well as research programmes worldwide if the panda-loans were to be decoupled from political issues. There are definitely some upsides to sending pandas to countries across the world for the sake of research and bringing in funds, but there is no benefit at all to shipping them back to China because of political upsets. Finally, I recommend the Chinese government to take climate change very seriously when it comes to the maintenance of

panda habitats. The areas that pandas call home and the bamboo they need to survive are especially susceptible to climate change, and it would be a tragedy if all progress regarding panda conservation would go to waste as habitats deteriorate. Massive leaps have been made in conservation efforts so far, but looking to the future there is still a lot of work left that needs to be done. The international breeding programme can prove to be a significant help in this: in facilitating research and scientific collaborations, in securing funds that can be spent on domestic conservation and habitat protection through the money made from panda-loans and tourism, and in spreading awareness about issues facing the giant panda as a species and nature as a whole across the globe.

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