

Comparison of Policy and Legislation to Protect Nature Reserves in Canada and China

By

Wenchao Li

FACULTY OF NATURAL RESOURCES MANAGEMENT
LAKEHEAD UNIVERSITY
THUNDER BAY, ONTARIO

April 2018



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China**

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Wenchao Li

A thesis
presented to Lakehead University
in fulfillment of the
thesis requirement for the degree of
Honours Bachelor of Science in Forestry

Thunder Bay, Ontario, Canada, 2018

Major Adviser:

Second Reader:

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ABSTRACT

Many animals and plants are extinct because of human activities. The nature reserve is the most effective way to protect natural resources and wildlife. In this paper, I reviewed policies to protect nature reserves in Canada and China. Although the two countries developed the concept of nature reserves relatively early in their history, legislation that is meaningful concerning the environment is recent, and there remain some problems in managing nature reserves, especially with respect to compliance with the law among local communities. In both countries, there is still a need to learn more about nature reserves, traditional ecological knowledge, and ways to make nature reserves more effective in the future.

Key world: nature reserves, wildlife, policies and legislation, protection

ACKNOWLEDGMENTS

Thanks to Dr. Brian McLaren who gave me so much help with my study, and to Si Chen who helped me correct the grammar and paragraph structure; without you I would not have been able to finish this study. Thanks to my friends who also provided me so much help while I worked on this study. Thanks to Lakehead University who gave me this chance and the library staff who provided many references.

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INTRODUCTION

An ecosystem provides a wide range of ecological functions and associated services for meeting economic, ecological, and social objectives (Millennium Ecosystem Assessment, 2005). Forests not only provide timber, fiber, and food for economic gains, but also play significant roles in maintaining biodiversity, regulating climate, and providing important information functions and cultural services for humanity (Costanza *et al.*, 2014; Chen *et al.*, 2016). However, an increasing frequency of anthropogenic disturbances has altered biodiversity, resulting in the rapid extinction of wildlife (Diaz *et al.*, 2006).

As a break from rapid global development, nature reserves are highly valued by people for their aesthetic, recreational and tourism attributes (Chen *et al.*, 2016). These reserves are increasingly significant to achieving the objectives of maintaining and protecting wildlife, as well as entertaining humanity. However, different wildlife species with diverse habitats need different approaches for protection. As a result, flexibility in policies and legislation is important to support a variety of nature reserves.

AIM

The primary aim of this paper is to understand the history, including infrastructure and characteristics, of nature reserves in Canada and China, as these two countries are diligently focused on a major concern within the United Nations to meet sustainable development goals. The project will compare the governmental norms and policies for

effective and sustainable maintenance of nature reserves in the two countries so that the comparison can help to understand the implications of the policies. Finally, this project will provide a list of recommendations regarding legislation and policies to upgrade the protection policies of these countries so that they can develop better reserves in the near future.

OBJECTIVES

In order to achieve the aim, these are the objectives:

- 1) To understand the diversity of nature reserves of the two countries. For this objective, three reserves from each country were selected. These nature reserves are: Yancheng Red-crowned Crane Nature Reserve, Anhui Alligator Reserve, and Sichuan Wolong National Nature Reserve (China); Wood Buffalo National Park, Jasper National Park, and Race Rock Ecological Reserve (Canada).
- 2) To compare the legislation to protect plants, animals and other natural resources of both countries so that the state of the forests can be understood and the level of protection needed for sustainable development can be understood.
- 3) To conduct a literature review of nature reserve related policies worldwide and critically compare policies in China and Canada so that positive and negative aspects of legislation in these two countries can be explored.
- 4) To provide a set of recommendations regarding China and Canada's policies and legislation to upgrade the protection related norms of both these countries.

INFORMATION ABOUT RESERVES LEGISLATION IN TWO COUNTRIES

CANADA

HISTORY AND BACKGROUND

As the country with the second largest territorial area in the world, Canada has a very large land area with a relatively small population. Canada's territory spans large natural ecosystems, which include a wide range of wildlife. As one of the early nature reserve Acts in the world, the Canada Wildlife Act was passed in 1973 by Royal Assent and was used to preserve habitats for wildlife species, especially migratory birds that were endangered or threatened.

The conservation of wildlife was a movement that started significantly earlier in the late 1800s (Wang, 2004). At that time some animals in Canada were already recently extinct or nearly extinct—such as the Labrador duck, great auk, wild turkey, western painted turtle, and swift fox—and Canadians pressed for the creation of nature reserves (Foster, 1998). By the early 20th century, many large sanctuaries were established in the Arctic to protect wildlife. However, they were largely abolished during World War II (Loo, 2011). Today, the Canadian government is paying more and more attention to building reserves and parks, based on previous successes in wildlife protection. However, with a growing population and increased urbanization, more and more wildlife species are in danger.

The Canadian government has recently focused on preparing new legislation and policies to protect endangered or threatened species of birds and other wildlife.

Almost all Canadians believe that forest and nature is a part of their culture, heritage, economy and environment. In response, the governments of all provinces have implemented sustainable forest management, and strict policies and legislation that spread awareness among citizens of the importance of protecting species at risk.

Another response by the Canadian government is to the fact that forest resources and natural biodiversity are helpful to sustainable growth and development of the Canadian economy and sense of community. Canada occupies more than 9 % of the global forest area and by protecting the forest ecosystem, the Canadian government contributes to a sustaining global environment. The current practices within Canada make it a leader in sustainable forest management, and Canada has also collaborated with other countries and organizations to adapt its forest policy framework to be able to monitor and mitigate the effects of climate change.

TYPES OF NATURE RESERVES

Canadian nature reserves can be separated into those protected by the federal government and those protected by provincial and territorial governments. Federally protected areas include National Parks, National Marine Conservation Areas, National Wildlife Areas, Migratory Bird Sanctuaries, and Marine Protected Areas. Provincial and territorial protected areas include Provincial and Territorial Parks, Marine Parks, Wilderness Parks, Wildlife Refuges, Ecological Reserves, Nature Reserves, Biological Reserves, Biodiversity Reserves, Natural Areas, Wilderness Areas, Habitat Protection Areas, some Wildlife Management Areas, Conservancies, and Special

Management Areas. There are also some protected areas that are collaboratively managed and some belong to non-governmental organizations or private enterprises (Environment and Climate Change Canada, 2016).

The most recent revision of the Canada Wildlife Act occurred in 1985. The Minister responsible for wildlife can take measures when necessary to protect any species of wildlife in danger of extinction. The Species at Risk Act was passed in 2003 and is intended to prevent wildlife species from being extirpated or becoming extinct. This Act not only shows what the Minister should do to protect risk species but also gives the Minister the power to define whether a species is in danger or not.

CHINA

HISTORY AND BACKGROUND

As one of the largest developing countries in the world, China has a very different approach in developing policy and legislation compared from Canada. In China, the history of nature reserves can be divided into three stages (He, 2012). The first was the creation stage from the year of 1956 to 1966. With the idea of establishing nature reserves playing out in public meetings at the time, public advice guided some rules and regulations. Although these rules and regulations promoted the development of nature reserves, the established reserves still lacked management policies. Then, from the year of 1967 to 1976, China's legal system was destroyed. Almost all the work of nature reserves was stopped, although some new management policies were being created. After 1976, the development of new nature reserves resumed with a very fast

pace. More and more policies and rules promulgated during these years, and the resulting laws made a system for nature reserve development more complete. In this period, some provincial governments also took leadership to develop their own policies to support nature reserves.

Although the Chinese government has made good progress in the last 60 years to support the development of nature reserves, there are still many problems. For example, before 1967, when a nature reserve was established, it always followed the idea of “rescue-type protection: first planning, then immediate construction, and only gradual improvement in the future” (Lv, 2008). Combined with the limited social and economic development and the level of science and technology at that time, scientific investigation remains poorly integrated into the planning of many nature reserves; several were established without even a basic inventory. If basic information for some reserves remains unknown, the effectiveness of their protection is limited.

Nowadays, the implementation of nature reserves in China requires standardization in planning and management, and all nature reserves are required to carry out a basic inventory using modern technology, devise a reasonable overall planning approach, and incorporate functional zoning that responds to natural conditions and the level of socio-economic development (Chen, 2012). Therefore, the Chinese government remains lacking concerns promoting relevant policies and legislation, and many nature reserves need to be updated according to new policies and legislation.

TYPES OF NATURE RESERVES

The way to separate nature reserves in China is based on their purposes, requirements, and their general conditions; there are six types of reserves recognized:

1) strict nature reserves and wilderness protection areas, 2) national parks, 3) natural monuments, 4) areas of special habitat and species management, 5) terrestrial and marine landscape protection areas, and 6) sites to protect ecological functions and special resources (Xue and Jiang, 1994).

Depending on the functional areas protected, the Chinese government has divided nature reserves into three sections that include a core area, a test area, and a buffer.

The core area has the best preserved natural ecosystem or contains key habitats where rare and endangered animals are protected. General entry by the public into the core area is prohibited, and if any organization or individual wants to conduct scientific research, authorization must be provided by the government. The buffer area is the place where scientific research is allowed, while tourism or activities associated with commercial production are not allowed. In the test area, the government allows educational activities, scientific research, visits by the public, and tourism activities, but proposed activities also need to be vetted through the corresponding legal process (Wang et al., 2012).

NATURE RESERVE RELATED LEGISLATION

CANADA

The Constitution of Canada relegates natural resources management including the

management of many natural reserves to provinces and territories, and also relegates some federal responsibilities for natural resources, like fisheries and migratory birds, into provincial tasks by agreement, so that regulation and enforcement of the laws becomes easier (Hessing, 2014). These laws control timber harvesting, wildlife habitat protection, land use, practices to regrow the forests and many others (Table 1).

Table 1. Related legislation of Canada

Related legislation of Canada	
Species at Risk Act 2002	Legal protection is provided to endangered species and the government is committed to conserving biological diversity
Fisheries Act 1985	All wetlands are protected and without government permission fishing or harvesting aquatic plants and animals may not occur
Migratory Birds Convention Act 1994	Migratory birds and their nests receive special protection; this Act is part of an international agreement that includes Mexico and the U.S.
Plant Protection Act 1990	The government must protect plants, agriculture, and forestry from human or natural disasters
Convention on Biological Diversity	The international convention is about maintaining biodiversity and the ways to sustain the rich and diverse natural areas around the world
Convention on International Trade in Endangered Species of Wild Fauna and Flora	The international convention ensures that the trade in animals and plants does not threaten their existence or survival
Forestry Act 1985	The government will review all the research related to protection, management and use of forest resources
National Parks Act 2000	The government must protect the national parks, including their biotic and abiotic components

CHINA

Effective conservation biodiversity can be achieved with a proper legal system. The government of China understood this fact after the drastic loss of biodiversity since the 1970s was found to be due to several human actions, and hence the focus shifted from preventive to protective actions for nature reserves (Xu, 2012). The Chinese Constitution, Article 26, is dedicated to the fact that state bears all the rights to protect its environment, and can take actions against deforestation, pollution and illegal hunting (Table 2).

DETAILS OF RESERVES IN BOTH COUNTRIES

CANADA

WOOD BUFFALO NATIONAL PARK

Wood Buffalo National Park is the largest national park in Canada (Figure 1), located in the Northeastern Alberta and Northwest Territories. This national park was established in 1922 to protect the world's largest herd of free-roaming wood bison. The importance of this national park can be understood from the fact that The United Nations Educational, Scientific and Cultural Organisation (UNESCO) declared it as a World Heritage Site in 2013. Further, the Royal Astronomical Society recently designated it as Canada's newest and world's largest dark sky preserve. This designation was given to the national park, as it not only protected bison, but also protected the night ecology and provided protection to bats, nighthawks, and owls (Reimer, 2014).

Table 2. Related legislation of China

Related legislation of China	
Criminal Law 1997	Actions such as hunting, selling or transporting animal parts are listed as crimes against the State
Environmental Protection Law 1979, revised 1989	The government can establish natural reserves to protect ecosystems, wetland sites, and habitats for endangered animals and plants
Forest Law 1984, revised 1998	A compensation fund will be created and used for forest development and management
Marine Environment Protection Law 1982	The marine ecosystem must be protected and reserves established in important coastal and marine ecosystems
Grassland Law 1985	The government must take effective steps to protect grasslands, other vegetation, and rare and endangered plants
Water Pollution Law 1984, revised 1986	The government must take necessary steps to protect wetland ecosystems
Air Pollution Law 1987, revised 1995	The government must protect the atmospheric ecosystem
Wild Animal Conservation Law 1988	Sales and purchases of wild animals and their hunting are prohibited, and the government forms teams to protect wildlife
Fishery Law 1986	Fishing of rare and endangered aquatic animals is prohibited, and the government can take any action if any individual is caught in violation
Import and Export Animal and Plant Quarantine Law 1991	The government controls animal and plant import and export to protect endangered species from illegal trade



Figure 1. Wood Buffalo National Park

JASPER NATIONAL PARK

Jasper National Park, established in 1907, is the largest protected area in the Canadian Rockies and a part of UNESCO'S Canadian Rocky Mountain Park's World Heritage Site. This is also the second largest dry sky preserve in the world designated by the Royal Astronomical Society in 2011.

RACE ROCKS ECOLOGICAL RESERVE

Race Rocks Ecological Reserve was established by the British Columbia Parks Ministry in the eastern entrance of the Strait of Juan de Fuca in the Salish Sea (Figure 2). Primarily, it previously served a marine science project for the students of Pearson College under the supervision of their teachers, Garry Fletcher and Marks McAvity. However, as per its biodiversity and ecological importance, it was included as a nature reserve in 1980, and by the end of 1998, the Canadian government included it as a marine protected area.



Figure 2. Race Rock Ecological Reserve

CHINA

YANCHENG RED-CROWNED CRANE NATURE RESERVE

Yancheng Red-crowned Crane Nature Reserve is one of the most important reserves in China, as it is the home for some of the world's rarest bird species (Figure 3). This nature reserve was created in 1984 with an area of 453,000 ha. Its location is on the edge of the Yellow Sea, making it as an important place for stopovers of migratory birds from north-east Asia and Australia. The reason behind this rich biological resource is the presence of rivers, swamps, and wetlands. More than 3 million migratory shorebirds pass through Yancheng, and more than 20,000 waterfowl visit the reserve. Therefore, to maintain biodiversity conservation, the Yancheng reserve plays an important role in China.



Figure 3. Yancheng Red-crowned Crane Nature Reserve



Figure 4. Anhui Alligator National Reserve

ANHUI ALLIGATOR NATIONAL RESERVE

Alligator sinensis is a species of alligator that is only found in China. In 1979, it was reported that only few of these alligators are present in the wild; hence, to protect these alligators, the Anhui alligator farm was developed (Figure 4). Eventually,

interested members of the local public and the government of Anhui province expanded the focus of the farm from alligator production to maintaining an environment that can sustain natural alligator breeding. Later, in 1988, the Chinese government listed it as a national reserve, and the Anhui Alligator Reserve and the Anhui *Alligator sinensis* breeding research center started working together as a united organization afterwards (Zhao, 2013).



Figure 5. Sichuan Wolong National Nature Reserve

SICHUAN WOLONG NATIONAL NATURE RESERVE

The Sichuan Wolong National Nature Reserve is located in Sichuan province, and it was established in 1963 with 20,000 ha. This place is home to around 4000 different species, including the highly endangered giant pandas (Figure 5). Furthermore, other animals, including snow leopards, red pandas, white-lipped deer and snow monkeys are also found in this protected area (Liu et al., 2015). The importance of this national park is that more than 200,000 visitors visited it before the devastating earthquake of

2008. The most important accomplishment of this park was in 1980 when the China Conservation and Research Center collaborated toward research on recovery of the giant panda and created strategies to protect this endangered species.

METHODS AND DEFINITIONS

What is a nature reserve? A nature reserve is a defined space with recognized, dedicated management by legislation or other effective means, a space for protecting the nature and its associated ecosystem services and cultural values. The studied areas for this report include Canadian and Chinese nature reserves. Research used official websites and documents available on the internet and included critical appraisal of the legislation (Table 3).

Table 3. Websites and documents

China

Yancheng Red-Crowned Crane Nature Reserve	http://gamebirds.me/2015/12/31/yancheng-the-crane-paradise-of-china/
Anhui Alligator Reserve	http://whc.unesco.org/en/tentativelists/106/
Sichuan Wolong National Nature Reserve	https://www.pandasinternational.org/panda-reserves/new-wolong-panda-center/

Canada

Wood Buffalo National Park	http://www.pc.gc.ca/en/pn-np/nt/woodbuffalo/index
Jasper National Park	http://www.jasernationalpark.com/
Race Rock Ecological Reserve	http://www.env.gov.bc.ca/bcparks/eco_reserve/racerocks_er.html

A literature review was included in the critical analysis so that the positive and negative points of laws and policies were highlighted. An assumption was made that norms related to forest and nature reserves also affected society and *vice versa*, the particularly socioeconomic status of communities and economy of the country. A large portion of population in both China and Canada depend on forest resources to fulfill their fundamental needs (Johansson et al., 2013). In order to track how the reserves used as case studies developed, I also reviewed each management plan taking into account that some conditions changed during so many years.

RESULTS

After comparing the legislation and policies, I reported gaps in regulations and policies related to nature reserves in both countries. As China used its forests as resources and exploited them for economic development by permitting its citizens to utilize them for their own benefit, modification of such a norm will take strict scrutiny and implementation of strict laws (Nachmany et al., 2014). The government should reinforce its legislations by appointing honest and trustworthy staff in those natural reserves (Cashore and Michael, 2012). The officials can use government policies and awareness programs to make the local population understand the effectiveness of such reserves in their life.

Furthermore, there is a set of recommendations that should be followed by both Chinese and Canadian governments, so that clarity, transparency, and consistency can be brought into nature reserve legislation:

1. Both Chinese and Canadian governments should focus on making policies based on scientific research before making laws. It is important because a clear and coherent policy helps to develop a clear approach and implementation process. For example, Ecuador used such policy for the development of its forest-related laws (Hicke et al., 2012).
2. Participatory law making can be used as an alternative to strict laws. Allowing each stakeholder, starting from government and its officials to the local public, to contribute to policymaking will help to create transparency that will easily be acknowledged by the public (Beaudoin et al., 2014).
3. The governments should make sure that the laws they are implementing have enough space in incorporation with all stakeholders.
4. The governments should focus on consistent development and upgrading of policies so that newer challenges created by internal and external factors like climate change can be addressed.
5. The governments should focus on decentralization of authorities so that local governments and authorities can also take part in the protection of the nature reserves. Furthermore, the governments should modify land acts, public property acts, and trade regulations, so that industries and businesses around nature reserves can be regulated (Xu et al., 2012).

CONCLUSIONS

As the human population is approaching its carrying capacity, exploitation of nature and its resources has started showing effects. Therefore, we have become more protective of nature and its resources. The United Nations has included maintaining nature reserves as one of its sustainable development goals for 2020. As two important nations of the world, China and Canada started thinking about nature and protection of resources since the last century. Both countries have large areas of forests in which to develop nature reserves but have utilized those areas for economic growth and development. This thesis reviewed six nature reserves in Canada and China and discussed their specifications and type of policies applied, with the prime aim to compare the rules, regulations, and laws related to reserves in China and Canada.

Both China and Canada have made many efforts to support the development of nature reserves, but we can also see that there are still many problems need to be solved. For example, all the policies in both countries are not properly regulated and scrutinized, and people started taking resources for the benefit of their industry or businesses. China and Canada may need to focus more on developing their laws and policies to support the development of more nature reserves.

REFERENCES

- Beaudoin, A., P. Y. Bernier, L. Guindon, P. Villemaire, X. J. Guo, G. Stinson, T. Bergeron, S. Magnussen, and R. J. Hall. 2014. Mapping attributes of Canada's forests at moderate resolution through kNN and MODIS imagery. *Canadian Journal of Forest Research* 44(5): 521-532.
- Brukas, V., and O. Sallnas. 2012. Forest management plan as a policy instrument: carrot, stick or sermon. *Land Use Policy* 29(3): 605-613.
- Cashore, B., and M. W. Stone. 2012. Can legality verification rescue global forest governance. Analyzing the potential of public and private policy intersection to ameliorate forest challenges in Southeast Asia. *Forest Policy and Economics* 18: 13-22.
- Chen, S., C. Shahi, and H. Y. H. Chen. 2016. Economic and ecological trade-off analysis of forest ecosystems: options for boreal forests. *Environmental Reviews* 24: 348-361.
- Chen, W. 2012. Chinese nature reserves. *Bulletin of Biology*. Retrieved from <http://www.cqvip.com/read/read.aspx?id=42254839>
- Costanza, R., R. de Groot, P. Sutton, S. van der Ploeg, S. J. Anderson, I. Kubiszewski, S. Farber, and R. K. Turner. 2014. Changes in the global value of ecosystem services. *Global Environmental Change-Human and Policy Dimensions* 26: 152-158.
- Diaz, S., J. Fargione, F.S. Chapin III, and D. Tilman. 2006. Biodiversity loss threatens human well-being. *PLoS Biology* 4: e277.
- Dong, K., S. Lu, and H. Terry, 2005. Bearing capacity of the Red-crowned Crane in Yancheng National Nature Reserve of Jiangsu Province. *Acta Ecologica Sinica* 25(10): 2608-2615.
- Environment and Climate Change Canada. 2016. Canadian Protected Areas Status Report 2012 to 2015. www.canada.ca/en/environment-climate-change.
- Environmental Stewardship Division Ministry of Water, Land and Air Protection. 2002. Race Rocks Ecological Reserve Management Plan.
- Foster, J. 1998. *Working for Wildlife: The Beginning of Preservation in Canada*. University of Toronto Press.

- He, G. Y. Lu, A. P. J. Mol, and T. Beckers. 2012. Changes and challenges: China's environmental management in transition. *Environmental Development* 3: 25-38.
- He, Q., Y. Qian, G. Wang, and L. Liu. 2009. Adjustment and driving forces of Yancheng National Rare Birds Nature Reserve in Jiangsu Province. *Journal of Ecology and Rural Environment* 25(1): 18-22.
- Hessing, M., and T. Summerville. 2014. *Canadian Natural Resource and Environmental Policy: Political Economy and Public Policy*. UBC Press.
- Hicke, J. A., C. D. Allen, and A. R. Desai. 2012. Effects of biotic disturbances on forest carbon cycling in the United States and Canada. *Global Change Biology* 18(1): 7-34.
- Jasper National Park Alberta. 2018. Jasper National Park Alberta - Jasper Travel, Tours and Hotels www.jasernationalpark.com.
- Johansson, T., J. Hjalten, J. de Jong, and H. von Stedingk. 2013. Environmental considerations from legislation and certification in managed forest stands: A review of their importance for biodiversity. *Forest Ecology and Management* 303: 98-112.
- Jiang, H., G. Chu, and Y. Hou. 2002. Breeding habitat selection by Saunders' Gull *Larus saundersi* in Yancheng of Jiangsu Province *Acta Ecologica Sinica* 22 (7): 999 - 1004.
- Liu, Y., F. Liu, Z. Xu, J. Zhang, L. Wang, and S. An. 2015. Variations of soil water isotopes and effective contribution times of precipitation and throughfall to alpine soil water in Wolong Nature Reserve, China *Catena* 126: 201-208.
- Loo, T. 2011. *States of Nature: Conserving Canada's Wildlife in the Twentieth Century*. UBC Press.
- Lv, S. 2008. Distribution, status and trend analysis of Red-crowned Crane in Yancheng Coastal Beach. *Ecological Science*, 27(3): 154-158.
- Millennium Ecosystem Assessment. 2005. *Millennium Ecosystem Assessment: Ecosystems and Human Well-Being*. Island Press Washington, DC
- Nachmany, M., S. Fankhauser, and T. Townshend. 2014. The GLOBE climate legislation study: a review of climate change legislation in 66 countries. Retrieved from <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2014/03/Globe2014>.

pdf

- Nepstad, D., D. McGrath, C. Stickler, A. Alencar, A. Azevedo, and B. Swette. 2014. Slowing Amazon deforestation through public policy and interventions in beef and soy supply chains. *Science* 344(6188): 1118-1123.
- Park Canada. 2010. Wood Buffalo National Park of Canada Management Plan.
- Park Canada. 2010. Jasper National Park of Canada Management Plan.
- Race Rocks Ecological Reserve. 2018. Race Rocks Ecological Reserve - BC Parks. www.env.gov.bc.ca/bcparks/eco_reserve/racerocks_er.html.
- Reimer, J. P., and M. K. Vassal. 2014. Bat activity and use of hibernacula in Wood Buffalo National Park, Alberta. *Northwestern Naturalist* 95(3): 277-288.
- Sichuan Wolong National Nature Reserve. 2018. Gengda Wolong Panda Center - Pandas International. www.pandasinternational.org/panda-reserves/new-wolong-panda-center.
- Wang, X. 2004. Nature Conservation Areas between Canada and China. (In Chinese.) retrieved from <http://www.cqvip.com/read/read.aspx?id=9453504#>
- Wang, G., J. L. Innes, S. W. Wu, J. Krzyzanowski, Y. Yin, S. Dai, X. Zhang, and S. Liu. 2012. National park development in China: conservation or commercialization? *Ambio* 41(3): 247-261.
- Watson, J. E. M., N. Dudley, D. B. Segan, and M. Hockings. 2014. The performance and potential of protected areas. *Nature* 515(7525): 67.
- Xu, J., Z. Zhang, Wenjing Liu, and P. J. K. McGowan. 2012. A review and assessment of nature reserve policy in China: advances, challenges and opportunities. *Oryx* 46(4): 554-562.
- Xue, D., and M. Jiang. 1994. Study on the classification of Nature Reserves in China. *China Environmental Science* 14(4): 246-251.
- Yancheng. Yancheng - The Red-Crowned Crane Paradise of China. 2018. <http://gamebirds.me/2015/12/31/yancheng-the-crane-paradise-of-china/>.
- Zhao, L., H. Yang, L. Fang, G. Pan, W. Zou, D. Ren, Q. Wan, and S. Fang. 2013. The sex ratio of wild Chinese alligators *Alligator sinensis*. *Current Zoology* 59(6): 725-731.
- Zheng, Heran, and Shixiong Cao. 2015. Threats to China's biodiversity by

contradictions policy. *Ambio* 44(1): 23-33.