China's biodiversity conservation research in progress

China is one of the world's mega-diversity countries and is associated with four global biodiversity hotspots as identified by Conservation International (http://www.cepf.net/resources/hotspots/Pages/default.aspx). Conserving China's biodiversity is therefore important not only for China, but for the entire world. Yet, China's huge population and rapid and ongoing economic growth place biodiversity in China under serious threat.

In the last few decades, the Chinese government and associated institutions and communities have made great efforts to promote biodiversity conservation. Between 1956 and the end of 2015, 2740 nature reserves were established (MEP, 2016). In 2013, a Red List of higher plants was officially released and one for vertebrates was released by the Ministry of Environment Protection of China and the Chinese Academy of Sciences in 2015. Two biodiversity monitoring networks, the Chinese Forest Biodiversity Monitoring Network (CForBio, http://www.cfbiodiv.org/english/) and the China Biodiversity Monitoring and Research Network (Sino BON) have been established by the Chinese Academy of Sciences. The complete Flora Republciae Popularis Sinicae (80 volumes, 126 books, in Chinese), Flora of China (49 volumes, in English, http://flrs.eflora.cn/), Fauna of China (154 volumes), and Catalogue of Life-China (http://sp2000.org.cn/) are available on line. More than 12 million specimens have been digitized and made available on line (http://www.nsi.org.cn/2017/). These data and others form a sound basis for conservation research in China.

Search with the key words “biodiversity” and “conservation” and “China” in the Web of Science, and more than 3000 papers can be found. In the top 100 most cited papers, the main issues addressed are: 1) The impacts of human activities, such as land use and land cover change, on biodiversity (including large engineering projects like the Three Gorges Dam); 2) The effectiveness of protected areas; 3) Climate change and biodiversity; 4) Biodiversity and ecosystem functions and services; 5) Negative impacts of invasive alien species; 6) Restoration of degraded ecosystems and habitats; 7) Community assembly rules and their conservation implications; and 8) Indigenous knowledge and conservation. However, research on threatened species, including underlying threat mechanisms and conservation measures, has received relatively little attention.

In this special issue of Biological Conservation, Feng et al. (2017) show that threatened plants tend to be concentrated in areas where anthropogenic impacts were limited before 1700, but since then have strongly intensified. The abundance and diversity of birds on tropical Hainan Island declined between 1997–1998 and 2012–2013, with deforestation and illegal wildlife use as the major drivers (Xu et al. 2017). With large-scale pollinator declines in many regions around the world, Teichroew et al. (2017) highlight the risks to wild and managed pollinators in China and the critical research gaps that hamper conservation efforts.

Three papers examine the status of critically endangered animal species in China. Fan (2017) reviews the status of six gibbon (Hylobatidae) species in China, the severe threats they are facing, and the urgent conservation actions needed to ensure their long-term survival. The Yangtze finless porpoise (Neophocaena asiaeorientalis asiaeorientalis) is in the same situation and will likely become extinct during this century (Huang et al. 2017). In contrast, data collected in the field from a large camera-trapping network show that Amur leopards (Panthera pardus orientalis) are returning to China (Wang et al. 2017), an example of achievements made by Chinese conservation efforts during the last few decades; this echoes the downgrading of the threat status of the giant panda by the IUCN in 2016.

Four papers focus on systematic conservation planning to identify priority areas based for conservation based on species distribution data at national and regional levels. Zhang et al., (2017b) build species distribution models for 7427 vascular plant species in China and identify species richness centers and priority conservation areas across the country. Zhang et al., (2017c) identify Key Biodiversity Areas in the Qinling Mountains after modelling the distribution of 259 protected plant and animal species in the region. Priority sites for a critical ecosystem type, coastal wetlands, are identified along China’s coasts to protect migratory shorebirds on the East Asian-Australasian Flyway (Xia et al. 2017). A species conservation redline—a core area for maintaining viable populations of target species—is proposed for giant panda conservation (Kong et al. 2017). To direct future conservation efforts, all of these papers use gap analyses to assess coverage of the priority areas identified by the current nature reserves.

Two articles in this special issue address existing protected areas in China. Zhang et al., (2017a) present an overview of the progress and problems of China’s protected areas, outlining future challenges and possible solutions. Miller-Rushing et al. (2017) compare the goals and approaches for establishment and management of nature reserves in China to those of national parks in the United States. These authors emphasize the importance of greater investment in science, resource management, and education in the national parks of both countries.

The papers in this special issue represent a solid collection of research on multiple aspects of biodiversity conservation in China. Going forward, we would like to see more work focusing on broader temporal and spatial scales, including long-term observational and experimental studies, as well as transboundary geographical research, since wildlife do not recognize political borders. More application-oriented research would also help to mainstream the management of biodiversity in China. Greater efforts in producing baseline inventories and monitoring changes in biodiversity are needed to help the implementation of conservation strategies. These efforts may take time to be developed, but the papers in this special issue show
how much progress has already been made in China, one of the most important arenas for biodiversity conservation in the world.

References


Keping Ma, Xiaoli Shen

State Key Laboratory of Vegetation and Environmental Change, Institute of Botany, Chinese Academy of Sciences, Xiangshan, Beijing, 100093, China

R. Edward Grumbine

Prescott College in Arizona

Richard Corlett

Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglan Township, Mengla County, Yunnan Province 666303, China