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## Evolution of tourism in a flagship protected area of China

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Nature-based tourism in protected areas, which is growing worldwide, offers much potential to enhance biodiversity conservation, poverty alleviation, and ultimately sustainable development. Understanding the evolution of protected areas as tourism destinations and the causes and consequences of changing supply and demand elements is an essential step toward sustainably managing tourism in these critical ecosystems. This research applied the Tourism Area Life Cycle (TALC) model to illustrate and analyze the 30-year evolution of tourism in Wolong Nature Reserve. Being inscribed in UNESCO Biosphere Reserve and World Heritage programmes, Wolong is a flagship protected area in China. We showed that the Reserve experienced exploration, involvement, and development stages of the TALC before tourism growth was completely halted by the Wenchuan Earthquake in 2008. We systematically investigated the changes related to the evolution of tourism and identified various internal and external driving forces. We examined the dynamics of politics, economy, and tourism growth that might propel the Reserve through the life cycle and identified significant tourism governance structural changes through the stages. The results have implications for sustainable tourism development in China's protected areas and also contribute to a broader and general understanding of the complex relationships between protected areas, sustainable tourism, and community development.

**Keywords:** sustainable tourism; conservation; protected area; tourism area life cycle; tourism governance; coupled human and natural systems

### Introduction

Nature-based tourism is a significant and growing segment of tourism (Newsome, Moore, & Dowling, 2002). The conservation sector plays an important role in the development of nature-based tourism, mainly through establishing and maintaining over 210,000 protected areas worldwide (WDPA, 2014). The International Union for Conservation of Nature (IUCN), the largest global environmental organization, defines a protected area as "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated

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ecosystem services and cultural values” (Dudley, 2008, p. 8). Conserving ecosystems and biodiversity through effective protected area management is important for tourism and recreation. IUCN classifies protected area systems based on the management objectives of the many protected areas worldwide. Seven categories of protected areas are defined, recorded, and classified under this most widely recognized and used system globally – (Ia) strict nature reserve; (Ib) wilderness area; (II) national park; (III) natural monument or feature; (IV) habitat/species management area; (V) protected landscape/seascape; and (VI) protected area with sustainable use of natural resources. Tourism and recreation are primary management objectives for categories II, III, and V protected areas, and secondary management objectives for categories Ib and VI protected areas (Dudley, 2008). Other internationally designated protected areas, such as UNESCO World Heritage sites and Biosphere Reserves, are also often important travel destinations. Around the world tourist visitation to protected areas continues to increase in most developed and developing countries (Balmford et al., 2009).

Protected area tourism has great potential to support biodiversity conservation and reduce poverty by replacing other destructive land uses (e.g. logging), directly financing protected areas, and providing income opportunities to local communities (Buckley, 2011; Coria & Calfucura, 2012; UNWTO, 2010). In practice, however, tourism is often found to cause ecological degradation in protected areas (Farrell & Marion, 2001; Grossberg, Treves, & Naughton-Treves, 2003; Klein, Humphrey, & Percival, 1995) with little or no benefit to the majority or the poor of the local community (He et al., 2008; Kruger, 2005; Liu et al., 2012). The fact that tourism is naturally dynamic and the processes and impacts associated with tourism are highly susceptible to change makes it difficult to harness the power of tourism for the sustainable development of destinations (Butler, 1999). Understanding the evolution of a tourism destination and the causes and consequences of changing supply and demand elements is a critical step toward sustainable tourism development.

The Tourism Area Life Cycle (TALC) (Butler, 1980) is one of the best known models of the evolution of tourism destinations. This model represents the relationship between an increasing rate of tourist visitation and the development of a tourist destination over time as a life cycle, and it offers a relevant framework for identifying development milestones for monitoring changes resulting from tourism development. The cycle includes several stages: exploration, involvement, development, consolidation, stagnation, and post-stagnation. These stages have been supported by a number of case studies (Lagiewski, 2006). In other cases, inconsistencies between observed tourism destination development and the TALC model were found. For example, Hovinen (1981, 1982) found that tourism development in Lancaster County, PA, deviated significantly from the TALC model in the later stages, while Bao (1995) found that some karst caves in China had no obvious exploration and involvement stages, and visitation declined sharply after the development stage. But overall, the TALC model is a useful descriptive tool for analyzing the evolution of tourism destinations (Johnston, 2001; Lagiewski, 2006).

Past studies on the application of the TALC model (Garay & Cánoves, 2011; Johnson & Snepenger, 1993; Oreja Rodríguez, Parra-Lopez, & Yanes-Estevez, 2008; Zhong, Deng, & Xiang, 2008) usually involved qualitative analyses to relate information on a specific destination to different TALC stages to portray the historical progression of tourism development. These studies tend to be descriptive rather than normative (Lagiewski, 2006). Some attempts have been made to examine the TALC model quantitatively (Lundtorp & Wanhill, 2006), but their usefulness is limited by the need for long-term data on visitors to tourism areas. Alternatively, Johnston (2001) proposed to specify mechanisms through finding “critical events” and “blurry transitions” that can be used to interpret stage or sub-stage

changes. The former refers to a key event that significantly influences the development of tourism. The latter focuses on a series of more subtle events that drive stage changes. Cut-off dates of stage or sub-stage changes identified in this way are then less arbitrary.

There are few studies applying the TALC model to protected areas (Boyd, 2006; Johnson & Snepenger, 1993; Zhong et al., 2008), possibly because protected areas are often subjected to more regulations that may interrupt tourism growth and cause deviation from the theoretical structure of TALC (Weizenegger, 2006). For example, Johnson and Snepenger (1993) found that tourism in Yellowstone was more intricate than the TALC model predicted, as different sources of information did not detect whether the park was at development or consolidation stage. In another example, Zhong et al. (2008) showed that the TALC model was applicable to tourism development in the first forest park in China, but environmental degradation took place in early rather than later stages. As the model suggests, different decisions among public and private sectors play important roles in both the demand and supply sides of tourism development (Lagiewski, 2006) and in shaping the life cycle process (Johnston, 2001). Thus, instead of trying to fit protected area tourism growth to TALC and regarding divergence from theory as a challenge to the concept, it might be more useful to treat the model as a descriptive framework and focus on identifying and explaining the major factors (e.g. government regulation, public and private investments) that cause stage progression during destination development or result in departures from theory. Understanding the roles and consequences of various political and commercial decisions during destination development can help design and plan sustainable nature-based tourism.

### Description of case study and research questions

Increases in nature-based tourism are significant in developing countries and emerging economies (Balmford et al., 2009). China is one of the largest international tourism destinations and has the largest domestic tourism market (Lew, 2003). Tourism in China's protected areas has grown rapidly during the past three decades (Wang et al., 2012). A survey on 100 nature reserves across 29 provinces in China in the late 1990s showed that 82% had developed nature tourism (Han & Zhuge, 2001). In 2002, the first national nature reserve ecotourism master plan was approved by the State Forestry Administration (SFA) to guide tourism development in Wolong National Nature Reserve (Figure 1). This signaled a new round of tourism development into the most restrictively managed and ecologically most important protected areas of China. Since then similar ecotourism master plans have been approved for over 30 national nature reserves (Peng & Zhang, 2011).

Wolong Nature Reserve was established in 1963 and expanded to the current size of 200,000 ha in 1975. It is part of the Southwestern China Mountains global biodiversity hotspot and most famous for hosting the largest wild population of the endangered Giant Pandas (*Ailuropoda melanoleuca*) (Wolong Administration Bureau, 2004). The Reserve is managed by the Wolong Administration Bureau, reporting to both SFA and Sichuan provincial government. The bureau is hierarchically structured with two townships, Gengda and Wolong, under its governance. There are ~5700 people living inside the Reserve, including ~5000 rural residents, about three quarters of whom are Tibetan and Qiang ethnic minorities, and ~700 urban residents, mostly Reserve employees and their family members. In the twentieth century, they survived primarily on a subsistence-based agricultural economy that was highly dependent on natural resources (Ghimire, 1994). Resources extraction activities in the Reserve once caused severe destruction of wildlife populations and habitat (Li et al., 1992, Liu et al., 2001).

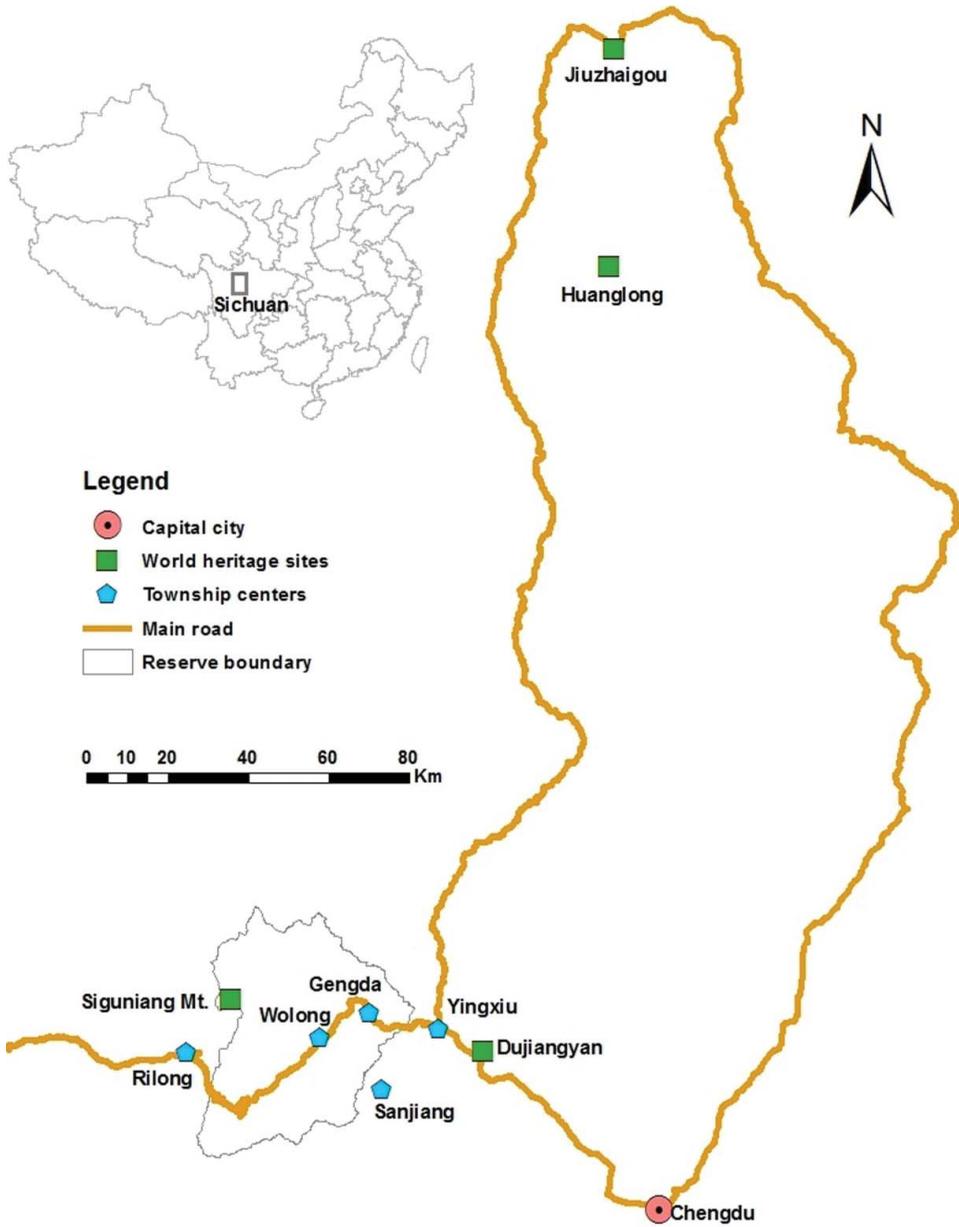


Figure 1. The location of Wolong Nature Reserve in the Greater Jiuzhaigou Touring Area in Sichuan, China.

Conservation challenges in the Reserve started to receive extensive attention both domestically and internationally in the late 1970s. In 1979, the Reserve was promoted to a national nature reserve and became one of China's first three UNESCO Biosphere Reserves (Li & Zhao, 1989). Biosphere reserves are internationally recognized protected areas that represent main terrestrial and coastal ecosystems on earth and promote sustainable development based on ecosystem management and local community participation.

Biosphere reserves serve in some ways as “living laboratories” for testing out and demonstrating integrated management of land, water, and biodiversity (MAB, 2012). Various conservation programs have been proposed and implemented in Wolong to stem ecological degradation and reduce poverty. Special attention was given to tourism as it was perceived as an environmentally clean industry that might provide job opportunities for locals (He et al., 2008; Yin & Eagles, 2005).

In this study, the TALC framework was applied to help describe tourism development in Wolong Nature Reserve since the 1980s. Using longitudinal data and a comprehensive analysis of tourism development in Wolong, this study provides an in-depth understanding of protected area tourism development in China. By using the experience of China under the context of economic transition and globalization, this research also aims to contribute to knowledge about protected area tourism management in general. The research questions are (1) did the evolution of tourism in Wolong adhere to or follow the stages as defined in the TALC framework; (2) what were the economic, ecologic, social, and governance changes associated with the evolution of tourism; and 3) what were the critical drivers of the tourism stage change?

## Methods

In this study, we examined whether the TALC model represents the observed tourism development in Wolong Nature Reserve, China. Data used in this study were collected through primary data sources such as in-depth interviews and surveys with various local stakeholders, questionnaire surveys of tourists, field surveys, and secondary data sources, such as government documents, as listed in Table 1. A combination of these methods allows a comprehensive study on all major types of stakeholders, including residents, reserve managers, tourism officials, and tourists.

The local rural household survey results reported are part of a longitudinal study on coupled human and natural systems (Liu et al., 2007) in the Reserve (An et al., 2001; Liu et al., 1999). Details about the household survey can be found in Liu et al. (2012). During the summer of 2005, semi-structured interviews were conducted with 68 local

Table 1. A summary of the data used in this study.

Data	Years	Sources	
Reserve official interviews	2005–2014	Conducted by authors	Primary data
Reserve official focus group	2007	Conducted by authors	
Tourism infrastructure inventory	2005–2007	Conducted by authors	Secondary data
Tourist survey	2006–2007	Conducted by authors	
Local business survey	2005	Conducted by authors	
Local business survey	2003	He et al., 2008	
Local household survey	2005, 2007	Liu et al., 2012	
Panda habitat assessments	2001, 2007, 2008	Viña et al., 2011	
Annual rural economic statistics	1980s–2012	Government data	
Annual tourist arrivals	1980–2007	Government data	
Annual tourism receipt	1997–2007	Government data	
Reserve management master plan	1998, 2014	Government document	
Reserve tourism master plan	2001, 2007, 2009	Government document	

tourism-related small businesses, including 40 hotel/restaurant owners or managers, 9 leisure farm owners, 8 souvenir shop owners, 5 retail shop owners, and 6 street vendors. This sample covered over 80% of each type of the small businesses, except the leisure farm owners (~45%). The others either were not reachable or refused to be interviewed. The information collected included business conditions, perceptions of tourism development, and knowledge about tourists' activities inside the Reserve.

In 2005, 15 government and reserve officials were surveyed about the history of tourism development in the Reserve and their perceptions on development. While the individuals were not randomly selected, they cover a range of age (23–52 years old), education levels (primary to college education), and working experience in the Reserve (3 to >20 years). In 2007, a focus group on tourism development issues in the Reserve was organized with the participation of 12 managers. These managers were specifically selected from the tourism-related government segments, such as tourism, natural resource management, and socioeconomic development departments. Interviews and in-depth discussions with the director and two vice directors of the Reserve were conducted at various times in 2007–2009 and 2012–2014.

A tourist survey was conducted at the most visited attraction in the Reserve, the China Conservation and Research Center for the Giant Panda (CCRCGP), where the world's largest in-captive panda population was located. Random intercepts were conducted at the exit of CCRCGP during July and August of 2006 (54 out of 62 days) and June to October of 2007 (62 out of 153 days). The first tourist leaving the center every 15 minutes during the day time was intercepted. The structured survey questionnaire covered basic information about the tourist's trip characteristics, trip motivation, and main activities in the Reserve. A total of 1663 tourists were intercepted, including 502 international tourists (30.2%) and 1161 domestic tourists (69.8%). The non-response rates for international and domestic tourists are 13.8% and 43.5%, respectively, resulting in a final sample size of 1090.

A tourism infrastructure inventory was conducted in 2006 and 2007 to record the locations of the main tourism attractions, hotels/restaurants, and the most used trails in the Reserve using a Global Positioning System receiver.

Secondary data used in this research included local government's annual statistical reports about visitor arrivals, annual tourism receipts and other tourism-related information, publications (i.e. peer-reviewed journals, books, news articles) about the Reserve, and road and zoning maps. A four-category giant panda habitat suitability map (highly, moderately, marginally, and non-suitable) was reviewed (Viña et al., 2007).

Based on annual visitor volumes, tourism receipts (Figure 2), and the change in accommodation capacity (Figure 3), tourism development in the Reserve was segmented into five stages by identifying critical events and the occurrence of major changes in tourism. Key indicators and their ecological, social, and economic impacts were summarized and compared within stages. Major changes in tourism planning and governance through the stages, some as driving forces and others as consequences of tourism development, were investigated.

## Results

### *Tourism development stages and driving forces*

A summary of five tourism development stages in the Reserve over the past three decades, including key events that are critical in causing and defining stages, is provided in Table 2.

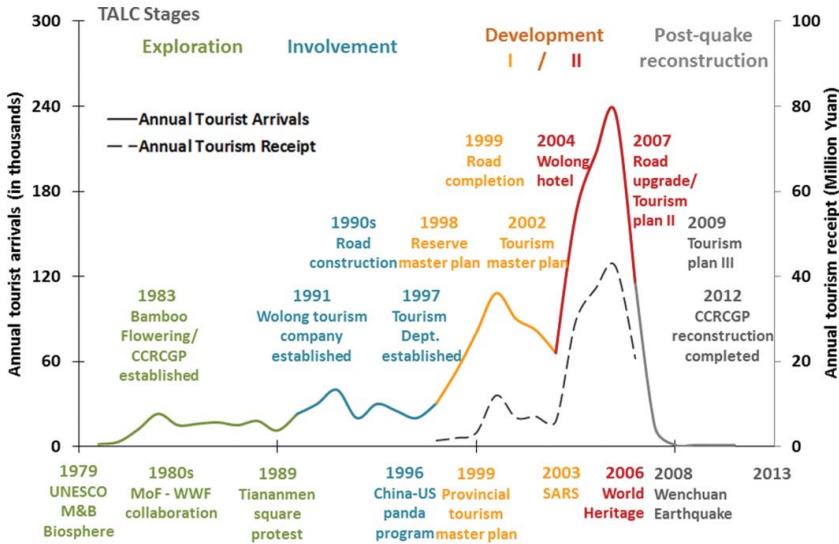


Figure 2. Trends of annual tourist arrivals (solid line) and tourism receipt (dashed line) in Wolong Nature Reserve from 1980 to 2013 (data on tourism receipt were only available since 1997, when the reserve’s Department of Tourism was established).

*Exploration stage (1980–1990)*

The late 1970s and the early 1980s mark the initiation of China’s recent economic boom, which was also the onset of China’s tourism development (Zhang, 2003). In 1980, an internationally collaborative giant panda research project was initiated in Wolong Nature Reserve by the Chinese Ministry of Forestry (now State Forestry Administration) and the World Wildlife Fund (WWF). This event attracted global attention as it was the first ever scientific collaboration on conservation between China and the Western world.

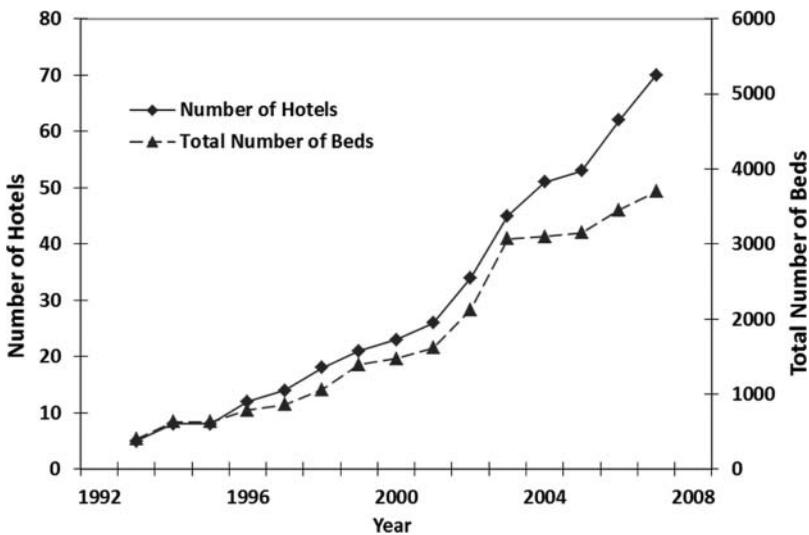


Figure 3. Numbers of hotels and beds available in Wolong Nature Reserve from 1993 to 2007.

Table 2. Key events in tourism area life cycle of Wolong Nature Reserve.

TALC Stage	Year	Key events
Exploration	1979	The Reserve was designated as a UNESCO Biosphere Reserve.
	1980	An internationally collaborative giant panda research project was initiated in the Reserve by the Chinese Ministry of Forestry and WWF.
	1983	Mass flowering and die-off of bamboo in Wolong Nature Reserve attracted global media attention; the China Conservation and Research Center for the Giant Panda (CCRCGP) was established.
Involvement	1991	The government-owned Wolong Tourism Development Inc. was formed to organize and regulate the increasing visitation to the Reserve.
	1996	Two pandas from CCRCGP were sent to San Diego Zoo in the USA as part of a new cooperative breeding and conservation program between China and the USA.
	1997	The Tourism Department under the Wolong Administration Bureau was established.
Development I	1998	The Wolong Nature Reserve Master Plan was approved.
	1999	A provincial highway connecting the Reserve to outside was completed.
	2000	The Wolong Nature Reserve ecotourism master plan (2001–2005) was approved by the Sichuan provincial government.
	2002	The Wolong Nature Reserve ecotourism master plan (2001–2005) was approved by the State Forestry Administration.
Development II	2004	The construction of Wolong Hotel, the only four-star hotel in the reserve, was completed.
	2006	The Sichuan Giant Panda Sanctuaries World heritage site was designated by UNESCO; a new round of road upgrade was started.
	2007	Tourism master plan II (2007–2015) was approved by State Forestry Administration.
Post-quake reconstruction	2008	The 7.9 Mw Wenchuan Earthquake struck the reserve on 12 May.
	2009	Tourism master plan III (2009–2015) was compiled.
	2012	The third round of road reconstruction was started.
	2013	The Reserve was identified as one of the two nature reserves in Sichuan Department of Forestry's pilot effort in national park development.
	2014	The Reserve, supported by Hong Kong Special Administrative Region, organized the first all-stakeholder workshop to discuss future tourism development.

The collaboration led to fruitful research findings on wild giant panda ecology and also resulted in the establishment of the world's first giant panda breeding facility in the Reserve, which was later named the China Conservation and Research Center for the Giant Panda (CCRCGP) (Schaller, 1994).

In 1983, a mass flowering and die-off of arrow bamboo (*Bashania fabri* Yi), a major staple food species for wild pandas, swept across the Reserve (Linderman et al., 2005). Field research showed that giant pandas did not change their daily and seasonal behavioral patterns despite the significant decline of their food base (Johnson, Schaller, & Hu,

1988); however, it was widely, though mistakenly, believed by the public and the government that the bamboo flowering would lead to panda starvation and mortalities (Pan et al., 2001; Schaller, 1994). News about the pandas and the Reserve made headlines in both domestic and international media and soon brought to the Reserve donations and aid from around the world. This attracted thousands of visitors every year, mostly “foreign scientists and delegates and domestic and international panda fans” (Wolong Administration Bureau, 2004), even though at the time all foreigners were required to get special entry permission from the Minister of Forestry (Sichuan Province Committee on Annual Compilation, 1996).

Throughout the 1980s, CCRCGP’s efforts to breed pandas in captivity were largely unsuccessful. The first and only surviving panda bred in 1980s was born in 1986 (Schaller, 1994). Britain’s Prince Phillip visited the Reserve as the president of WWF and named the panda “Blue Sky” (Wolong Administration Bureau, 2004). With the increasing media exposure, the Reserve started to establish its fame as the “Hometown of the Giant Pandas” both internationally and domestically. During this period, annual tourist arrivals in the Sichuan province increased at a rate of almost 25%, but the annual tourist arrivals to the Reserve fluctuated between 10,000 and 20,000 (Figure 2). This was partly due to the poor road and the lack of tourism infrastructure in the Reserve. For example, it was recorded that over 3000 tourists from Chengdu city, including 200 foreigners, visited the Reserve during the Labor Day holiday (May 1) in 1983. Only a small proportion of the visitors were able to stay in the Reserve’s government guesthouses with a total of 120 beds, and many others had to stay in reserve staff dorms (Wolong Administration Bureau, 2004).

The lack of tourism growth in the 1980s was due to the lack of infrastructure for accessing the Reserve, available basic tourism services, and ultimately the cautiousness of the Reserve administration. The earliest plan to develop tourism was prepared in 1982 (Li et al., 1992). The discussions on whether and how to develop tourism in the Reserve continued throughout the decade. The Reserve authorities thought there was not enough knowledge to support a tourism development plan that would result in minimal potential negative impacts on the ecosystem and the endangered pandas. During this period, while visitors were generally welcomed, there was no specific government segment on tourism management and local people had little involvement in tourism.

#### *Involvement stage (1991–1997)*

In the 1990s, China’s economic reform and “open-door” policy entered a new era and the country started to receive more international visitors (Yu, 1992; Zhang, 2003). In Sichuan province, giant panda habitat was identified as its top tourism resource and the previous restrictions on tourist visitation (i.e. requirement of entry permission) to Wolong Nature Reserve were lifted (Sichuan Province Committee on Annual Compilation, 1996). Further discussions on developing tourism in the Reserve led the managers to believe that carefully planned and managed tourism might bring multiple benefits. The perceived benefits included (1) using tourism income to supplement support from the central government and improve the financial status of the Reserve administration and their employees; (2) diversifying the income sources of local residents to help reduce their extraction and consumption of natural resources (e.g. through fuelwood harvest and illegal logging) so that habitats of wildlife, such as the giant pandas, could be better protected; (3) providing job opportunities for family members of the Reserve administration officials; and (4) enhancing communication and information exchange with outside parties for obtaining more external support (Li et al., 1992).

The Wolong Tourism Development Inc., a government-owned company, was formed in 1991 to organize and regulate the increasing visitation to the Reserve. This marked a major change in the government's role in tourism development from reactive to active tourism management. In 1997, the company was reformed into Tourism Department, an official governmental section under the Wolong Administration Bureau, to take charge of all tourism planning and management issues. Potential attractions were carefully selected by the Reserve administration to balance the economic and conservation needs, and all were distributed along the main road to avoid disturbing wild pandas. These attractions included CCRCGP, a wild animal and plant specimen museum at Wolong township, and short trails into two valleys (Li et al., 1992).

During this period, the CCRCGP achieved ground-breaking successes for in-captive panda breeding. In 1991, twin pandas were born in CCRCGP with one cub surviving to adult age. Every year since then, at least one new panda cub was born and survived in CCRCGP. In 1996, the first captive born and surviving panda was relocated to San Diego Zoo in the USA as one of a pair of pandas in a new cooperative breeding and conservation program between the two countries. This panda, named Bai Yun, became the most productive female panda outside China and has so far given birth to five cubs. These pandas continued to put Wolong Nature Reserve in the global media.

The successful panda breeding program at CCRCGP further publicized the Reserve. The annual tourist arrivals doubled from the previous period to about 25,000–30,000 (Figure 2). The situation started to change since a multi-year provincial road construction project, funded by the provincial government, was initiated in 1992. The main goal of this project was to strengthen the economic, social, and political linkage between the eastern urban regions of the Sichuan province and the mountainous regions in the west, where ethnic minorities, such as Tibetan and Qiang people, reside. The improved road in the Reserve made large-scale infrastructure construction possible and more efficient. In 1995, Wolong Hotel, the first of its kind in the Reserve with 126 beds, was built with partial financial support from the provincial government. In 1996, another hotel, Sitongyuan Hotel, was constructed with investments from the Sichuan Department of Transportation (Wolong Administration Bureau, 2004).

During this period, some small businesses, almost all owned and managed by the relatives of the Reserve officials, emerged to provide food and lodging to tourists. Some rural residents started to sell local products, mainly non-timber forest products such as mushrooms and herbal medicines, to tourists (He et al., 2008).

#### *Development I stage (1998–2004)*

By the late 1990s, forest and panda habitat loss and degradation in the Reserve peaked, largely because the “fence and fine” type of conservation policies in the past failed to address local people's livelihood needs (Liu et al., 2001). To change this situation, a new comprehensive conservation plan, the *Wolong National Nature Reserve Master Plan*, was developed by the Reserve and approved by the SFA in 1998. The plan officially aligned tourism as a new strategy within a larger conservation framework. Outcomes of the plan were to draw funds from tourism revenue (e.g. admission to attractions) for forest and panda habitat conservation and provide alternative income for local farmers through tourism-related activities. A zoning management system, including experimental, buffer, and core zones, was established as a guideline for regulating human activities and mitigating negative human impacts across the Reserve (Figure 4).

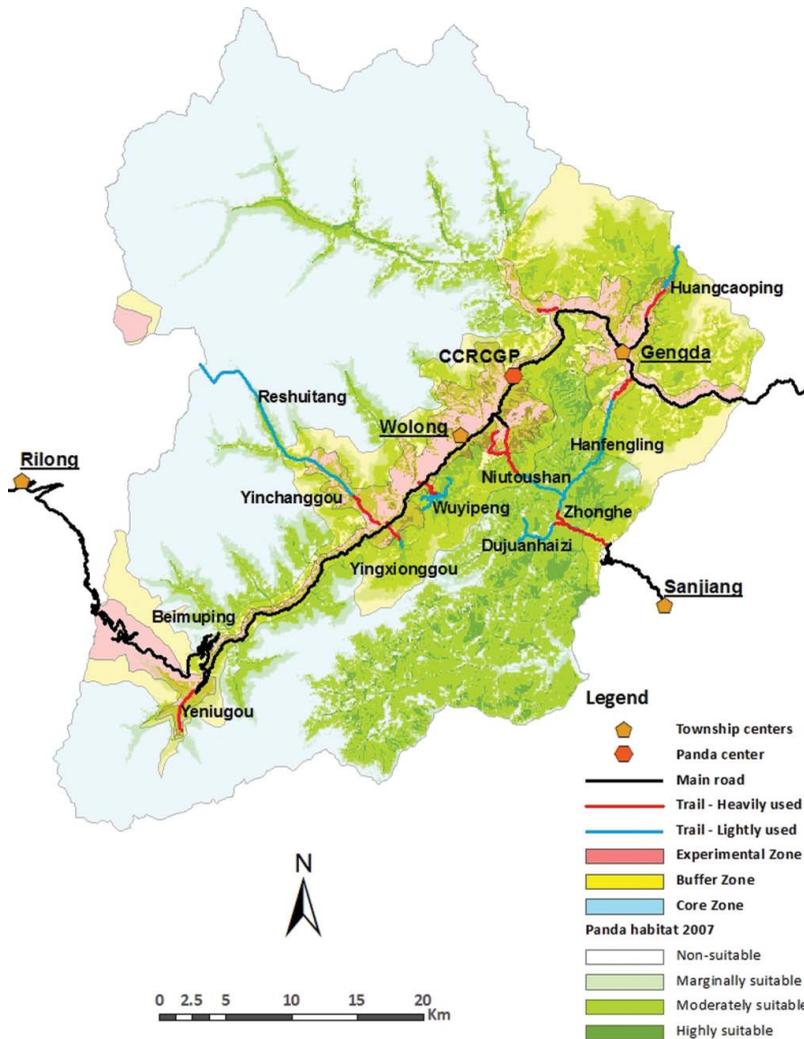


Figure 4. Distribution of trails and natural attractions with tourist activities across Wolong Nature Reserve in development II stage. Township names are shown with underscores.

Also, in 1998, the Sichuan province government announced the first *Sichuan Province Tourism Development Master Plan* (Wu, 2001), in which giant panda was branded as the province's tourism image marker and Wolong panda tourism was given special development priorities. In 2000, the giant panda was further promoted as one of the top three tourism brands of the province. Two government agencies, the Sichuan Department of Tourism and the Sichuan Department of Forestry, were identified to work with Wolong Administration Bureau to make a panda tourism plan, which later evolved into the *Wolong National Nature Reserve Ecotourism Development Master Plan* and was officially approved by SFA in 2002.

The completion of the provincial road in 1999 connected the Reserve to an important tourism destination cluster in Sichuan, collectively called the Greater Jiuzhaigou Loop Touring Area (Figure 1), which covers several National Scenic Areas and World Heritage

Sites and receives millions of domestic and international tourists every year. As a result, annual tourist arrivals in the Reserve almost tripled in the development I stage compared to the involvement stage (Table 3).

A new round of tourism infrastructure development was implemented in this period. The first project was the new Panda Hotel constructed by CCRCGP in 1999. In 2001, Wolong Investment Co., Ltd. was established by the Reserve administration with tourism management and promotion as one of its key businesses. But the escalating demand for tourism soon dwarfed the Reserve's limited financial (e.g. investment), physical (e.g. infrastructure), and human (e.g. tourism management expertise) capital. In 2002, the Reserve signed a contract with the Luneng Xinyi Ltd. Co., a state-owned enterprise from Eastern China, to set up a new non-listed shareholding tourism corporation, with the Reserve receiving 45% of the total shares and Luneng 55% (Su, Wall, & Eagles, 2007). Luneng invested 42 and 30 million Yuan (1 Yuan = 0.1208 \$US in 2002), respectively, to build a new four-star level Wolong Hotel with 668 beds (a fivefold increase from the 126 beds in the old Wolong Hotel), which was completed in 2004 and operated by Luneng, and the Wolong China Giant Panda Museum, completed in 2003 and operated by the Reserve.

Another tourism development project in this period took place in the Zhonghe river area of the Reserve, which administratively belongs to the Sanjiang Township of Wenchuan County (Figure 4). Limited by steep mountain ridges, the Reserve's capacity in monitoring human encroachment in this area was low. Since the late 1990s, the Wenchuan County government developed tourism infrastructure in the area (State Forestry Administration, 2006). In 1999, the Reserve established a tourism development agreement in this area with the Wenchuan County government under the supervision of Sichuan Department of Forestry. Not only the existing tourism infrastructure in the buffer zone around Zhonghe (Figure 4) was kept, a new three-star hotel in the buffer zone and a series of tourism facilities penetrating three kilometers into the core zone of the Reserve were also constructed.

During this stage, local participation in tourism increased significantly. Over 30 household-owned hostels and restaurants, almost all distributed around the township centers and beside the main road, were constructed, together providing over 1000 beds. A significant number of micro-businesses emerged, mainly to sell local products and souvenirs to the tourists. Souvenir demand stimulated the establishment of a family workshop factory in the Wolong Township.

#### *Development II stage (2004–2007)*

In 2004, the Reserve and Luneng decided to terminate their contract and all shares of Luneng were transferred to Wolong Investment Co., Ltd. In 2005, another collaboration was established between the Wolong Administration Bureau and the Jiuzhaigou National Scenic Area Administration. Jiuzhaigou was the first World Natural Heritage Site and the most popular nature-based tourism destinations in Sichuan with over 2,000,000 annual arrivals (Lew, 2003). A new Jiuzhaigou-Wolong Giant Panda Ltd. Co. was formed to manage tourism in the Reserve, in which Wolong had 20% of the total shares and Jiuzhaigou 80%. Full tourism managerial power over all major tourism attractions (e.g. CCRCGP, panda museum) and facilities (e.g. Wolong Hotel) was given to the more experienced Jiuzhaigou side in order to intensify tourism marketing using the brand of Wolong pandas, construct new tourism facilities and attractions to enrich visitor experiences, and enhance the underdeveloped services and transportation systems. Between 2005 and

Table 3. Major changes across the tourism area life cycle stages in Wolong Nature Reserve.

Stage	Exploration 1980–1990	Involvement 1991–1997	Development		Post-quake reconstruction 2008–present
			I 1998–2003	II 2004–2007	
Mean annual tourists (thousand)	14.1	27.9	77.5	180.0	N/A
Mean annual tourism receipt (million Yuan)	N/A	1.40	5.51	32.40	N/A
% International tourist	1.93%	2.15%	12.43%	6.72%	N/A
Total number of panda cubs born and survived at CCRCGP	1	14	38	51	63
Per capita annual net income of rural residents *(Yuan)	1247	1795	2415	3010	1860 ('08)
Rural community annual service industry income (million Yuan)	0.02	0.10	0.42	1.42	6628 ('12)
% Service industry income in rural economy	0.7%	1.9%	3.3%	7.1%	2.7%
% tourism receipt to rural residents	No Data	No Data	8.5%	4.7%	N/A
Tourism management body	Wolong Administration Bureau	Wolong Tourism Inc.	Wolong Tourism Department, Wolong Investment Co., Ltd.		
Major external partners	Ministry of Forestry, WWF	Sichuan Provincial Government	Luneng Xinyi Ltd. Co.	Jiuzhaigou National Scenic Area, Aba Prefecture Government	
Tourism management model	National park model	Parastatal model	Public and for-profit combination model	Mixed model	

\*Data from the years 1990, 1997, 2003, 2006, 2008, and 2012 (inflation adjusted to year 2012) were used to represent approximately the end of each stage. Year 2007 and 2013 data were not available.

2007, over 80 million Yuan were spent in infrastructure construction in the Reserve (Wolong Administration Bureau, 2009).

In 2006, a World Natural Heritage site, namely Sichuan Giant Panda Sanctuaries, was officially designated by UNESCO, with Wolong Nature Reserve as its most important part (IUCN, 2006). A new ecotourism development plan (2006–2015) was developed by the Wolong Administration Bureau and approved by the Sichuan provincial government. Another round of construction was implemented to further widen and upgrade the provincial road.

Although the road construction and the related traffic restriction significantly limited and reduced the visitation to the Reserve in 2007, the rise of tourist arrivals in the Reserve was apparent (Figure 2). Tourists came from around the world. Our sample at CCRCGP between 2006 and 2007 included 434 international tourists from 27 foreign countries and 656 domestic tourists from 29 provinces in China. The top five origins of foreign tourists were Japan (13.3%), the United States (7.9%), the United Kingdom (5.0%), France (2.8%), and the Netherlands (2.6%). The top five origins of domestic tourists were Sichuan (28.6%), Chongqing (15.8%), Guangdong (6.4%), Beijing (2.7%), and Shanghai (2.0%). Wild pandas, natural forests and wildlife, and unspoiled air and water were the top three reasons that motivated the domestic tourists to come to the Reserve; for international tourists, the top three were natural forests and wildlife, wild pandas, and pandas in captivity (Table 4). Late spring to early fall marked the main tourism season, with two peaks in early May (the Labor Day holiday in China) and early October (the National Day holiday in China) (Figure 5).

Besides the day-trippers who spent time at the conventional attractions (e.g. panda center, museum) in the Reserve, several new tourist groups emerged in this period. One group was *Nong Jia Le* (or leisure farm) tourists, who visited the Reserve mainly for the cool weather and unspoiled air and water in the summer. These tourists were mainly city dwellers from the nearby Chengdu metropolitan area. They usually spent weekends in private hostels or stayed a prolonged period in local people's houses, and some chose to walk the neighboring trails during daytime. Another group was backpackers, who came mainly for hiking, camping, birding, or enjoying the forest and alpine landscapes. The backpackers frequented the trails across the Reserve. These trails used to be the main routes connecting the reserve to outside and were mostly abandoned after the first road was paved into the Reserve in the 1960s. Backpackers followed these trails into the buffer and core zones of the Reserve, where highly suitable panda habitat is located (Figure 4).

Table 4. Importance of different tourism resources in the Reserve as perceived by the tourists ( $n = 1090$ ) (measured using a five-point Likert scale: 1. Not important; 2. Somewhat important; 3. Important; 4. Very important; 5. Extremely important) based on surveys at CCRCGP in 2006 and 2007. Students'  $t$ -tests were conducted for comparison between domestic and international tourists.

Tourism resources	Domestic		International		$p$ -value
	Mean	SD	Mean	SD	
Giant pandas in the wild	4.39	0.89	4.14	1.06	<0.0001
Giant pandas in captivity	3.74	1.08	4.07	1.02	<0.0001
Unspoiled air and water	4.19	0.94	3.91	1.11	<0.0001
Natural forest and wildlife	4.27	0.91	4.21	0.95	0.13
Tibetan and Qiang culture	3.24	1.23	3.32	1.27	0.86

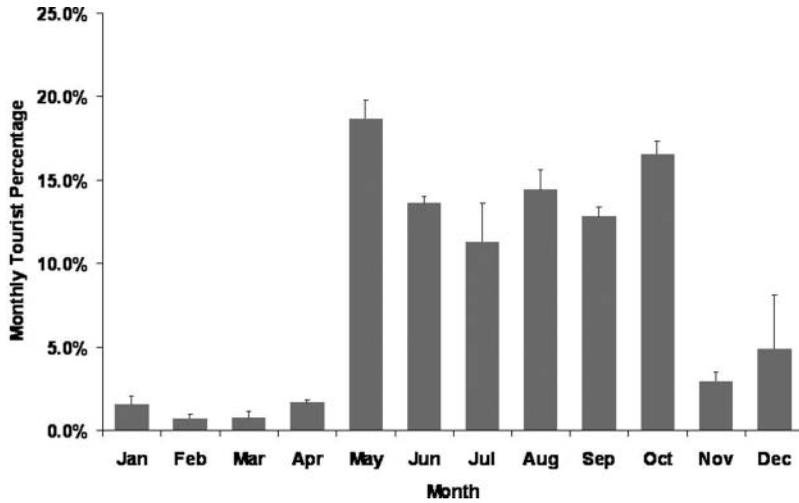


Figure 5. Seasonality of tourist visitation to the China Conservation and Research Center for the Giant Panda (CCRCGP) at Wolong Nature Reserve in development II stage (2004–2006 data used).

According to *Regulations of the People's Republic of China on Nature Reserves* (State Council of China, 1994), tourists are banned from visiting areas outside the experimental zone in nature reserves. But the lack of monitoring staff and the low frequency (seasonal before 2008 and biannual after 2008) of field monitoring made it impossible to ban backpackers from entering the forests or collect enough disturbance data to inform management. As a result, almost none of the tourists' activities along trails have been regulated or controlled in the Reserve (field observation).

#### *Earthquake and post-quake reconstruction (2008–present)*

The Olympic Games were held in Beijing, China, in 2008. With the road upgrade completed in early spring, a peak tourism year for the Reserve was anticipated, but two unexpected events struck this region and resulted in a complete stop of tourism. The Tibetan unrest (Yeh, 2009) in spring 2008 led the government to enforce travel restrictions to western Sichuan. The Labor Day holiday of 2008 witnessed a much lowered visitation to the Reserve. On 12 May 2008, a 7.9 Mw earthquake struck the Reserve at its eastern boundary. The earthquake and its associated landslides led to 48 casualties (6 reserve employees, 35 rural residents, and 7 visitors), over 100 visitors missing and extensive damage to the infrastructure, including the road network and the tourism facilities in the Reserve (Viña et al., 2011). Many houses and other buildings collapsed or were damaged. All in-captive pandas raised in CCRCGP were relocated to its branch base in Ya'an, Sichuan. A series of plans were drawn to rebuild the infrastructure and restore the ecosystem. Tourism was identified as the main tool of economic development after the completion of infrastructure reconstruction. Recently, a newer version of the ecotourism master plan has been proposed, with 1.382 billion Yuan (1 Yuan = 0.1464 \$US in 2009) to be spent by 2015 (Wolong Administration Bureau, 2009). Plans call for the repair or replacement of damaged infrastructures, including roads and tourism facilities. To accommodate the new demand for lands to build tourism infrastructure, the zoning scheme was modified, with an extra 102 ha of highly suitable habitat allocated into the experimental zone

(Hull et al., 2011), and many local households relocated and their cropland converted into built areas.

Post-earthquake tourism development in the Sanjiang township territory within the Reserve was first revitalized. The Sanjiang area was promoted to a National Scenic Area in 2009, the first of its kind in the Wenchuan Earthquake affected region (Xinhua News Agency, 2012). A new round of infrastructure development and tourism growth in this area may further encroach wildlife habitat from southeast of the Reserve. Inside the Reserve, Wolong Administration Bureau originally expected volumes of tourists would return soon and tourism would replace agriculture and become the dominant economic segment after reconstruction (Wolong Administration Bureau, 2009). However, frequent landslides and debris flow every summer since 2008 recurrently damaged the newly reconstructed road and delayed the completion of new CCRCGP facilities in the Huangcaoping area of Gengda township to 2014 (Figure 4). A third round of road reconstruction was started in 2012 and will take at least four years. Because of the disaster risks, Wolong Administration Bureau declared the Reserve too dangerous to visit and thus closed for tourism until 2016. While some individual tourists and small groups still pass through the Reserve occasionally, no official tourist-related data have been collected since May 2008.

### ***Changes related to tourism development***

#### *Economic changes*

When tourism started in the Reserve in early 1980s, the local economy was a subsistence-based agricultural economy (An, He, Liang, & Liu, 2006). Over the last 20 years, per capita annual net income of local residents increased steadily from 1297 Yuan in 1990 to 3010 Yuan in 2006 (Table 3). Several factors contributed to the income increase: (1) shifting crop type from corn and potato to cash crops (e.g. cabbage and radish); (2) temporary labor jobs inside the Reserve on road or other infrastructure construction projects; and (3) participating in commercial activities, mainly tourism-related. Based on a random sample of 220 local households, the percentage of tourism-participating households increased from 4% in 1998 to 27% in 2006. A multivariate analysis showed that households with greater financial (e.g. income), physical (e.g. access to key tourism sites), human (e.g. education), and social (e.g. kinship with local government officials) capital and less natural capital (e.g. cropland) were more likely to participate in tourism activities (Liu et al., 2012).

By 2006, the service industry (mainly tourism) was still a small part of the rural economy in the Reserve, although its importance had been increasing since the 1980s (Table 3). Economic leakage, flowing of tourist expenditures to outside investors or managers that do not directly benefit local economy and community, was significant and the level of leakage continued to increase. While the annual service industry total income in the rural community more than tripled from development I stage to development II stage, the total share of tourism receipt by the rural community was almost halved from 8.5% to 4.7% (Table 3). These statistics have been confirmed by findings reported by He et al. (2008) and from the interviews with the tourist business participants. In 2006, about 60% of the employees in the three government-owned hotels were from outside the Reserve. About half of the employees in the private hotels and restaurants were nonlocals, and they held higher paying and more prestigious managerial jobs. Almost all raw food products were purchased from nonlocal sources. The locally owned souvenir factory stopped its production in 2005, after which all souvenirs sold in the Reserve were purchased from

outside. Furthermore, opportunities to participate in tourism within the local community were also unevenly distributed (Liu et al., 2012).

After the 2008 earthquake, tourism has not been an income source for local households for five years and the local service industry has shrunk to the level of early 2000s. The annual rural per capita net income plummeted in 2008, but increased significantly afterwards, mainly from the highly paid local laborer jobs in the reconstruction projects, which came to an end by early 2013 (Table 3).

### *Ecological changes*

Forests and panda habitat in the Reserve experienced severe destruction and degradation in the twentieth century (Liu et al., 2001; Viña et al., 2007). This declining trend has recently been stopped, largely attributed to the implementation of two national forest conservation and restoration programs (Viña et al., 2011). Under these programs, logging in natural forests for any purpose was banned and over three quarters of cropland on steep slopes in the Reserve was reclaimed into tree plantation. Subsidies were provided to local households through these two programs. A large amount of labor was released from fuelwood harvesting and cropping, and tourism became one option for some of this labor. Households with less cropland tended to have a higher likelihood of participating in tourism, and households operating a private hostel, restaurants, or *Nong Jia Le*, tended to reduce fuelwood consumption more than those who did not (Liu et al., 2011). Tourism infrastructure construction in the Reserve, especially in the development II stage, was mostly conducted with low direct impact on vegetation. Timber needed for construction was imported from outside and tree felling only occurred when the road was widened. Thus, tourism appears to have positively supported the forest recovery in the Reserve.

Visitation to key panda habitats of the Reserve was increasing before the earthquake. The current zoning scheme included less than half of the highly suitable panda habitat inside the core zone and 15.4% and 39.6% of the highly suitable panda habitats are inside the experimental and buffer zones, respectively (Figure 4). The core zone is not immune to tourists' disturbance. Many trails extend well into the core zone through large patches of highly suitable panda habitat (Figure 4). More than 95% of the locations, where panda presence was confirmed in the Reserve between 2005 and 2007, were at least 500 meters away from heavily used trails (Liu 2012). Increasing road traffic of tourists may also discourage wildlife from visiting roadside areas and thus further segregate wildlife populations on the two sides of the road.

### *Social changes*

The social impact of tourism in the Reserve was mixed. Tourism helped raise more awareness about conservation in the Reserve and made the Reserve more visible both domestically and internationally. Tourism induced more interactions and information exchanges between local people and outside visitors, although the information flows primarily from locals to tourists (Liu et al., 2012). People from households participating in tourism tended to perceive more nonfinancial benefits in addition to more negative environmental impacts of tourism, compared with households not participating in tourism. Interviews in 2005 and 2007 showed that most local residents considered tourism a good thing for the Reserve, and some complained about the unequal distribution of tourism job opportunities in the Reserve (Liu et al., 2012). Conflicts between local jobless young people and nonlocal tourism industry employees were on the rise. Overall, while many local

residents, especially those who operated small businesses, embraced tourism; some others might react in different ways by tolerating tourists traveling through their villages or adjusting to the times when tourists were near their daily lives by being in their homes (Ap & Crompton, 1993).

### *Governance change*

The tourism governance structure in the Reserve changed substantially through the stages. In the exploration stage, the Reserve administration was the main tourism management body and various international nonprofit organizations (e.g. WWF) and national governance agencies (e.g. Ministry of Forestry) were also involved. In the involvement stage, financial support from the provincial government played a critical role in tourism infrastructure development, such as road and hotels, and a local government-owned company, the Wolong Tourism Inc., emerged. Late in the development I stage, an outside corporation, Luneng, become part of the management body. By the development II stage, all attractions were operated and managed by a complex parastatal corporation, largely controlled by an outside public organization, Jiuzhaigou. Tourism development in the Sanjiang part of the Reserve was operated by the private sector with strong support from the Wenchuan County and Aba Prefecture governments. The alterations in tourism management body and emergence of new tourism governance structures in the Reserve are important indicators of stage changes. On the one hand, the local community and government lacked the necessary financial capacity and human resources to meet the increasing demands for tourism in the Reserve. On the other hand, regional and national authorities held increasing interests in regulating tourism development in the Reserve.

### **Discussion**

In this study, we found that the observed tourism development in Wolong Nature Reserve generally conforms to the exploration, involvement, and development stages described in the TALC model. Although the Reserve has not completed a full cycle or even reached the consolidation stage, the TALC model is useful in characterizing a general pattern of tourism growth in the Reserve. Annual tourist numbers, tourism receipt, and tourism facilities all increased significantly from stage to stage as one would expect from a TALC model. Key events that significantly affected relevant policies to tourism development in the Reserve were crucial in modifying the speed and shape of tourism growth. The Reserve experienced prolonged exploration and involvement stages, and then fast development in the late 1990s and early 2000s, when the Reserve's management master plan and tourism master plan were approved. The World Heritage site designation in 2006 is another critical event boosting tourism growth; however, the earthquake in 2008 changed its course. This study also creates a platform for studying how tourism in the Reserve recovers from the disaster and starts another life cycle.

Strong fluctuation in visitor volume within stages is obvious, which was caused by various endogenous and exogenous uncertainties. For example, the spike in tourist arrival in 1983 was triggered by the media report on "panda starvation" due to bamboo flowering and die-off; the reasons for the tourist number drops in 1989, 2003, and 2008 can be attributed to the Tiananmen square protest (Lüsted, 2010), an outbreak of severe acute respiratory syndrome (SARS) (Liu, 2003), and the 2008 earthquake (Figure 2). These rises and falls suggest that tourism is an open and complex system exposed to risk and uncertainty from many sources. For example, the Reserve and the surrounding areas in

western Sichuan mountains are within a global hotspot for landslide and earthquake disasters. Historically, human population density in these regions was low as a result of low land fertility and high natural hazards. In a commentary on the Sichuan province's tourism development master plan, Wu (2001) pointed out that a major flaw of the plan was the high level of investment in developing mass nature-based tourism in the disaster-prone region of western Sichuan. Before the 2008 earthquake, landslides and debris flow were common in Wolong Nature Reserve, and in less than one hour, a flood in summer 2007 damaged millions of Yuan of infrastructure construction in the Zhenghe valley of the Reserve. The 2008 earthquake is a vivid example showing how fragile a tourism system can be when facing natural disasters. Landslide and debris flows induced by heavy rainfall events occurring every summer since 2008 have further damaged the newly reconstructed infrastructure and significantly impacted the local community's normal social and economic exchange with the outside. Based on current information, the Reserve will be classified as an officially inactive tourism destination for at least eight years following the earthquake. This is the first reported case of a natural disaster having such a profound impact on tourism growth as a factor within the TALC model.

The case of Wolong offers an interesting laboratory for assessing the dynamics of governance in regulating tourism growth. Tourism is naturally multifaceted and dynamic. Policy-making and management for tourism and protected areas can be distinct and fragmented (Eagles, 2009). Different organizations (government, private, nonprofit, and community) deal with different aspects of protected area tourism according to their respective interests and responsibilities and form various kinds of partnerships. Eagles (2009) used 10 criteria for governance to evaluate 8 common management models of tourism partnership development in parks and protected areas, and concluded that generally models with high degrees of for-profit operations ranked lower and high nonprofit sector involvement ranked higher in terms of the ideals of good governance. This is supported by a recent review of public-private partnerships on tourism in South Africa's national parks (Varghese, 2008).

Applying Eagles' management models to the case of Wolong, we found a series of changes in tourism governance structure through stages (Table 3). In the exploration stage, the Reserve adopted a national park model. With the establishment of Wolong Tourism Inc., a parastatal model was taken in the involvement stage. In the early development stage, a public and for-profit combination model was used, which was considered a "theoretically viable" innovation in China's protected area tourism governance (Su et al., 2007), but lasted for only two years. Later, a new partnership between two protected area agencies (Wolong and Jiuzhaigou) emerged to form another tourism enterprise. In this unique partnership, one protected area agency transferred full tourism managerial rights to another protected area that was more experienced in developing tourism. Each change in governance structure was a critical event that can be used to interpret sub-stages or stage changes in the TALC model.

Analyzing the governance structural changes also helped us understand how the major driving forces of tourism development changed over time and across organizational scales. In the early stages, internal financial needs of both rural residents and the Reserve's management body drove tourism growth. The national and international level partner agencies and provincial government (Table 4) mostly provided policy and intellectual support. In the later stages, tourism boomed in the surrounding region. By the early 2000s, the Reserve had been surrounded by a cluster of nature and culture tourism destinations (Figure 1). Both the Aba Prefecture and Sichuan provincial governments considered this "Hometown of the Giant Pandas" their greatest tourism asset and a critical

piece to complete the regional tourism development arrangement. Therefore, a combination of internal needs and external pressure fueled the fast tourism growth in this period. By 2007, the Aba Prefecture government had gained almost full control of tourism development in the Reserve through Jiuzhaigou National Scenic Area and Wenchuan County, which had caused serious concern for some senior officials of the Reserve.

As a flagship reserve in China, Wolong's conservation and tourism management serves as a role model for many other reserves. In China, nature reserves are disproportionately distributed in the economically underdeveloped western provinces, where tourism has been identified as a major economic development and poverty reduction strategy for over a decade (Yeung & Shen, 2004). As demand for tourism resources increases in Western China, these nature reserves inexorably become the targets. The approval of Wolong's ecotourism master plan by SFA in 2002 was a strong top-down signal to other reserves and their regional authorities about the national government's positive attitude toward developing tourism in these most strictly managed protected areas and has triggered a new wave of ecotourism development in national nature reserves (Luo & Wang, 2010). Considering the important role of tourism and recreation in national parks around the world, it can be expected that Wolong Nature Reserve will continue being a laboratory in testing sustainable tourism development models in China's protected areas.

## Conclusions

Past tourism growth in Wolong shows a high level of dynamism in protected area tourism in the context of China during a period of great societal transition. As an important process of telecoupling (socioeconomic and environmental interactions over distances [Liu et al., 2013]), tourism has connected Wolong with many distant parts of the world. Applying the TALC model to longitudinal data from one of China's prominent protected areas, we systematically tracked major changes in the system and explored the forces that drove those changes. This approach enabled us to "better understand the 'why' as well as the 'what' of destination development and cycles" (Butler, 2011: 17). While the tourism growth trend in Wolong before 2008 generally follows what would be predicted by the TALC model, this trajectory was significantly altered by a single event and its aftermath. This longitudinal analysis also sets ground for future research to systematically monitor recent and near-future tourism-related activities and understand how a complex and fragile tourism system (Farrell & Twining-Ward, 2004) reorganizes in response to new destination characteristic and enters into the next stage of the destination life cycle.

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