

Monitoring Report on the Sustainable Tourism Development of Mt. Huangshan (Mid-term)

Huangshan Management Committee

UNWTO Monitoring Center for Sustainable Tourism Observatories

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1. Foreword

1.1 Origin

In the background of globalization and industrialization, it has become a global common understanding to promote sustainable tourism development, which requires long-term impact monitoring, and necessary preventive and corrective measures. Looking for specific monitoring techniques of sustainable tourism development has become a focus of concern. Since 2006, Sun Yat-Sen University (SYSU for short) has completed the 2006-2008 monitoring report of Yangshuo, China using the indicators and methods of UNWTO's GOST program since 2006. On September 28, 2010, UNWTO and SYSU entered into a cooperative agreement, and founded the UNWTO Monitoring Center for Sustainable Tourism Observatories (UNWTO MCSTO, hereinafter the "Center") to take charge of the management and monitoring of sustainable tourism observatories in China and even those in the Asian-Pacific region in the future, and other technical work, so as to ensure continuous, comprehensive and effective monitoring.

The sustainable tourism observatory of Mt. Huangshan was founded in March 2008. UNWTO and UNESCO held the International Conference on Sustainable Tourism Management at World Heritage Sites in Huangshan, and set the second Chinese sustainable tourism observatory in the Huangshan scenic zone following that in Yangshuo, which was the first sustainable tourism observatory at a world heritage site. The purpose is to collect a variety of indicators on the sustainable tourism development of Mt. Huangshan, and explore a development pattern that maximizes the tourism economy and minimizes negative environmental impacts at world heritage sites by monitoring ecological environment indicators of Mt. Huangshan, such as biodiversity and geological resource vulnerability. On May 30, 2011, the Huangshan Management Committee entered into a cooperative agreement on observatory building with SYSU, and joined the technical evaluation system of UNWTO's GOST program formally. From August 22 to September 2, 2011, the Center started the 5-year sustainable tourism development monitoring project of Mt. Huangshan.

1.2 Monitoring Methodology

1.2.1 Monitoring Process

The range of this monitoring project includes the range of the Master Plan of the Huangshan Scenic Zone (2006), and part of the buffer zone. Specifically, the range includes an area of 160.6 km² of the Huangshan scenic zone, and surrounding 5 towns and one farm (Tangkou, Tanjiaqiao, Sankou, Gengcheng and Jiaocun Towns, and Yanghu Forest Farm in Huangshan District, with a total administrative area of about 490 km²).

From August 22 to September 2, 2011, the Center conducted the first field survey of this project in the Huangshan scenic zone with the great support of the Huangshan Management Committee. The task force is composed of one professor from the Center for Tourism Planning and Research at SYSU, and one project coordinator, one doctoral degree candidate and two master's degree candidates from the Center. During the survey, the task force visited the Tourism Office, Statistics Sect., Planning Office, Environmental Protection Sect., Data Storage Sect., Sewage Treatment Station, Cultural Relic Management Sect., Museum, Information Center and Heritage Office of the Huangshan Management Committee, and the departments concerned of the Huangshan Tourism Development Co., Ltd. For tourists, the task force conducted a questionnaire (semi-structured) survey of "perception of cultural heritage of Mt. Huangshan by domestic tourists" on the Huangshan scenic zone, and the whole questionnaire was fully completed by respondents, with 114 valid copies obtained. For communities, the task force visited some communities governed by Tangkou Town and interviewed residents.

This sustainable tourism development monitoring report of Mt. Huangshan has been prepared based on an analysis of the existing study, field survey, interview data and questionnaire statistics, and by reference to *Indicators of Sustainable Development for Tourism Destinations: A Guidebook* published by UNWTO (2004). The main part of this report consists of six parts: tourism, Resource Conservation and Environmental Protection, tourism and community, economic impacts of tourism, tourist behavior and satisfaction, and conclusion and suggestions.

1.2.2 Screening of Key Issues and Indicators

In this round of monitoring, the basic indicators for sustainable tourism development monitoring of the Huangshan scenic zone have been developed based on UNWTO's indicators and methods, and the overall tourism plan and practical tourism

development of the Huangshan scenic zone, as shown in Table 1-1. In subsequent monitoring, the topics and indicators will be increased or decreased based on the practical situation and survey results then.

**Table 1-1 Summary of Topics and Basic Indicators of Sustainable Tourism Development
Monitoring of the Huangshan Scenic Zone**

	Topic	Basic monitoring indicator	Is routine monitoring in place?	Recommended monitoring frequency in this project
Tourism, Resource Conservation and Environmental Protection	Biodiversity conservation	1. Number of national key species	Yes	Every 5 years
		2. Endangered species and quantities	No	Every 5 years
		3. Quantity, distribution and protection levels of famous ancient trees	Yes	Every 5 years
		4. Forest coverage	Yes	Every 5 years
		5. Cooperative scientific research projects on resource conservation, tasks, cooperative agencies, durations	No	Annually
		6. Additional protective measures	No	Every 2 years
	Conservation of cultural resources	7. Quantities of cliff stone inscriptions and cultural relics, and protection	Yes	Every 5 years
		8. Funds used for cultural relic protection (restoration, protection and maintenance), and proportion thereof	No	Annually
		9. Additional policies and protective measures	No	Every 5 years
	Tourist diffluence	10. Proportions of incoming tourists from different gates	Yes	Annually
	Aquatic environment	11. Conformance to quality standard for surface water	Yes	Annually
		12. Conformance to quality standard for drinking water	Yes	Annually
		13. Annual treatment capacity domestic sewage and peak daily treatment capacity in the busy season	Yes	Annually
	Acoustic environment	14. Conformance to standard for domestic and traffic noise	Yes	Annually

	Atmospheric environment	15. Conformance to standard for air quality	Yes	Annually
	Solid waste	16. Annual output of solid waste	Yes	Annually
		17. Method of waste disposal	Yes	Every 5 years
		18. Proportion of recycled waste to total waste	Yes	Annually
	Reputation of main attractions	19. Reputation of main attractions	No	Every 3 years
	Construction area of reserve	20. Construction area and concentration of reserves	Yes	Every 3 years
Tourism and community	Tourism development level	1. Community population (locals and non-locals))	Yes	Every 3 years
		2. Number of attractions	Yes	Annually
		3. Number of accommodation facilities	Yes	Annually
		4. Number of tourists received	Yes	Annually
		5. Overall influence of tourism on local communities	No	Every 2 years
	Residents' attitude and perception of impacts	6. Overall attitude of residents to tourism development (questionnaire)	No	Annually
		7. Resident perception of economic, community and cultural impacts from tourism	No	Annually
	Degree and awareness of community participation	8. Proportion (number) of community residents doing tourism-related jobs and main types	No	Annually
		9. Proportion of tourism involvement by community residents	No	Annually
		10. Proportion of the concept "sustainable tourism development" by community residents	No	Annually
		11. Issues on tourism involvement of concern for community residents	No	Annually
	Satisfaction of business partners	12. Satisfaction of tour guides and travel agencies	No	Every 2 years
Tourist perception and satisfaction	Tourist satisfaction level	1. Satisfaction of tourists with resources, services, overall environment and other aspects of Mt. Huangshan	No	Annually
		2. Overall satisfaction of tourists	No	Annually
		3. Tourist perception of whether tourist experience is as expected	No	Annually

		4. Revisit rate of tourists and willingness for recommendation	No	Annually
		5. Tourist complaint rate of the Huangshan scenic zone	Yes	Annually
	Tourist safety	6. Incidence of tourist accidents	Yes	Annually
		7. Tourist perception of tourist safety in Mt. Huangshan	No	Annually
	Tourist education	8. Proportion of tourists participating in interpretation and education activities in the Huangshan scenic zone	No	Annually
Economic impacts of tourism	Tourism income	1. Total number of tourists received by the Huangshan scenic zone	Yes	Annually
		2. Tourism statistics (gross tourism income, number of beds, number of tourists staying overnight and per capita spending, etc.)	Yes	Annually
		3. Number of tourists received by surrounding low-altitude attractions	Yes	Annually
		4. Tourism statistics of surrounding low-altitude attractions	Yes	Annually
	Seasonality of tourism	5. Tourist ratio in busy months to slack months	No	Annually
	Tourism and Employment	6. Job opportunities created by tourism	No	Annually
		7. Satisfaction of tourism employees	No	Every 2 years
	Economic driving role of tourism	(Topical study)	No	Every 3 years

2. Tourism, Resource Conservation and Environmental Protection

2.1 Conservation of Resources

2.1.1 Biodiversity Evaluation

2.1.1.1 Overview

According to the Convention on Biological Diversity, biodiversity means the variability among living organisms from all sources on the earth, and includes the 3 levels of genetic diversity, species diversity and ecosystem diversity. In terms of ecosystem diversity, Mt. Huangshan is located in the mid-latitude subtropical zone, where the climate is controlled by the southeast monsoon. It is a typical forest ecosystem, where expanses of subtropical forests have developed (including broad-leaved evergreen forests, evergreen deciduous broad-leaved forests, deciduous broad-leaved forests, and coniferous and broad-leaved mixed forests; there are some coniferous forests on peaks), with a forest coverage of over 75%. In terms of species diversity, there are 456 vertebrate species and 1,807 higher plant species (over 7% of all species in China) in Mt. Huangshan, including 35 key animal species and 31 key plant species protected by the state.

Based on the rich biodiversity of the Huangshan area, the 108 biodiversity distribution centers worldwide identified by IUCN include the Huangshan area (Jiangnan hilly region, and Zhejiang-Fujian mountainous region, IUCN Conservation office, 1990. Criterion for evaluation: diversity of plant species), and the 33 biodiversity conservation priority areas of China identified recently also include the Huangshan area (criterion for evaluation: “Ecoregional Assessment” methodological system of The Nature Conservancy). In the CBPF (China Biodiversity Partnership Framework), the biodiversity non-substitutability index of the Huangshan area is the highest in eastern China and the biodiversity hotspot that is the most worthy of conservation in this region. The above evidence shows that the biodiversity of the Huangshan area is of global significance.

2.1.1.2 Current situation of conservation

Biodiversity conservation has always been a priority for the Huangshan scenic zone. This round of monitoring reveals that the overall situation of biodiversity

conservation in the Huangshan scenic zone is very good relative to the surrounding areas and other ordinary scenic zones. The specific measures include:

(1) In terms of environmental protection, a strict enclosed rotation retirement system has been applied to attractions on a long-term basis, and the series of enclosed rotation retirement regulations was standardized in September 2010 (including the basic requirements for enclosed rotation retirement, enclosure period management and open period management). In the enclosed rotation retirement system, the high-altitude (above 1,350m) core attractions in the Huangshan scenic zone are enclosed rotationally to rehabilitate and upgrade the vegetation, and restore the ecological environment through a combination of artificial auxiliary and natural rehabilitation measures. Ecological monitoring and evaluation will also be performed. These attractions will be open depending on the degree of rehabilitation.

(2) In terms of famous ancient trees, the fifth survey of key famous ancient trees in the scenic zone was completed in 2009. A catalog of famous ancient trees has been established by identifying basic information, specific locations, altitudes, protection levels and ages of all famous ancient trees in the Huangshan scenic zone. Key famous ancient trees are subject to the conservation and management system of “one tactic per tree” with long-term monitoring, expert consultation, guardianship and emergency response.

(3) In terms of scientific research cooperation, the Landscaping Office of the Huangshan scenic zone has been working together with scientific research agencies and universities in recent years to conduct biodiversity surveys, and studies on the conservation and ecological maintenance of famous ancient trees. The key research tasks in recent years are summarized as follows:

Table 2-1 List of Key Research Topics on Biodiversity Conservation

Name	Task	Partners	Duration
1. Biodiversity background survey	Investigate and catalog wild plant species (especially rare endangered plant species), and their populations, locations and growth in the scenic zone, and prepare the Biodiversity Resource Assessment Report of the Huangshan Scenic Zone, and the Biodiversity Resource Conservation Plan of the Huangshan Scenic Zone, etc.	Anhui Normal University; Huangshan University	
2. Study on prevention and emergency control techniques of Huangshan pine wood nematode disease	Find out the pattern of disease development of Huangshan pines after infection with pine wood nematode disease, screen out one or two efficacious preventive and curing drugs, and pine sawyer beetle repelling agents, master the optimum	Anhui Provincial Bureau of Forest Pest Control; Forest Protection Station, Anqing	May 2007 – Dec. 2009

	timing, latest treatment time and treatment techniques for curing infected Huangshan pines.	Municipal Forestry Bureau	
3. Study on the granite weathering mechanism and vegetation rehabilitation of the Huangshan scenic zone	Analyze physical and chemical properties of granite weathering accumulation, and impacts of a variety of environmental factors on granite weathering, find out the distribution of plant communities in bare rock desertization areas, and propose a management program.	College of Territorial Resources and Tourism, Anhui Normal University	Jun. 2005 – Jun. 2008
4. Study on vegetation rehabilitation and conservation techniques of high altitude ecologically vulnerable scenic zone of Mt. Huangshan	Study rehabilitation and conservation techniques for main vegetation communities in high-altitude areas, along main tourist paths and in key attractions, and develop a local standard for enclosed rotation retirement.	Biological Resources Research Institute, Huangshan University	Jan. 2009 – Dec. 2011
5. Assessment of breakage and lodging risks of key famous ancient trees in the Huangshan scenic zone	Conduct a nondestructive inspection on 136 famous ancient trees in the scenic zone, evaluate breakage and lodging risks of rotten or defective famous ancient trees, propose a scientific conservation program, and establish a health database for ancient trees.	Anhui Agricultural University	Jul. 2010 – Jul. 2015
6. Damage resistance evaluation and stress measurement system development of guest-greeting pines	Evaluate the damage resistance of guest-greeting pine trunks, develop a monitoring system that can measure wind and snow loads, and trunks in real time, and establish a database of relations between wind speed and wind load, and snow amount and snow load.	Anhui Agricultural University	Aug. 2010 – Dec. 2011
7. Identification of pathogens of heart rot for famous ancient trees in the Huangshan scenic zone, and research of preventive and control techniques	Prepare a list of wood destroying fungi in the Huangshan scenic zone, identify pathogenic bacteria of heart rot for Huangshan pines, and develop a feasible and effective prevention and control program.	Beijing Forestry University, Nanjing Forestry University	Approved, to be started
8. Assessment of harmful adventitious plants in the Huangshan scenic zone, and research of management measures	Prepare a list of adventitious plants through investigation, conduct a risk evaluation, and develop a management program and management measures for adventitious plants.	Huangshan University	Aug. 2010 – Jul. 2013

Source: Data Storage Sect., Landscaping Office, Huangshan Management Committee

2.1.2 Evaluation of Cultural Resources

2.1.2.1 Overview

Mt. Huangshan is located in ancient Huizhou that boasts a long cultural history and rich cultural heritage. Presently, the Master Plan of the Huangshan Scenic Zone divides cultural resources into the following 3 categories: cliff stone inscriptions, historical buildings and structures, and museum collections (including nonmaterial cultural heritage, i.e., myths, Huangshan school of painting, essays and poems, book compilations, list of historical sites, historical events). Cliff stone inscriptions hold an especially important historical position in the Huangshan scenic zone's material cultural resources. They are of great historical value because they are the witness of historical vents occurring in Mt. Huangshan and historical celebrities having been to Mt. Huangshan, and of great aesthetic value because they fully embody the elegance of ancient people and the artistic conception of Chinese calligraphy.

According to the census data of cultural relics, there are over 290 cliff stone inscriptions, and 148 ancient paths, bridges, temples, pavilions, tombs and other ancient architectural relics in Mt. Huangshan. In 2009, the guest-greeting pine was identified as the first "living relic" of the Huangshan pine family of China against the criteria of the third national census of cultural relics. In addition, in terms of nonmaterial cultural heritage, Mt. Huangshan is the cradle of the Huangshan school of painting, which has remained unfailing for hundreds of years, and created calligraphic, painting and photographic works about Mt. Huangshan. There have been over 20,000 essays and poems about Mt. Huangshan in the past.

2.1.2.2 Present situation of preservation

(1) In terms of preservation organization setup, the Huangshan Management Committee has further defined the cultural relic preservation and management tasks of different departments: The Cultural Development Center of the Politics Div. has set up the Cultural Relic Management Sect. and the Museum as the functional bodies for cultural relic preservation, responsible for the collection of cultural treasures and historical materials in different historical periods, and the display of world heritage and relics; the Planning and Land Div. has set up a heritage office to manage the world heritage of the whole mountain.

(2) In terms of policy support, except the state- and province-level cultural relic preservation and management regulations, the Huangshan scenic zone developed the Interim Regulations on the Preservation of Cultural Relics in the Huangshan Scenic Zone on September 21, 2006 to direct and regulate the internal cultural relic

preservation work of the Huangshan scenic zone.

(3) In terms of cultural relic identification, there are 4 province-level key units of cultural relic preservation in the Huangshan scenic zone, and an application for state-level key unit of cultural relic preservation has been filed for two attractions.

(4) In terms of long-term monitoring, except the national census and registration of cultural relics, the Huangshan Management Committee has conducted a census of cultural relics within the scenic zone, which is supplemented by ongoing manual monitoring. Recently, IT system building has been conducted throughout the Huangshan scenic zone, and the electronic census database for cultural relic preservation is being established and improved.

(5) In terms of cultural relic preservation and renovation, the completed cultural relic preservation and rehabilitation projects are summarized below:

Table 2-2 List of Key Results in Cultural Relic Preservation and Renovation

Name	Task	Investment	Duration
1. Gate reconstruction project of Ciguang Pavilion	The Ciguang Pavilion, included in the World Heritage List, was built during Emperor Jiajing's reign in the Ming dynasty and later renowned as the "Nation-protection Ciguang Temple". The project has a floor area of 700 m ² and a building area of 161.13 m ² .	Over RMB700,000	Jul. 2004 – Oct. 2005
2. Rehabilitation of the Pumen Tower, Thousand-monk Stove and Fayan Spring of the Ciguang Pavilion	As an integral part of the Ciguang Pavilion, these 3 relics are seriously damaged for historical reasons. In the rehabilitation project, except that the damaged parts were rebuilt, the circular tomb passage, tombstones, carved stone balustrades of the Pumen Tower were produced and installed, the wooden gallery and pavilion of the Thousand-monk Stove were built, the tablet and couplet boards of the Fayan Spring were carved, and a surrounding area of 1,798 m ² was landscaped.	Over RMB400,000	Oct. 2004 – 2005
3. Preservation and reinforcement of the celebrity calligraphy stele forest of the Ciguang Pavilion	The potential hazard of damage to the walls and valuable inscribed tablets of the stele forest was eliminated, and a rainproof cornice was added.	RMB30,000	N/A
4. Renovation of the Villa for Viewing the Waterfall— residence of Deng Xiaoping	The leaking roof, rotten wood structure and stripped paint were renovated in general.	RMB50,000	N/A

during his visit to Mt. Huangshan			
5. Excavation and rehabilitation of the Lingxi Spring	The desolate spring site and the blocked spring vent were cleaned up, and carved stone balustrades were provided around for protection so that the area of relic preservation of the Lingxi Spring was increased from 20 m ² to 150 m ² .	RMB60,000	N/A
6. Renovation of Songgu Nunnery and Diaojiao Nunnery	The two nunneries were seriously dilapidated and on the verge of collapse, and were renovated thoroughly.	RMB500,000	N/A

Source: Cultural Relic Management Sect., Politics Div., Huangshan Management Committee

2.1.3 Monitoring of Indicators

Table 2-3 Monitoring Indicators on Resource Conservation and Results

Topic	Indicator	Frequency	Dept. concerned	Mode	Result of this round of monitoring
Biodiversity conservation	1.Number of national key species	Every 5 years	Data Storage Section, Landscaping Office	General biodiversity survey	There are 35 key animal species and 31 key plant species protected by the state in Mt. Huangshan.
	2.Endangered species and quantities	Every 5 years	Data Storage Section, Landscaping Office	General biodiversity survey	42 rare endangered plant species have been discovered in the Huangshan scenic zone to date. There is a lack of monitoring data of these species, so the target species can hardly be identified. (Note: Monitoring will help learn how well the objectives of the Master Plan of the Huangshan Scenic Zone (2006) have been realized. For biodiversity conservation, the planning objective is, “By 2025, 25 rare endangered animal and plant species, and 15 local-specific species are scientifically acceptable. “Scientifically acceptable” means that the population of a species is stable without human interference.”)
	3.Quantity, distribution and protection levels of famous ancient trees	Annually	Data Storage Section, Landscaping Office	Routine daily monitoring	69 famous trees (in which 54 are in the World Heritage List), 3 ancient trees under Class I protection, 7 ones under Class II protection and 57 ones under Class I protection were identified in 2009. There are 61 famous ancient trees in the hot spring area, in which 19 are in the World Heritage List; 39 famous ancient trees in the Tianhai area, in which 24 are in the World

					Heritage List; 19 famous ancient trees in the Fusong area, in which 10 are in the World Heritage List; and none in the Diaojiao area.
	4.Forest coverage	Every 5 years	TBD	Census	N/A (The forest coverage of Mt. Huangshan was 75% before 1955, dropped to 56% in 1979, and was restored to 84.6% in 1992.)
	5.Cooperative scientific research projects on resource conservation, tasks, cooperative agencies, durations	Annually	Data Storage Section, Landscaping Office	This project	See Table 2.
	6.Additional protective measures	Every 2 years	Landscaping Office		Main existing measures: 1) enclosed rotation retirement; 2) one tactic per tree; 3) routine patrol; 4) expert consultation
Conservation of cultural resources	7. Quantities/ quality of cliff stone inscriptions and cultural relics	Every 5 years	Cultural Relic Management Sect., Politics Div.	Census of cultural relics	There are over 290 cliff stone inscriptions 290, 148 cultural relics and one “living relic” (guest-greeting pine).
	8.Funds used for cultural relic protection (restoration, protection and maintenance), and proportion thereof	Annually	TBD	This project	N/A See Table 3.
	9. Additional policies and protective measures	Every 5 years	Cultural Relic Management Sect., Politics Div.; Heritage Office of Planning and Land Div.	This project	On September 21, 2006, the Interim Regulations on the Preservation of Cultural Relics in the Huangshan Scenic Zone were developed.
Tourist diffidence	10. Proportions of incoming tourists from different gates	Annually	Statistics Sect. of the Group	This project	In 2010, 2,208,079 entered via the south gate (including tourist statistics of the Yungu Temple and the Ciguang Pavilion), accounting for 87.7% of all tourists, and 310,267 entered via the north gate (including tourist statistics of the Songgu Nunnery), accounting for 12.3%; few tourists entered via the other gates and were not included in statistics.

Source: survey information

2.2 Environmental Protection

2.2.1 Aquatic Environment Protection

2.2.1.1 Surface water quality in two rounds of monitoring

The Huangshan scenic zone is a state-level scenic zone. According to the criteria for functional division of reclaimed water areas in the Environmental quality standard for surface water (GB3838-2002), and the measures for functional division of water areas of Huangshan City in Document HMEPB [1993] No.38, the national Class II standard applies to surface water resources in the Huangshan scenic zone. Currently, the monitoring agency of the scenic zone divides surface water resources in the zone into the 3 types of stream water, spring water and reservoir water for monitoring purposes.

In stream water quality monitoring, based on the water quality monitoring data of the Huangshan scenic zone during 2006-2009 obtained in this survey, there are 4 monitoring points in the Huangshan scenic zone – Jiulong Waterfall, main gate of Mt. Huangshan, Songgu Nunnery and Jiaocun, and the monitoring items include pH, dissolved oxygen, ammonia nitrogen, permanganate index and 5-day biochemical oxygen demand (BOD5). Aquatic environment quality is subject to time sequence analysis. It can be seen that the surface water quality of the Huangshan scenic zone is excellent, and meets or exceeds the Class II requirements in the Environmental quality standard for surface water (GB3838-2002). Water quality has improved greatly and can be maintained, where:

- 1) The pH values of all the 4 monitoring cross sections meet the requirements in the quality standard for surface aquatic environment.
- 2) 99% of the dissolved oxygen levels of all the 4 monitoring cross sections meet the Class I standard for surface water quality, except that the dissolved oxygen level the main gate of Mt. Huangshan in November 2006, and those at Jiulong Waterfall and the main gate of Mt. Huangshan on August 10, 2008 were slightly lower than Class I standard, but all higher than the Class II standard (within 7-7.5mg/L).
- 3) The biochemical oxygen demand value of all the 4 monitoring cross sections meet the standard for Class I surface water bodies.
- 4) The permanganate indexes of all the 4 monitoring cross sections are less than the Class I water quality standard.
- 5) The ammonia nitrogen levels of all the 4 monitoring cross sections are less than the national Class II water quality standard and the detection limit (What

is the detection limit?).

Through a comparison of the monitoring data, it is found that the water quality of the Laolong Pool in the Songgu scenic zone and the Shuanglong Pool in Jiaocun Village is relatively good, with all items meeting or beyond the national Class I standard; the dissolved oxygen levels of the Jiulong Waterfall and the main gate of Mt. Huangshan are slightly lower than Class I standard in two rounds of monitoring, the other items also meet the national Class I standard.

There are 15 springs in the scenic zone. In terms of spring water quality monitoring, based on the water quality monitoring and analysis results of the 4 major spring vents (hot spring, Mingxian Spring, Songgu Spring and Fayan Spring) in 2008, the spring water quality of the Huangshan scenic zone is good.

In terms of reservoir monitoring, based on the monitoring data provided by the environmental monitoring station of the scenic zone in 2010, the water quality of the sources of the Yungu, Wuliqiao, Tianhai and Xihai Reservoirs in the Huangshan scenic zone meets the national Class II standard for surface water.

2.1.2.2 Drinking water quality

Indicators and data on any other domestic drinking water standard are not available yet.

(Water supply, especially water used by tourists, residents and scenic zone staff; and whether the standard is met)

2.1.2.3 Sewage treatment

In terms of domestic sewage, 13 sewage treatment facilities have been built in the scenic zone since 1986, with a total design daily treatment capacity of over 7,000 tons, and are being upgraded and improved gradually. To date, the improvement of 3 facilities (Tianhai, hot spring and Yuping) has been completed, realizing automatic control and 24-hour video monitoring, in which the sewage discharge standard of the Yuping and hot spring facilities has been increased to the Class I, Grade A standard in the Discharge standard of pollutants for municipal wastewater treatment plants (GB18917-2002). The other latest sewage treatment data is not available yet (e.g., actual annual amount of treated sewage, daily peak treatment in the busy season and reclaimed water utilization rate).

(According to the Master Plan 2006, the reclaimed water utilization rate in the Huangshan scenic zone should reach or exceed 20% by 2010; it should be confirmed

if this indicator is met.)

2.2.2 Acoustic Environment Protection

In the Huangshan scenic zone, noise is from hotels, restaurants, stores, cultural and entertainment facilities, living activities and vehicle driving, and includes domestic and traffic noise.

In terms of noise control, two measures can promote noise monitoring and control in the scenic zone: 1) In September, 2004, New State Line Tourism Passenger Transport Co., Ltd. was founded in the Huangshan scenic zone, and vehicles of individual businesses and minibuses were prohibited from entering the zone, further improving traffic noise; 2) The monitoring station of the Huangshan scenic zone started noise monitoring in 2005.

Indicators and data on the conformance to the noise standard are not available yet.

2.2.3 Atmospheric Environment Evaluation

Ambient air quality monitoring in the Huangshan scenic zone began in 1988. At the initial stage, this was done completely manually, and only 3 indicators were monitored – TSP, NO₂ and SO₂. In early 2004, the building of the automatic continuous air monitoring system began, which was completed at the end of September. The monitoring data during 2005-2010 was obtained in this survey, as shown in Table 5, where the monthly and annual average values of sulfur dioxide (SO₂) and nitrogen dioxide (NO₂) were much lower than the national Class I standard (0.05 mg/m³ and 0.08 mg/m³), and the monthly and annual average values of inhalable particulate matter (PM₁₀) were normal, and met the international Class I standard (0.05 mg/m³).

Table 2-4 List of Key Air Pollutants in the Huangshan Scenic Zone (Unit: mg/m³)

Monitoring period	Annual average value of SO ₂	Data range of SO ₂	Annual average value of NO ₂	Data range of NO ₂	Annual average value of inhalable particulate matter (PM ₁₀)	Data range of inhalable particulate matter (PM ₁₀)
2005	0.014	0.007-0.022	0.010	0.005-0.015	0.018	0.006-0.039
2006	0.012	0.008-0.018	0.010	0.004-0.017	0.021	0.010-0.034
2007	0.006	0.004-0.007	0.005	0.004-0.006	0.027	0.020-0.034
2008	0.009	0.005-0.011	0.010	0.005-0.011	0.028	0.019-0.033
2009	0.007	0.003-0.019	0.012	0.004-0.028	0.024	0.006-0.045
2010	0.007	0.003-0.025	0.014	0.008-0.018	0.029	0.012-0.045

Source: Environmental Protection Sect. of the landscaping office (national Class I standard: SO₂ 0.05 mg/m³, NO₂ 0.08 mg/m³ and PM₁₀ 0.05 mg/m³)

It can be seen from the air quality monitoring data of 2005-2010 that SO₂ essentially dropped year by year, and the monitoring values of NO₂ and PM10 were quite stable and also much lower than the national Class I standard. According to the criteria for evaluation in the Ambient air quality standard (GB3095-1996), the air quality of the Huangshan scenic zone meets the national Class I standard and is excellent.

2.2.4 Solid Waste Disposal

Compared to cities, the annual solid waste output of the Huangshan scenic zone is low and remains stable in general. Year-to-year fluctuations in output arise mainly from the amount of construction waste produced in development and construction, and the variation of the number of persons entering the mountain. In Mt. Huangshan, solid waste is located in 3 types of areas – near tourist paths, hotels, guesthouses and other places of business, and living areas of workers.

Currently, solid waste is subject to strict categorized management in the Huangshan scenic zone: Hazardous solid waste is collected, transported and stored specially by the environmental sanitation authority and other authorities concerned according to a strict hazardous waste management system depending on type (medical waste, waste transformers, waste chemicals, waste ink cartridges and waste batteries); general solid waste is divided into construction and domestic waste, where construction waste is subject to a strict declaration, supervision and inspection system, and an array of measures have been taken for domestic waste, including reduction, recycling and hazard-free treatment (sophisticated treatment system). The major measures include:

(1) A purchasing and distribution center has been established to deliver clean food to the mountain, especially vegetables, poultry and aquatic products, and reduce waste output;

(2) All waste must be bagged to reduce secondary pollution, and the waste classification system has been strengthened from the very beginning;

(3) Routine cleaning is done manually, and the ropeway is used to carry waste in the peak period;

(4) A special environmental sanitation plan has been developed to implement the “external disposal of internal waste” project.

Based on the statistical data during 2008-2010, the main type of solid waste in the scenic zone is domestic waste, with an annual output of about 4,000 tons; the modes of disposal include incineration, biological treatment, land filling, waste

recovery and organic waste recycling. It is advised to calculate solid waste arising from tourist activities separately.

2.2.5 Monitoring of Indicators

Table 2-5 Monitoring Indicators on Environmental Protection and Results

Topic	Indicator	Frequency	Dept. concerned	Mode	Result of this round of monitoring
Aquatic environment	1. Conformance to quality standard for surface water	Annually	Environmental Protection Sect. of the landscaping office	Routine monitoring of environmental monitoring station	Stream water: water quality monitoring data during 2006-2009: The water quality of the Laolong Pool in the Songgu scenic zone and the Shuanglong Pool in Jiaocun Village is relatively good, with all items meeting or beyond the national Class I standard; the dissolved oxygen levels of the Jiulong Waterfall and the main gate of Mt. Huangshan are slightly lower than Class I standard in two rounds of monitoring, the other items also meet the national Class I standard. See Section 2.2.1 above. Spring water: monitored in 2008, good in quality Reservoirs: In 2010, the water quality of the sources of the Yungu, Wuliqiao, Tianhai and Xihai Reservoirs meets the national Class II standard for surface water.
	2. Conformance to quality standard for drinking water	Annually	N/A	N/A	N/A
	3. Annual treatment capacity domestic sewage and peak daily treatment capacity in the busy season	Annually	N/A	N/A	N/A
Acoustic environment	4. Conformance to standard for domestic and traffic noise	Annually	Monitoring station of scenic zone	N/A	N/A

Atmospheric environment	5. Conformance to standard for air quality	Annually	Environmental Protection Sect. of the landscaping office	Automatic continuous air monitoring system	It can be seen from the air quality monitoring data of 2005-2010 that SO ₂ essentially dropped year by year, and the monitoring values of NO ₂ and PM ₁₀ were quite stable and also much lower than the national Class I standard. According to the criteria for evaluation in the Ambient air quality standard (GB3095-1996), the air quality of the Huangshan scenic zone meets the national Class I standard and is excellent.
	6. Annual output of solid waste	Annually	Environmental sanitation authority	Routine monitoring	2008: 4,056.5 tons in total (including 1.7 tons of construction waste) 2009: 3,991.1 tons in total 2010: 4,373.6 tons in total
Solid waste	7. Method of waste disposal	Every 5 years	Environmental sanitation authority	This project	The mode of combination of incineration, biological treatment, land filling, waste recovery and organic waste recycling is currently applied; Hazardous waste is recovered, transported and stored separately.
	8. Proportion of recycled waste to total waste	Annually	Environmental sanitation authority	This project	In 2008-2010, the amount of recovered and sold waste (metals, glass and paper) accounted for 32.9%, 33.7% and 32.1% of the total amount of solid waste respectively. In 2008-2010, the amount of recycled organic waste accounted for 39.7%, 41.0% and 40.8% of the total amount of solid waste

Source: survey information

3. Tourism and Community

3.1 Overview

The communities surrounding the Huangshan scenic zone are five towns in Huangshan District, which are Tangkou, Tanjiaqiao, Sankou, Gengcheng and Jiaocun Towns, in which Tangkou, Tanjiaqiao, Jiaocun and Gengcheng Towns are the seats of the south, east, west and north gates of the scenic zone. According to the statistical data from the Master Plan 2006 of the Huangshan Scenic Zone, there were over 10,000 permanent residents within the scenic zone then (see Table 3-1); community residents of the scenic zone should also include service and management personnel staying in the scenic zone, and the number is estimated to be 778 in the Master Plan.

Table 3-1 Population Statistics of the 5 Towns and One Farm in the Huangshan Scenic Zone
(Unit: person)

Town	Tangkou Town	Tanjiaqiao Town	Sankou Town	Gengcheng Town	Jiaocun Town	Yanghu Forest Farm
Existing resident population in the Huangshan scenic zone	Tangkou: 3,941	1676	258	--	1858	16
	Zhaixi: 1,100					
	Shancha: 1,315					

Source: the Master Plan of the Huangshan Scenic Zone (2006)

In the second round of monitoring, the above data will be updated for 2010.

3.2 Case Study: Tangkou Town

Case analysis: Monitoring of tourism impacts on communities in Tangkou Town

Tangkou Town is the town that benefits most from the tourism development of the Huangshan scenic zone, and is by far ahead of the other 4 towns in terms of per capita income, employed population and attraction development. In this survey, the departments concerned of the Tangkou Town Government, and the 4 main communities of Tangkou Zhaixi, Gangcun and Fangcun were visited to learn the general situation of tourism development; some residents were interviewed to learn key issues in community tourism development, and provide a pre-evaluation for the second round of community monitoring.

1. Overview of tourism development

According to the statistical data from the survey, Tangkou Town governs the Tangkou Community Committee, and the 3 village committees of Shancha, Gangcun and Fangcun, with a land area of 129 km². In the resident population, there are 15,755 locals and 4,733 non-locals.

There are 8 low-altitude attractions (Jade Valley, Jiulong Waterfall, Phoenix Home, Xiangxi, Monkey Valley, New Peach Land, Tianhu Lake and Fangcun Bamboo Sea) in Tangkou Town. In the past 5 years, the number of tourists received by Tangkou Town has been growing. All attractions received 917,000 tourists in 2007, 1.004 million in 2008, 1.09 million in 2009, 1.54 million in 2010, and 1.31 million in 2011 (as of August); the town received 1.2 million tourists in 2007, 1.5 million in 2008, 1.7 million in 2009, 2 million in 2010 and 2.45 million in 2011 (as of August).

In terms of accommodation facilities, there were 2 four-star hotels, 5 three-star hotels, 7 agritainment sites and 205 guesthouses in Tangkou Town in 2011, with 15,000 beds in total (as of August 2011; comprehensive statistics before 2011 are not available).

In 2011 (as of August), the town tourism sub-bureau and other departments concerned received 28 tourism complaints in total, including 17 complaints about hotels, accounting for 60.7%, 6 about travel agencies, accounting for 21.4%, 3 about transport, accounting for 10.7%, and two about attractions, accounting for 7.2%.

2. Tangkou Community (service-oriented residential area)

✧ Monitoring methods

Investigation and resident interview; 25 residents were interviewed, including 12 small business owners (accommodation 2, catering 5 and other 5), 7 workers (accommodation 4 and retail 3), and 6 other ordinary residents

✧ Monitoring results

Tangkou Community is the tourist service site that is the closest to the south gate, where tourism services are relatively sophisticated, as shown in: (1) Residents have a high tourism engagement and strong awareness of participation, and are very concerned about the local tourism plan (traffic transfer center) and community tourism development (real estate development and relocation); (2) Residents have a certain sense of environmental protection (to be further monitored); they generally think that the water quality of the Xiaoyao Stream is deteriorating, and suggest that the water quality monitoring of this stream be strengthened; and (3) The community has a strong commercial atmosphere, and the tourism market should be further regulated.

3. Zhaixi Community (service-oriented residential area)

✧ Monitoring methods

Investigation and resident interview; 7 residents were interviewed, including 5 workers (accommodation 3, traffic and transport 1 and catering 1), and 2 other ordinary residents

✧ Monitoring results

Zhaixi Community has developed in strong reliance on tourism: (1) The

community has attracted many migrant workers due to tourism development; (2) The development of Zhaixi is actually the result of the rapid profit making of developers, and there is no clear zoning plan; the intervention of developers has driven the real estate development of Zhaixi, which will be eventually connected with Tangkou. The New State Line transfer center has moved to Zhaixi, which has brought great benefits to Zhaixi with a huge population influx into the new Zhaixi Development Zone, bringing a great impetus to Zhaixi's accommodation, catering and retail services.

4. Fangcun Community (ordinary residential area)

✧ Monitoring methods

Investigation mainly, supplemented by resident interview; one village party branch official and 5 ordinary residents were interviewed

✧ Monitoring results

There are over 820 households with over 2,400 persons in Fangcun. Fangcun is located in a mountainous area and short of land, and each household has less than 1 mu of irrigated land, less than 1 mu of non-irrigated land and some tea farm. About one third of villagers do tourism-related jobs. Many young adults under the age of 50 in the village serve as constructors, guesthouse and restaurant attendants, travel agency employees and tour guides in Tangkou and Zhaixi Villages. A few people run restaurants and guesthouses themselves. The other two thirds of villagers do farm work at home. Some people are flexibly employed based on the employment arrangements of the scenic zone every year.

5. Gangcun Community (ordinary residential area)

✧ Monitoring methods

Investigation mainly, supplemented by resident interview; one village party branch secretary and 6 ordinary residents were interviewed

✧ Monitoring results

The main income sources of villagers include tealeaf cultivation (there is over 80,000 mu of tea field in the village), forestry (bamboo and timber), and tourism. Tourism has simply a spillover effect on Gangcun. Like Fangcun, there are also Gangcun villagers who lift sedan chairs or run stalls in Mt. Huangshan, accounting for about one tenth of all villagers. Second, there are 50-60 guesthouses and restaurants run by rural households along Provincial Highway 103, offering catering and reception services to tourists in the busy season. Some young adult men serve as constructors in Tangkou and Zhaixi. Finally, women of child-bearing age serve as hotel and guesthouse attendants, or as attendants and narrators at kickback stores below the mountain. (There are a large number of kickback stores along highways in Tangkou, such as tealeaf, drug, bamboo charcoal and knife stores.)

6. Suggestion

This round of monitoring is focused on tourism impacts on communities. It is advised that Feicui New Village (service-oriented residential area) and Wuniguan Village (ordinary residential area) be included in subsequent monitoring. On the basis

of general situation survey, the second round of monitoring will be focused on the attitude of residents to tourism and their perception of tourism in these communities.

Source: survey information

3.3 Monitoring of Indicators

Table 3-2 Monitoring Indicators on Tourism and Community, and Results

Topic	Indicator	Frequency	Dept. concerned	Mode	Result of this round of monitoring
Tourism development level	1. Community population (locals and non-locals))	Every 3 years	Tourism Office	Statistical data	Tangkou Town: In the resident population, there are 15,755 locals and 4,733 non-locals.
	2. Number of attractions	Annually	Tourism Office	Statistical data	Tangkou Town: 8
	3. Number of accommodation facilities	Annually	Tourism Office	Statistical data	Tangkou Town: There were 2 four-star hotels, 5 three-star hotels, 7 agritainment sites and 205 guesthouses in 2011, with 15,000 beds in total (as of August 2011; comprehensive statistics before 2011 are not available).
	4. Number of tourists received	Annually	Tourism Office	Statistical data	Tangkou Town: All attractions received 917,000 tourists in 2007, 1.004 million in 2008, 1.09 million in 2009, 1.54 million in 2010, and 1.31 million in 2011 (as of August); the town received 1.2 million tourists in 2007, 1.5 million in 2008, 1.7 million in 2009, 2 million in 2010 and 2.45 million in 2011 (as of August).
	5. Overall influence of tourism on local communities	Every 2 years	Task force	Case study	See the case analysis in Section 3.2.
Residents' attitude and perception of impacts	6. Overall attitude (questionnaire)	Annually	Tourism Office	This project; sampling Qr. survey; interview	N/A
	7. Resident perception of economic, community and cultural impacts from tourism	Annually	Tourism Office	This project; sampling Qr. survey; interview	N/A
awareness of community	8. Proportion (number) of community residents doing tourism-related jobs and main types	Annually	Tourism Office	This project; statistical data; sampling Qr.	According to the statistical data from the Master Plan 2006 of the Huangshan Scenic Zone, the workforce of the Huangshan scenic zone was 2,896 then, in which 280 jobs were offered to

				survey	communities, accounting for 9.8%. Employees at low-altitude attractions from communities accounted for 85% of the whole workforce. A sampling questionnaire survey has to be conducted to collect employment data of other industries related to tourism, and such data is not available in this round of monitoring.
	9. Proportion of tourism involvement by community residents	Annually	Tourism Office	This project; sampling Qr. survey; interview	N/A
	10. Proportion of the concept “sustainable tourism development” by community residents	Annually	Tourism Office	This project; sampling Qr. survey; interview	N/A
	11. Issues on tourism involvement of concern for community residents	Annually	Tourism Office	This project; sampling Qr. survey; interview	N/A

Source: survey information

4. Tourist Perception and Satisfaction

4.1 Overview

According to the Master Plan 2006 of the Huangshan Scenic Zone, tourists of the Huangshan scenic zone satisfied with facilities, services, attractions and experiences accounted for 70% of all tourists of the scenic zone, tourist complaint rate was 30 cases per 10,000 tourists (tourist complaint rate means the proportion of tourists filing complaints with competent authorities for inconvenience, interference or unfair treatment during travel or consumption), the incidence of tourist accidents was two cases per annum (incidence of tourist accidents means the probability of accidents, such as personal injury and property loss of tourists during travel), tourists satisfied with interpretation and education events in the scenic zone were not less than 60% of all tourists, and tourists attending interpretation and education events in the scenic zone accounted for 5% of all tourists.

Based on the tourist management level then, the tourist management objectives proposed in the Master Plan are as follows: By 2025, tourists satisfied with facilities, services, attractions and experiences are not less than 95% of all tourists' by 2025, the tourist complaint rate of the Huangshan scenic zone does not exceed one case per 10,000 persons; by 2025, the incidence of tourist accidents arising from nonphysical factors of the Huangshan scenic zone does not exceed one case every two years; by 2025, tourists satisfied with interpretation and education events in the scenic zone are not less than 90% of all tourists; and by 2025, tourists attending interpretation and education events in the scenic zone are not less than 85% of all tourists.

On the basis of the tourist management objectives in the Master Plan of the Huangshan Scenic Zone, and UNWTO's system of indicators for sustainable tourism development, it is advised that tourist perception and satisfaction routine monitoring should include the 3 aspects of "tourist satisfaction level", "tourist safety" and "tourist education", as detailed in Table 10. In the survey of the second round of monitoring, special surveyors will distribute a questionnaire to tourists at the gates, key attractions and tourist centers of the Huangshan scenic zone, and conduct some tourist interviews.

4.2 Topical Study: Tourist Cultural Experience

Topical study: Tourist cultural experience

1. Background

Sofield¹ and Li² are scholars who studied the experience differences of natural landscapes between the two different social groups of Chinese and Western tourists very early. They think that when enjoying and experiencing natural landscapes, Western tourists look at the relationship between man and nature from the perspective of dualistic opposition, in which man and nature are opposite to each other, while Chinese tourists are integrated with nature into a whole and always explain nature from the perspective of Chinese culture. Therefore, all natural tours of China are also cultural tours, and culture plays a primary, decisive role in China's tourism development³. Xu⁴ et al also think that compared to Western tourists, the travel experience of Chinese tourists has its own feature: Due the cultural traditions and background unique to China, motives and experiences of Chinese tourists are affected by philosophical thoughts, such as Taoism and Confucianism, reflected in that Chinese tourists tend to choose familiar attractions that have been depicted in poems or other works of art. Chinese tourists judge mountains and other sceneries other than through natural beauty, but through their connections with celebrities and poems. These studies provide very important information to domestic and foreign scholars, and enable them to understand travel experiences of Chinese tourists different from Western tourists.

2. Process

This study is focused on cultural experiences and modes of experience of Chinese tourists in Mt. Huangshan travel. In August 2011, we conducted a random questionnaire survey on domestic tourists in the Huangshan scenic zone, and used semi-structured interviews as a supplement. 114 valid copies of the questionnaire were collected, and 10 persons interview. The questions were designed mainly to learn perceptions and experiences about nonmaterial cultural heritage and cliff stone inscriptions of Mt. Huangshan. Among the respondents, men account for 59.8% and women account for 40.2%; tourists having received below junior high school education accounted for 3.6%, those having received junior high school education accounted for 7.2%, those having received senior high school or secondary technical school education accounted for 20.7%, those having received junior college or

¹ Sofield T H B, & Li F M S: Tourism governance and sustainable national development in China: a macro-level synthesis [J]. *Journal of Sustainable Tourism*, 2011, 19:4-5, 501-534.

² Li F M S. Chinese common knowledge, tourism, and natural landscapes: Gazing on "Bie you tian di" – "An altogether different world" (PhD thesis). Murdoch University, Perth, Western Australia. 2005

³ Li F M S. Culture as a Major Determinant in Tourism Development of China [J]. *Current Issues in Tourism*, 2008,11(6):492-513

⁴ Xu H G, Ding P Y, Packer J, Tourism Research in China: Understanding the Unique Cultural Contexts and Complexities, *Current Issues in Tourism*, 2008,11(6):473-491.

undergraduate education accounted for 64%, and those having received master's degree or above education accounted for 4.5%.

3. Main conclusions

This study investigates tourist experiences of Mt. Huangshan in the broader context of Chinese society and traditional culture, and has arrived at the following conclusion through questionnaire survey and interviews: The influence of culture on tourists is still significant, reflected in that tourists always look at nature from a cultural perspective and almost all natural landscapes are of cultural features, but cultural implications seen by modern tourists are at a low level and mostly for fun.

The tourist experience of cliff stone inscriptions and other cultural landscapes during the travel of Mt. Huangshan is not as strong as described by Li (2005). The feature of Chinese tourists in experiences of natural landscapes as described by Li and Sofield is in fact to build culture into a fixed pattern, and they think that most or a main part of tourists gain experiences under the influence of Chinese culture. In fact, the differences between modern Chinese tourists (usually referring to those traveling for mental and physical pleasure mainly of the young generation) and modern Western tourists are narrowing. These people can be called postmodern tourists, who travel for the simple motive of relieving themselves from daily lives to experience the beauty of nature, and pursue mental and physical pleasure. This also explains they tourists of Mt. Huangshan are predominantly indifferent to stories and legends in natural landscapes, and much less interested in cliff stone inscriptions and other cultural landscapes than in natural landscapes. Although tourists differ greatly in the perception of the calligraphic art of cliff stone inscriptions, such perception differs greatly from the artistic value of inscriptions themselves.

4.3 Monitoring of Indicators

Table 4-1 Monitoring Indicators on Tourist Perception and Satisfaction, and Results

Topic	Indicator	Frequency	Dept. concerned	Mode	Result of this round of monitoring
Tourist satisfaction level	1. Satisfaction of tourists with resources, services, overall environment and other aspects of Mt. Huangshan	Annually	Tourism Office	This project; sampling Qr. survey; interview	N/A
	2. Overall satisfaction of tourists	Annually	Tourism Office	This project; sampling Qr. survey	N/A
	3. Tourist perception of whether tourist	Annually	Tourism Office	This project; sampling Qr.	N/A

	experience is as expected			survey	
	4. Revisit rate of tourists and willingness for recommendation	Annually	Tourism Office	This project; statistical data; sampling Qr. survey	N/A
	5. Tourist complaint rate of the Huangshan scenic zone	Annually	N/A	This project	N/A
Tourist safety	6. Incidence of tourist accidents	Annually	N/A		N/A
	7. Tourist perception of tourist safety in Mt. Huangshan	Annually	Tourism Office	This project; sampling Qr. survey	N/A
Tourist education	8. Proportion of tourists participating in interpretation and education activities in the Huangshan scenic zone	Annually	Tourism Office	This project; sampling Qr. survey	N/A
	Topical study on tourists	Every 2 years	Task force	This project;	See the topical study in Section 4.2.

Source: survey information

5. Economic Impacts of Tourism

5.1 Overview

5.1.1 Tourism Income

According to the monitoring data of 2010, the Huangshan scenic zone received 2.5183 million tourists in 2010, a year-on-year growth of 6.88%; and the cableway operations carried 4.2 million men-times of tourists, a year-on-year growth of 13.82%; the annual operating income of Huangshan Tourism Development Co., Ltd. exceeded RMB1.4 billion, a year-on-year growth of 28.11%; the operating income of the whole group in 2010 exceeded RMB1.65 billion, a year-on-year growth of 11%.

Taking Tangkou Town as an example, the tourism income of surrounding low-altitude attractions is as follows: By the end of August 2011, Tangkou Town had received 2.45 million men-times of tourists, in which all attractions received 1.3818 million men-times, a year-on-year growth of 26.07%; entrance ticket income was RMB45 million, a year-on-year growth of 39.31%. In particular, the Jade Valley received 625,800 men-times, a year-on-year growth of 10.58%; the Jiulong Waterfall received 249,800 men-times, a year-on-year growth of 18.85%; the Phoenix Home received 143,500 men-times, a year-on-year growth of 10.69%; the Monkey Valley received 19,300 men-times, a year-on-year growth of 16.97%; the Xiangxi drifting site received 265,400 men-times, and the Tianhu Lake site received 78,000 men-times.

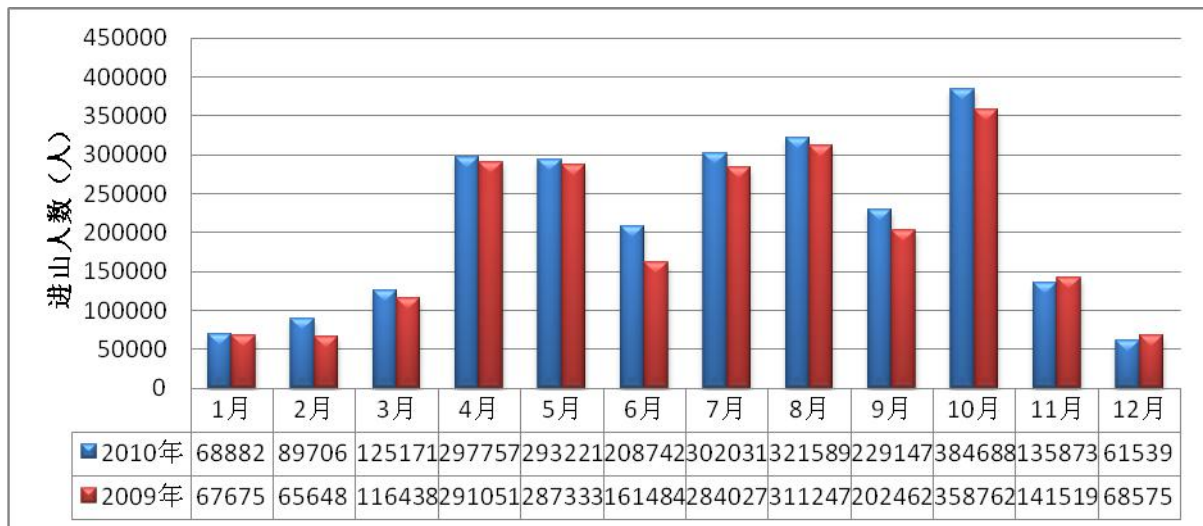
5.1.2 Tourism and Employment

In terms of employment, according to the Master Plan 2006 of the Huangshan Scenic Zone, the workforce of the Huangshan scenic zone was 2,896 then, in which 280 jobs were offered to communities, accounting for 9.8%. Employees at low-altitude attractions from communities accounted for 85% of the whole workforce.

It is learned from interviews of residents in the surrounding communities that in the past 30 years of tourism development of the Huangshan scenic zone, sedan chair lifting and stall operation jobs would be distributed to villages based on population. After a quota is assigned to each village, eligible villagers will finally obtain such jobs by lot drawing. These chosen villagers will then do such jobs in the year and get paid.

5.1.3 Seasonality of Tourism

Figure 5-1 Distribution of Tourists Entering the Huangshan Scenic Zone in 2009-2010 by Month



Source: Statistics Sect., Huangshan Tourism Development Co., Ltd.

It can be seen that the number of tourists received by the Huangshan scenic zone varies seasonally. The busy season lasts long, with the number of tourists remaining at high levels from April to October (7 months in total), and relatively low from November to next March (5 months in total). In 2010, the number of tourists received by the Huangshan scenic zone in the busy season accounted for 80.9% of all tourists of the year, and the ratio of the number of tourists in the busiest month (October) to that in the slackest month (December) was 6.25.

5.2 Monitoring of Indicators

Table 5-1 Monitoring Indicators on Economic Impacts of Tourism and Results

Topic	Indicator	Frequency	Dept. concerned	Mode	Result of this round of monitoring
Tourism income	1. Total number of tourists received by the Huangshan scenic zone	Annually	Statistics Sect.	Routine statistics	The Huangshan scenic zone received 2.5183 million tourists in 2010, a year-on-year growth of 6.88%; and the cableway operations carried 4.2 million men-times of tourists, a year-on-year growth of 13.82%
	2. Tourism statistics (gross tourism income, number of beds, number of tourists staying)	Annually	Statistics Sect.	Routine statistics	In the Huangshan scenic zone, there were 3,266 beds on the mountain and 550 beds below the mountain in 2010, and 3,176 beds on the mountain and 550 beds below the mountain in 2011 (as of July).

	overnight and per capita spending, etc.)				The annual operating income of Huangshan Tourism Development Co., Ltd. exceeded RMB1.4 billion, a year-on-year growth of 28.11%; the operating income of the whole group in 2010 exceeded RMB1.65 billion, a year-on-year growth of 11%.
	3. Number of tourists received by surrounding low-altitude attractions	Annually	Government authorities concerned of surrounding communities	Routine statistics	By the end of August 2011, Tangkou Town had received 2.45 million men-times of tourists, in which all attractions received 1.3818 million men-times, a year-on-year growth of 26.07%; entrance ticket income was RMB45 million, a year-on-year growth of 39.31%. In particular, the Jade Valley received 625,800 men-times, a year-on-year growth of 10.58%; the Jiulong Waterfall received 249,800 men-times, a year-on-year growth of 18.85%; the Phoenix Home received 143,500 men-times, a year-on-year growth of 10.69%; the Monkey Valley received 19,300 men-times, a year-on-year growth of 16.97%; the Xiangxi drifting site received 265,400 men-times, and the Tianhu Lake site received 78,000 men-times.
	4. Tourism statistics of surrounding low-altitude attractions	Annually	Government authorities concerned of surrounding communities	Routine statistics	By the end of August 2011, the entrance ticket income of all attractions in Tangkou Town was RMB45 million, a year-on-year growth of 39.31%.
Seasonality of tourism	5. Tourist ratio in busy months to slack months	Annually	Statistics Sect. of the Group	This project; statistical data	In 2010, the number of tourists received by the Huangshan scenic zone in the busy season accounted for 80.9% of all tourists of the year, and the ratio of the number of tourists in the busiest month (October) to that in the slackest month (December) was 6.25.
Influence of tourism on employment	6. Job opportunities created by tourism	Every 3 years	Latest data N/A	This project; sampling Qr. survey;	According to the Master Plan 2006 of the Huangshan Scenic Zone, the workforce of the Huangshan scenic zone was 2,896 then, in which 280 jobs were offered to communities, accounting for 9.8%. Employees at low-altitude attractions from communities accounted for 85% of the whole workforce. The latest data of 2011 is not available yet.

Composition of tourist spending	7. Proportions of dining, accommodation, travel, travel, entertainment and shopping expenses in tourist spending	Annually	Task force	This project; sampling Qr. survey; statistical data	N/A
Economic driving role of tourism	(Topical study)	Every 3 years	Task force	Topical study	Subsequent monitoring; Complete the topical study report.

Source: survey information

6. Conclusion and Suggestions

6.1 The Huangshan Scenic Zone Has Gained Considerable Experience in Scientific Resources and Environmental Conservation

(1) Institutional setup and policy support

It is learned from monitoring that the division of responsibilities for natural and cultural resource conservation, and environmental protection in the Huangshan scenic zone is very careful and resource conservation and environmental protection is highly valued at all levels. A policy system that is more sophisticated than those of other mountainous scenic zones has been established and well implemented.

Deficiencies: Due to this careful division of responsibilities, the channels of information sharing among departments are not smooth enough. It is advised to further strengthen inter-departmental collaboration (e.g., resource conservation and tourism management departments), and information sharing.

(2) Scientific protection and management

After many years of exploration, systematic, scientific management experience and conservation methods with Mt. Huangshan characteristics have been formed in respect of environmental protection and the conservation of famous ancient trees in the Huangshan scenic zone, including “one tactic per tree”, “IT-based monitoring” and “enclosed rotation retirement”. Through continuous monitoring, and cooperation with scientific research agencies and universities, the monitoring and scientific research system of the Huangshan scenic zone is increasingly sophisticated.

Except the conservation of natural resources, much effort has been paid on the preservation and renovation of cultural relics in the Huangshan scenic zone, including cultural relic identification, census and manual monitoring.

Strict environmental protection management and monitoring is practiced in the Huangshan scenic zone. The monitoring data of 2011 shows that the current aquatic, acoustic and atmospheric environment quality of the Huangshan scenic zone is excellent, all environmental quality standards are met, and the quality level was maintained during 2006-2010.

Deficiencies: the Huangshan scenic zone is closely associated with the surrounding communities and the low-altitude attractions in respect of resource conservation and environmental protection, but these two parts are relatively independent and there are still some problems in environmental protection in the surrounding areas (e.g., the water quality of the Xiaoyao Stream is deteriorating). In the future, environmental monitoring and resource conservation in the surrounding areas should be further strengthened. On the other hand, it is advised that routine monitoring points in the Huangshan scenic zone should be set up in consideration of the core zone and the buffer zone.

6.2 The Tourism Development of the Huangshan Scenic Zone

Influences Surrounding Communities Deeply

In this round of community monitoring, the key communities within the jurisdiction of Tangkou Town near the south gate of the Huangshan scenic zone were surveyed. This is an area affected heavily by the tourism development of the Huangshan scenic zone.

Based on the survey results, the awareness of resource conservation of residents in the surrounding communities is enhancing in general, and tourism plays a significant role in driving the development of all communities of Tangkou Town, especially in the employment of local residents and the development of surrounding low-altitude attractions. Running low-altitude attractions has become an important means of generation of tourism income in Tangkou Town. In addition, since a great part of the workforce of these low-altitude attractions is composed of local residents, the development of low-altitude attractions has a more direct and significant role in promoting local employment and increasing the income level of residents.

It is advised to continue to strengthen the market regulation, management and control of the surrounding communities and the low-altitude attractions. In subsequent monitoring, a study on resident attitude will be conducted.

6.3 The Tourist Service Functions of the Huangshan Scenic Zone

Should Be Further Improved

One of the key functions of the Huangshan scenic zone is to provide rest opportunities, education events and diversified services to tourists on the basis of resource conservation. The tourist management objectives proposed in the Master

Plan 2006 are as follows: (1) On the basis of resource conservation, tourists are satisfied with the safety, availability, accessibility, diversity and quality of facilities, services and rest opportunities offered by the Huangshan scenic zone. (2) Tourists and the public understand and enjoy the resources offered by the Huangshan scenic zone to the current generation and later generations, and also understand and accept the corresponding resource conservation work.

With the increase of tourists of the Huangshan scenic zone, higher requirements have been raised for the tourist management work of the Huangshan scenic zone. In this round of monitoring, it is learned through interviews that many attempts have been made toward the above objectives, including:

(1) IT system building: IT systems are being improved gradually as an aid for the traditional means of resource conservation and tourist management. Currently, IT systems are being deployed for tourist centers, key traffic intersections, car parks, major sightseeing points and units of cultural relic preservation, and there are 58 monitoring points in total.

(2) First aid and rescue: The hard and soft environment for first-aid and rescue of the Huangshan scenic zone is improving. In 2007, the Huangshan scenic zone set up the first-aid station of the Huangshan scenic zone in cooperation with Hong Kong St. John Ambulance and Anhui Provincial Hospital. On December 21, 2010, the new medical first-aid center was put into operation, and provided with professionals, facilities and emergency measures. To date, data and files on tourist first-aid and mountain rescue in the Huangshan scenic zone since 1999 have been accumulated, a number of employee first-aid training courses have been held, and exchange events and cooperative scientific research projects with other rescue agencies have been implemented.

(3) Volunteer services: During each peak period, the Huangshan Management Committee would mobilize employees in the scenic zone to attend volunteer service events, such as guiding tourists and handling on-site tourist complaints.

Deficiencies: The tourist education function of the Huangshan scenic zone is yet to be further developed. The signage system of the scenic zone should be further improved (presently, this system is not planned in a unified manner, and English signs and interpretations should be further enriched and improved). On the other hand, publicity and education on the cultural heritage of Mt. Huangshan should be strengthened, and diversified tourist segments (cultural, ecological and international tourists, etc.) developed actively. The survey of tourist perception and satisfaction will be conducted in subsequent monitoring.

6.4 Use of Monitoring Information

One of the primary objectives of this project is to establish systematic data and information collection channels, share collected information with all departments and stakeholders (communities, tourists and other partners) of the scenic zone, drive their joint participation, and eventually promote the sustainable tourism development of the Huangshan scenic zone.

Monitoring will be conducted in the form of routine and topical monitoring mainly. The following suggestions are proposed for monitoring information, indicators and data obtained every year:

(1) Making effective use of monitoring information helps to realize the objectives of the Master Plan of the Huangshan Scenic Zone. By collecting indicators and data sequentially, and comparing them at stages, we can measure how well the objectives of the Master Plan are realized at different stages.

(2) Making effective use of monitoring information helps all management departments of the Huangshan scenic zone to make decisions scientifically. It is advised to establish a historical monitoring database at the Huangshan Management Committee from the project startup in this year, put monitoring reports, and indicators and data therein on record, and apply relevant information to routine decisions on tourism management.

(3) Making effective use of monitoring information helps to strengthen the information communication between the Huangshan scenic zone, and the surrounding communities and tourists. Tourism planning and management cannot exist independent of the key subjects of the destination—"local communities" and "tourists". This project will help establish a channel of information communication with local communities and tourists. By learning the attitude of tourists and the satisfaction of tourists, we can adjust the management objectives pertinently, and take effective measures to handle relations with residents in the surrounding communities and improve tourist experiences. On the other hand, many indicators and data can be used directly as an educational tool for residents in the surrounding communities and tourists, so that they better understand and accept resource conservation and environmental protection work.