South China Karst

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: China
Inscribed in: 2007
Criteria: (vii) (viii)

The South China Karst region extends over a surface of half a million km² lying mainly in Yunnan, Guizhou and Guangxi provinces. It represents one of the world’s most spectacular examples of humid tropical to subtropical karst landscapes. The stone forests of Shilin are considered superlative natural phenomena and a world reference with a wider range of pinnacle shapes than other karst landscapes with pinnacles, and a higher diversity of shapes and changing colours. The cone and tower karsts of Libo, also considered the world reference site for these types of karst, form a distinctive and beautiful landscape. Wulong Karst has been inscribed for its giant dolines (sinkholes), natural bridges and caves. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 01 Dec 2020

GOOD WITH SOME CONCERNS

The outstanding scenic and geological values are well protected under the recently revised management regime which brings all categories of protected areas in China under the same department. This is significant as the serial property comprises multiple types of protected area classification. These values are largely resilient to human modification and loss and their overall condition and trend is good and stable. Significant progress continues to be achieved with the ongoing implementation of the overarching Conservation and Management Plan for South China Karst. Significant threats are few in number and generally under control. The two significant current threats are pollution of upstream catchments affecting both surface and underground water courses in the property and increased tourism infrastructure development both of which are subject to management intervention to reduce their impact, however the issues of concern vary in seriousness from component to component in this serial property, and should be managed accordingly.

The potential threat posed by development of the Guiyang- Nanning High-speed Railway which traverses a section of the buffer zone has been the subject of a comprehensive Environmental Impact Assessment which indicates that there is no threat to the OUV of the property and provides for appropriate measures to minimize potential impact on the buffer zone. A small note of concern is the potential for the completed railway to further exacerbate tourism pressure on parts of the property.
FULL ASSESSMENT

Description of values

Values

World Heritage values

► Spectacular humid tropical to subtropical karst landscapes

South China Karst represents one of the world’s most spectacular examples of humid tropical to subtropical karst landscapes (State Party of China, 2006; Management plan, 2005; IUCN, 2006; WCMC, 2011). The property includes the stone forests of Shilin, superlative natural phenomena which include the Naigu stone forest occurring on dolomitic limestone and the Suyishan stone forest arising from a lake, the remarkable fengcong and fenglin karsts of Libo, and the Wulong Karst, which includes giant collapse depressions, called Tianteng, and exceptionally high natural bridges between them, with long stretches of deep unroofed caves. It also includes Guilin, which displays spectacular tower karst and internationally acclaimed fenglin riverine landscapes, Shibing Karst, which has the best known example of subtropical fengcong karst in dolomite, deep gorges and spine-like hills often draped with cloud and mist, and Jinfoshan Karst, which is an isolated island long detached from the Yunnan-Guizhou plateau, surrounded by precipitous cliffs and punctured by ancient caves. Huanjiang Karst provides a natural extension to Libo Karst, contains outstanding fengcong features and is covered in almost pristine monsoon forest (World Heritage Committee, 2014).

► Limestone karst landforms and landscapes of global scientific significance.

Stone forests of Shilin illustrate episodic evolution in four major geological time periods over a period of 270 million years. Libo has carbonate outcrops of different ages eroded into cone (Fengcong) and tower (Fenglin) karsts, with intervening deep dolines, sinking streams and long river caves. Wulong represents high inland karst plateaus that have experienced considerable uplift, with giant dolines and bridges. Wulong’s landscapes contain evidence for the history of one of the world’s great river systems, the Yangtze and its tributaries. Huanjiang Karst is an extension of the Libo Karst component. Together the two sites provide an outstanding example of fengcong karst and also preserve and display a rich diversity of surface and underground karst features (State Party of China, 2006; Management plan, 2005; IUCN, 2006; WCMC, 2011; World Heritage Committee, 2014). Guilin Karst is considered the best known example of continental fenglin and provides a perfect geomorphic expression of the end stage of karst evolution in South China. Guilin is a basin at a relatively low altitude and receives abundant allogenic (rainfed) water from surrounding hills, leading to a fluvial component that aids fenglin development, resulting in fenglin and fengcong karst side-by-side over a large area. Scientific study of karst development in the region has resulted in the generation of the ‘Guilin model’ of fengcong and fenglin karst evolution. Shibing Karst provides a spectacular fengcong landscape, which is also exceptional because it developed in relatively insoluble dolomite rocks. Shibing also contains a range of minor karst features including karren, tufa deposits and caves. Jinfoshan Karst is a unique karst table mountain surrounded by massive towering cliffs. It represents a piece of dissected plateau karst isolated from the Yunnan-Guizhou-Chonqing plateau by deep fluvial incision (World Heritage Committee, 2014).

Other important biodiversity values

► Intact and biologically rich subtropical karst forests

The property protects one of the largest expanses of intact karst forest in the world, dominated by evergreen broadleaved forest and evergreen mixed broadleaf-conifer forest. Located at the junction of three biogeographical provinces, the property has transitional vegetation of great variety. Shilin has 899 spp. of vascular plants of which eight are nationally protected plants, and there are 100 rare and locally
endemic plants. Libo has 1,532 vascular plants with 18spp. listed in the IUCN Red List. Wulong has 558 vascular plant spp. Of the fauna - Shilin has 185 vertebrate species; Libo has 314 species plus 174 spp. of cave fauna; and Wulong has 332 species of animals including nationally rare and endemic species. The property is partly within a WWF Global 200 Eco-region, and it forms a Birdlife-designated Endemic Bird Area (State Party of China, 2006; Management plan, 2005; IUCN, 2006; WCMC, 2011).

Assessment information

Threats

Current Threats

Overall, the current threat level is assessed as low to very low although the threat from increasing tourism pressure probably should be rated somewhere between High and Low. The threat is there and growing but the policies and practices to mitigate against impacts from tourism should, if consistently applied, contain the threat. Vigilance is required to ensure that some threats, particularly that of tourism pressure, do not result in significant negative effects on the site’s values and integrity in the long run.

Other Biological Resource Use

(Agriculture runoff)

Agricultural runoff poses a threat to water quality in the site. However, following the introduction of measures such as waste water interception and treatment, cleaning of river courses and constant cleaning maintenance monitoring results show a significant improvement in water quality since 2015 (state Party of China, 2018), with rock weathering (natural process) the most influential factor in the hydrochemistry of the Shibing component, as opposed to rainfall or human activity (Xiao Shizhen, 2015).

Solid Waste

(Waste production)

Reports have highlighted the threat of the inadequate disposal of solid waste from residents and tourism operations within the site but recent reports from the State Party do not address the issue of solid waste management. However, in recent years, the relevant departments of Chinese government have successively promulgated and implemented national standards and normative documents that can be applied to the rural areas such as those in which the components of the South China Karst World Heritage site are situated (SAC, 2015; 2018; gov.cn, 2018; 2019). For example, the sewage of the scenic spot are treated in septic tanks, and the solid waste is transported to the county for treatment in Shibing Karst. These measures minimize the direct entry of tourism pollutants into natural areas (Fu Lian, 2019). The EIA pertaining to a railway development crossing the buffer zone demonstrates a thorough understanding of the need for, and strategies available for, the effective collection and disposal of solid waste from residential, commercial and development activity in and around the site. During the design period of the Guinan Railway, the site selection of the slag yard for the construction of the railway was demonstrated to avoid impact on the site and buffer zone (IUCN Consultation, 2020). A project safety supervision team was set up during construction to carry out supervision and inspection of pollution prevention and control work such as domestic waste disposal and sewage treatment with the Solid Waste Management Department. The improvement project of rural human settlements focusing on waste treatment and sewage treatment was comprehensively implemented, and the domestic waste classification in the site and its surrounding was incorporated into the government annual work plan continuously (sohu.com, 2018; gzhb.gog.cn, 2020; libo.gov.cn, 2018; 2019; 2020).

Tourism/ Recreation Areas

(Tourism infrastructure development)

Parts of the site are popular places for domestic and international tourism and tourist numbers have grown steadily since inscription of the site. There were concerns that construction of new tourist facilities might influence the integrity of the site but there are now strict regulations in place to prevent
any new constructions within the boundaries of some component parts of the site (IUCN Consultation, 2017).

Measures to mitigate the threats of tourism developments have included imposing strict control on tourism facilities and optimizing the organization of tour routes. Relocation of tourism service facilities, environmental control and ecological restoration projects have also alleviated the impact of tourism on the site. For example:

a) Libo Karst area has relocated the business shops in the site to the tourism services center for centralized and standardized management;
b) Wulong Karst area has relocated two visitor centers at Tianshengsanqiao and the Furong Cave to places outside the site;
c) Shilin Karst area demolished the tourism services facilities, including guesthouses, inns and parking lots previously built in the buffer zone of the site and completed ecological restoration in these areas (State Party of China, 2019).

An additional concern is the potential for the development of informal, less well-managed tourism and recreation. For example camping and exploration of caves that have no infrastructure which could have impacts on the site if not properly monitored and mitigated for in the management of the site (IUCN Consultation, 2020).

Invasive Non-Native/ Alien Species (Invasive species) Data Deficient

Invasive species are reported among the negative factors affecting the site (Management plan, 2005; State Party of China, 2012). The EIA for the new railway line passing through the buffer zone provides for comprehensive measures to prevent the introduction of new invasive species to the site but there is limited data available to assess the measures taken - if any- to control or eradicate alien or problematic species. A study pointed out there are cases of alien species invading national protected areas in Chongqing Jinfoshan (Gong et al., 2017).

Earthquakes/ Tsunamis, Avalanches/ Landslides, Erosion and Siltation/ Deposition (Natural events) Low Threat

Parts of the site experience earthquakes, landslides, accelerated soil erosion, flooding and drought (Management plan, 2005; Nomination document, 2006; IUCN, 2006, WCMC, 2011). For example, Wulong karst is located in the Yunnan-Guizhou Plateau and the joint position of the Three Gorges region, which is prone to collapse, landslides, mudslides, karst collapse and earthquakes (Zhang Zhenzhen, 2016). Shilin Karst is easily affected by earthquakes, whilst Jinfoshan is vulnerable to collapses and landslides (Chen Yan, 2017). Whilst such geological events can be seen to form part of the evolution of a landscape, significant short term damage to the World Heritage values should be accounted for in the management of the site, especially should their intensity or frequency alter due to climate change.

Tourism/ visitors/ recreation (Impacts from tourism) Low Threat

Tourism in the site has grown steadily since its inscription and it has become a pillar industry in some parts of the site. Shilin Stone Forest alone experienced a 100% growth in visitation between 2010 (2 million) and 2015 (4 million) with a projection of 25% growth from 2015 to 2020 (5 million) made in 2016, (GoKunming Staff , 2016) however, this number would in all likelihood have been surpassed already although up to date figures are not available as at May 2020. This economic success story brings with it many associated problems including the increased impact by solid waste accumulation and pollution.

In 2017, the World Heritage Committee asked the State Party to closely monitor the effectiveness of the measures taken to ensure that the promotion of tourism does not exacerbate the current impacts and threats from high levels of visitation in the site.

In reply the State Party reported that the main measures to mitigate the threats of tourism activities
have been to set a tourism carrying capacity for each of the component parts of the site, imposing strict control on tourism facilities and optimizing the organization of tour routes. It notes that the tourism carrying capacity has been strictly enforced and no excessive tourist flow has occurred in the recent years. It notes that the tourism pressure in the Major and Minor Stone Forest in Shilin Karst was relieved through reorganizing tourist flow and appropriate exhibition and utilization of other scenic areas such as the Naigu Stone Forest, the Long Lake and the Grand Waterfall (State Party of China, 2019).

Roads/ Railroads  
(Roads and Railways Construction)

In 2017 the World Heritage Committee noted the two planned tourist roads that would cross the Shilin Karst and have a negative influence on OUV of the site and asked the State Party not to proceed with these projects. In reply the SP advised that as these two roads were built in the 1970/80s and the surface pavement had subsequently been badly damaged, it was planned to reconstruct and widen the two roads. In respect for the wishes of the Committee, the road widening and renovation project will not proceed, however some maintenance works will be required to increase the radius of some sharp turns, to level and repair the road surfaces and improve the road drainage system (IUCN Consultation, 2020). The Committee also requested the State Party to submit the results of the Environmental Impact Assessment of the planned Guiyang-Nanning High Speed Railway that would cross the buffer zone of Libo Karst. The State Party subsequently submitted the results in a report that concludes that the project will not affect the OUV of the site, will cause no impact on protected objects nor the structure and function of ecosystems of the site. It will however, cause some impacts on the environment in the buffer zone, with very low impact on acoustic, vibration, air and water quality indicators. However, the project’s potential threat and negative effects on the buffer zone will be minimized through implementing relevant mitigation measures and an environmental management plan (State Party of China, 2018).

Potential Threats

Given the already high and increasing tourism at the most popular areas, pressure to expand existing facilities and infrastructure resulting from improved transport systems (railways) will increase, even if regulations are in place to prevent any harmful developments.

Other  
(Expansion of tourism infrastructure and transportation networks)

Given the already high and increasing tourism at the most popular areas, pressure to expand existing facilities and infrastructure will remain, even if regulations are in place to prevent any harmful developments. The IUCN analysis of the 2018 SOC report, noting that one of the main objectives of the railway development is to improve accessibility to the site, expressed concern that a need to disburse the pressure resulting from increased visitation has potential for further construction of local tourism facilities with adverse impacts on wildlife habitats in the buffer zone and the site (UNESCO, 2019). However, the existence of a buffer zone is designed to protect the geomorphic value of Libo free from the threat of Guiyang-Nanning High-speed Railway construction (Xiong Kangning, 2020).

Overall assessment of threats

The current and potential threats to the values of the site can be assessed as low, and capable of being controlled by existing management capacity. Of greatest concern, is expanding development of tourism infrastructure. Other threats of lesser concern are the impacts of subsistence cropping and livestock grazing, introduction of invasive species, waste management, and natural disasters such as landslides, floods and droughts.
Protection and management

Assessing Protection and Management

Management system

The Conservation and Management Plan of South China Karst (CMP-SCK) was finalized in late 2016 covering the period 2016-2025, and has established the Protection and Administration Coordinating Committee for South China Karst World Heritage Sites (PACC) in 2015 to integrate planning, governance and management of the whole serial property (41COM 7B.26).

Effectiveness of management system

Significant progress has been achieved with the development and implementation of an integrated management system for the entire serial property (UNESCO, 2017). The overarching Conservation and Management Plan for South China Karst (CMP-SCK) identifies threats at each component of the property and includes specific targets and management measures for water, solid waste, air pollution, light pollution, and noise control, as well as separate chapters on tourism, local communities, education, scientific research, and monitoring (UNESCO, 2017).

The 2018 SOC report provides an insight to the effectiveness of its implementation as follows.

1. The administrative organizations of the seven component sites have set up functional offices and sections specialized in resources protection, conservation management and planning to ensure:
   - that the zoning management is implemented with strict observance to the CMP-SCK;
   - that the construction projects are reviewed and ratified in accordance with the CMP-SCK and the relevant laws and regulations, as well as the statutory plans of the national parks, nature reserves and geoparks;
   - that the anthropogenic disturbance is forbidden in the strict protection areas;
   - that the supervision over the implementation of key construction projects is enhanced;
   - that the related conservation and management measures elaborated in the CMP-SCK are put into practice in all areas.

2. The threat of impact by tourism has been reduced by the establishment and enforcement of a carrying capacity for each component site, strict control on tourism facilities and the organization of tour routes and attractions have been optimized to reduce crowding. Tourism facilities have been relocated, environmental control and ecological restoration have alleviated the impact of tourism on the properties.

3. The water quality in the property and the upstream rivers are gradually improving through waste water interception and treatment, cleaning river courses and constant cleaning maintenance.

4. The impact of agriculture is being reduced by means of a policy of “subsidizing agriculture through tourism”, restructuring the agricultural industry and taking other steps to control the impact of agricultural development. Between 2015 and 2018 Guilin Karst reclaimed 633 hectares of agricultural land by reforestation and Shilin Karst reforested about 666 hectares of agricultural land.

5. The impact of urban development (Wulong and Guilin) has been reduced through strict review and approval of construction land, control of residential settlements, demolition of illegal structures. Guilin Karst has demolished various types of illegal structures along the Lijiang River; and Wulong Karst investigated and penalized 12 cases of illegally constructed farm houses, and two cases of illegal quarries were investigated, penalized and halted.

In summary, the State Party considers that the orderly implementation of the CMP-SCK has yielded positive outputs and good progress in addressing these issues. (State Party of China. 2019)

The State Party also notes the Protection and Administration Coordinating Committee (PACC) of South China Karst which was established in 2015.

Its role in the overall management of the property is said to have had good results but with no detail provided to support this statement. Of interest and possibly some concern is found in that PACC adopts a rotary duty mechanism in which the four provinces associated with the property take turns to administer the overall coordination and administration of the component parts of the property with one-year term of office. This annual rotation of management coordination introduces a lack of continuity.
which may be a threat to the effectiveness of implementing the management plan.

**Boundaries**

The property was extended in 2014 and now includes seven karst clusters in four Provinces: Shilin Karst, Libo Karst, Wulong Karst, Guilin Karst, Shibing Karst, Jinfoshan Karst, and Huanjiang Karst (World Heritage Committee, 2014). A proposal for a boundary modification of the Wulong component is currently being developed (IUCN Consultation, 2017). While the State Party has acknowledged its willingness to apply for the boundary modification in the required format for review by IUCN (UNESCO, 2018) there has been no progress made on this matter since January 2017.

**Integration into regional and national planning systems**

In May 2018 the State Party restructured the management institutions for the various categories of natural protected areas in China. These are now overseen by the National Forestry and Grassland Administration (NFGA) under the Ministry of Natural Resources to fully reflect the importance that the State Party government places on the coordinated management of all types of protected areas. This strengthens the management of the property which comprises multiple types of protected areas which had been overseen by four different provincial Departments under the Ministry of Housing and Urban-Rural Development. The World Heritage Conservation and Research Center which had been established to assist and coordinate management of the world heritage sites in China was also transferred to the NFGA. (State Party of China. 2019). While this move clearly shows a commitment to a national overview of planning for the management of the property it does provide any insight to the integration of the property with wider planning issues. However, it is difficult to understand the role of ‘the Protection and Administration Coordinating Committee for South China Karst World Heritage Sites’ (PACC) which has had responsibility for the overall coordination and administration of the property since 2015.

**Relationships with local people**

A policy for sharing tourism benefits with community was proposed, which may encourage local community to take part in direct administration of the sites (State of Conservation Report of South China Karst World Natural Heritage, 2016). Wukeshu Village had been relocated from the property of Shilin Karst with the consent of the population concerned (41COM 7B.26). Traditional management by minority peoples is an important element in some components which requires continued recognition and respect in site management (World Heritage Committee, 2014). While the management plan for the property includes a chapter on local communities the recent reports from the State Party include little data upon which to assess the relationship between the property and the local communities. The 2018 report does provide details of the voluntary relocation of (most of) the Wukeshu Village but notes that even though construction within the property is forbidden “the illegal tourism activities in Guilin were reduced by the dismantling of 762 stalls and 41 illegal buildings and by detaining rafts and canoes involved in illegal boating”.

In view of the enforcement activities to combat illegal tourism developments and the absence of updated information about benefit sharing (apart from economic benefit accruing to the ne Wukeshu Village) and involvement of the local community in the property’s management the assessment of the relationship with local people continues to be one of Some Concern.

**Legal framework**

There is a strong legal framework at national and provincial levels, but some lack of capability to enforce regulations outside the site (31COM 8B.11; IUCN, 2006; WCMC, 2011). The promulgation of the Regulations on the Protection of Shibing Karst World Natural Heritage in Qiandongnan Miao and Dong Autonomous Prefecture in 2018 emphasizing the protection and management of both the property and buffer zone, as well as the formal implementation of Regulations on the Protection of Shilin Karst World
Natural Heritage Sites in Shilin Yi Autonomous County, Yunnan Province in 2019. Measures for the Protection of Jinfoshan Karst World Natural Heritage in Chongqing City in 2016, and the EIA process for the railway development in the buffer zone are recent developments which are aimed at increasing the legislative protection of the site (qdn, 2018; Credit Sailing, 2018; sohu.com, 2016). Recently, Guilin also announced the formal implementation of the Guilin City Lijiang Scenic Area Management Regulations from August 1 (Guilin.gov, 2020; IUCN Consultation, 2020).

Law enforcement

Mostly Effective

Strict regulations on development and constructions within the property are being effectively enforced. Within the buffer zone, there is a set of very strict approval regulations for new constructions, including assessment of scales, site selection, environmental evaluation and reporting procedures (State Party of China, 2016). The 2018 State of conservation report by the State Party of China indicates that the anthropogenic disturbance is forbidden in the strict protection area and that enforcement of regulations has resulted in a number of illegal tourism activities having been curtailed and therefore it can be concluded that Law Enforcement is not a significant issue of concern for management of the property.

Implementation of Committee decisions and recommendations

Highly Effective

The request expressed by the World Heritage Committee in 2014 “to continue efforts to integrate planning, governance and management across the whole South China Karst World Heritage property including the proposed finalization of a management plan anticipated by 2015” (World Heritage Committee, 2014), has been now addressed through the development of an overarching Conservation and Management Plan for South China Karst (UNESCO, 2017). The 2018 SOC report addresses all requests by the Committee in a comprehensive and timely manner, however the 2019 decision of the World Heritage Committee requests the State Party to 'address any impact on the buffer zone, any potential impact of invasive alien species on the property, and that it assess, monitor and manage the potential long-term cumulative impacts of increased tourism pressure on the OUV of the property'; as well as ensure that any relocation programmes 'are in line with the 2015 World Heritage and Sustainable Development Policy and relevant international standards.' (World Heritage Committee, 2019).

Sustainable use

Some Concern

While the 2006 nomination document states that local communities were engaged in sustainable farming activities with support of site managers there appears to have been a significant reconsideration of this position. The 2018 SOC report notes that parts of the property are significantly affected by agricultural activities and a policy of "subsidizing agriculture through tourism" has been adopted, the agricultural industry has been restructured and agricultural solid waste treatment facilities installed. Remedial works have included removing hundreds of thousands of illegally planted fruit trees and the reforestation of 1,300 hectares carried out. Tourism developments have also impacting the sustainable use of the property and intervention measures have been required to reduce ongoing impacts (carrying capacity enforcement) and undertaking remedial work to reduce tourism induced pollution of water resources. Sustainable use is a matter of concern for the property despite notation of the comprehensive monitoring programmes being implemented.

Sustainable finance

Data Deficient

Adequate funding levels are reported (Nomination document, 2006; Management plan, 2005). No reference to financial support for management of the property can be found in recent documentation.

Staff capacity, training, and development

Some Concern

The 2018 State Party report on the State Of Conservation notes a management staff of 905 persons across the component parts of the property and indicates that in the 3 years from 2015 to 2017 training in protection and management of the property was provided for just 150 of them.
No data is available to indicate an increase in staff training and development in the years 2018 and 2019 nor is there any indication of need for enhanced management capacity in the latest SOC report.

▶ **Education and interpretation programs**

Some Concern

A number of new exhibition centres were built up to promote the values and importance of the components of the property, for example the Shibing World Heritage Exhibition Center. Although the management plan includes a specific chapter on 'education' there is no information available to determine have effectively its provisions are being implemented and a review of social media indicates that, at least in the show caves within the property, there is no attempt at appropriate site interpretation.

▶ **Tourism and visitation management**

Some Concern

Tourism is growing steadily and proving increasingly harder to control. May require imposition of limits on visitors (Nomination document, 2006, Management plan, 2005, IUCN, 2006). A carrying capacity has been established for each of the component parts of the property and is being enforced such that overcrowding does not occur (2018 SoC report) but social media comments suggest that crowding is a serious problem, particularly in the Shilin Stone Forest and part of Guilin. Ground water pollution by tourism related activity is noted and is subject to management intervention and enforcement has been required to removed illegal tourism facilities. Despite noting the responses by the management authority the impacts of tourism continue to be of Some Concern.

▶ **Monitoring**

Highly Effective

Monitoring of cave environments, fires, floods, water quality, species, invasive species, and numbers of visitors is undertaken (Nomination document, 2006, Management plan, 2005; IUCN, 2006). Remote sensing of all components is being undertaken and is complemented by field inspections (State Party of China, 2016). The management plan for the property includes a chapter on monitoring requirement and a monitoring indicator system for the individual sites within the property has been established. Monitoring activities to gather data pertaining to threats to the OUV, the environment and tourist numbers are carried out by satellite remote sensing, station observation, instrument monitoring and community patrols. Information collected is submitted to the management departments concerned and appropriate external institutions are commissioned to analyze and evaluate the monitoring outputs. (State Party of China. 2019).

▶ **Research**

Highly Effective

Many scientific institutions are active in the property with a recent founding of the National Overseas Expertise Introduction Program for Discipline Innovation of China “Overseas Expertise Introduction Center for South China Karst Ecosystem Discipline Innovation” in Gzhou Normal University (Ministry of Education and State Administration of Foreign Experts Affairs P. R. China, 2017). Scientific values are well documented. Socio-economic research occurs (State Party of China- Nomination Document, 2006, Management Plan 2006, WCMC, 2011; State Party of China, 2016). A diverse array of property related research results have been published in recent years covering the broader issues of climate change, natural re-greening of the region, karst desertification and the chemistry of karst landscapes through to the more focused issues such as ground-water pollution due to tourism within the property. (Xiong Kangning ,2016; Xiong Kangning ,2019), in view of the key scientific issues on coordinated development of World Heritage protection, rocky desertification control and eco-tourism industry in South China Karst, clarified maintenance mechanism of natural beauty of karst landscape and biodiversity of the property, revealed the coupled development of heritage protection and eco-tourism industry in the property, and rocky desertification control based on the restoration and conservation of biodiversity, ecological industry development derived from the rocky desertification control in the buffer zone, with 12 master and 3 doctoral studies and planted 2300 hm2 golden pear and 400 hm2 kiwi fruit planting in Shibing karst buffer zone. While most of this research has highly academic and institute driven rather than management driven to provide applicable solutions to on-ground problems, the EIS for the Guinan High-speed Railway in the buffer zone places a very high emphasis on research requirements to protect values in the development phase of the project and research.
opportunities to enhance management of the property in the operational phase of the project (State Party of China, 2019; Xiong Kangning and Zhang Zhenzhen, et al, 2020).

### Overall assessment of protection and management

Overall, the protection and management of the property can be assessed as mostly effective. The property has a very strong legal basis and a good administrative framework, and site management is of adequate capacity and capability. The scientific interest in the site is excellent, but could be integrated into management activities more effectively and educational outreach needs further work. Significant progress has been achieved with the development and implementation of an integrated management system for the entire serial property with the development of the overarching Conservation and Management Plan for South China Karst. Management of tourism (crowding and site interpretation programmes) and tourism impacts (human waste management issues) need ongoing intervention by management.

#### Assessment of the effectiveness of protection and management in addressing threats outside the site

The range and level of threats inside the property are mirrored by those in the buffer zone and surrounding areas. The site managers appear to have a good relationship with provincial management authorities in identifying threats and concerns, but successful solutions require ongoing collaborative efforts. The recent restructuring of the management framework such that the property's management is now overseen by the National Forestry and Grassland Administration rather than by four different provincial Departments under the Ministry of Housing and Urban-Rural Development bodes well for an on-going collaborative effort.

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### State and trend of values

#### Assessing the current state and trend of values

**World Heritage values**

<table>
<thead>
<tr>
<th>Spectacular humid tropical to subtropical karst landscapes</th>
<th>Good</th>
<th>Trend: Stable</th>
</tr>
</thead>
</table>

The current state of the scenic and aesthetic values and attributes of the property is assessed as good as, in general, the identified threats do not have serious potential to impact its OUV. They do potentially impact the associated biological elements which, though not considered to be of outstanding universal value, do play a major role in maintaining the OUV. To date the site managers have been able to avoid any serious deterioration, but continued vigilance and effective management intervention are required in the long term (State Party of China, 2012). The additional karst landforms added to the property in 2014 completed the diverse spectrum of South China Karst landscapes and landforms (IUCN, 2014). Restoration of the natural forest cover to 1,300 hectares of mountainous land has been a positive contribution to the aesthetic value.

<table>
<thead>
<tr>
<th>Limestone karst landforms and landscapes of global scientific significance</th>
<th>Good</th>
<th>Trend: Stable</th>
</tr>
</thead>
</table>

The condition and trend of the geological values of the property can be rated as good and stable respectively. However, the natural progression of geomorphological evolution of the karst landscapes requires that the biological and hydrological regimes of the natural ecosystems remain intact and unmodified. These regimes will require the principal management effort to maintain the World Heritage values of the property in perpetuity (State Party of China, 2012). The areas that were added to the property in 2014 through its extension were evaluated as being in good condition (IUCN, 2014).
However, clastic and chemical cave sediments are fragile features that are easily damaged by humans. Caves open to tourists need to be managed to the highest standards. While the carrying capacity has been set for each of the component parts of the property there is insufficient data to evaluate management of the show caves.

### Summary of the Values

**Assessment of the current state and trend of World Heritage values**

<table>
<thead>
<tr>
<th>Good</th>
<th>Trend: Stable</th>
</tr>
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</table>

The property includes all of the diverse spectrum of landscapes and landforms found in Southern China. Its outstanding scenic, aesthetic and geological values are in good condition and their trend is stable. The associated biological and hydrological elements play a major role in maintaining these values and in allowing the natural progression of landscape evolution. The identified threats generally impact or potentially impact these associated values and are mostly rated at a low or very low level.

**Assessment of the current state and trend of other important biodiversity values**

<table>
<thead>
<tr>
<th>Low Concern</th>
<th>Trend: Data Deficient</th>
</tr>
</thead>
</table>

While the condition and trend of biota in the property are generally of low concern there is a need for constant vigilance to detect deterioration in their condition. The management plan for the property provides for on-going monitoring and assessment of the identified threats to these associated values and provides for appropriate management intervention as required. An intact vegetation cover is vitally important for the continuation of natural geomorphological processes and geological evolution. Management intervention is already in process to address invasive species occurring within the property and to reduce pollution of waterways. There are also many endemic and endangered species of national and international conservation and scientific importance. In particular, significant cave fauna could be detrimentally affected by tourist activities.

### Additional information

**Benefits**

**Understanding Benefits**

- **Importance for research**
  
  The property is a significant focus of research and is a major source of knowledge about karst landscapes, with more than 500 scientific papers published since its inscription. There is also some contribution to local education programs but this could be expanded.

- **Traditional agriculture**
  
  Small-scale farming by local residents is permitted in the property. Agricultural practices avoid the use of herbicides and pesticides. Livestock grazing is generally discouraged.

Factors negatively affecting provision of this benefit:
- Pollution: Impact level - High, Trend - Decreasing
- Overexploitation: Impact level - High, Trend - Increasing
- Habitat change: Impact level - High, Trend - Decreasing

There is some pollution with runoff from agricultural land but an on-going management intervention programme has resulted in a significant reduction in water pollution in recent years.
History and tradition

Traditional lifestyles and practices of the local minority groups are recognized and encouraged, and they contribute to tourist programs. The property protects many sacred sites.

The State Party has taken commendable steps to maintain the cultural identity and preserve the ethnic traditions of the people relocated to the new Wukeshu Village for the original village inside the property (Shilin Karst area).

Soil stabilisation, Flood prevention, Water provision (importance for water quantity and quality)

The property provides very substantial environmental services such as protection of natural vegetation cover, prevention of soil erosion, mitigation of impacts of landslides and flooding, and maintenance of water quality.

Factors negatively affecting provision of this benefit:
- Climate change: Impact level - Moderate, Trend - Continuing
- Pollution: Impact level - High, Trend - Decreasing
- Overexploitation: Impact level - High, Trend - Increasing
- Habitat change: Impact level - High, Trend - Increasing

Direct employment

The property provides economic opportunity for an undetermined number of local people through direct employment in the property and in tourist accommodation in the buffer zone, opportunities for the provision of tourism related services, sale of local produce and handicrafts as well as the provision of accommodation food and beverages in the buffer zone.

On a broader scale the property contains a large part of the major attraction for national and international tourism in southern China - the karst landscape. While a detailed assessment of the economic contribution of the property to the regional and national economy is not available two examples which can be cited include a report (Luo Wangshu, 2016) noting a 2015 tourism revenue in Wulong County of USD308Million and another (Mingmei, 2019) noting that in 2018 Guilin had a record 140 million visitors and tourism revenue of USD20Billion. Comparative data for other elements of the serial property have not been sourced and, while it is not being claimed that all of this tourism activity is due entirely to the property, the property is intrinsically tied to the landscape which is the attraction. These figures are provided as an indicator of the scale of the industry based on spectacular landscape of the South China Karst.

Factors negatively affecting provision of this benefit:
- Pollution: Impact level - High, Trend - Decreasing

While an overall assessment of economic benefit accruing to the local community is not available the 2018 SoC notes that in 2017:
A) of the 671 working age people in the new Wukeshu Village 625 participated in the tourism industry
B) the Village generated an income of RMB6 million from the collective-owned resources and RMB7 million from the collectively managed shops and teahouses.

Summary of benefits

The property contributes significantly through research to an improved scientific understanding of karst landscapes. Local residents including minority groups are able to pursue traditional agricultural activities, and receive benefits from cash income as employees within the property or through the sale of local produce and handicrafts to visitors. Protection and management programs contribute to a wide range of environmental services and to the promotion of cultural values and the property plays a major role in the economy of broader community of southern China.
Compiling of active conservation projects

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<th>Brief description of Active Projects</th>
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<td>1</td>
<td>Guizhou Normal University</td>
<td>“Industrial Mode and Technology Integrating Demonstration of Rocky Desertification Control, World Heritage Protection and Mountain Tourism” According to the document of the Ministry of Science and Technology of People’s Republic of China (National Science Agenda Office [2016] No. 6), the program has invested 59 million yuan during 2006-2021 for Guizhou Plateau in South China Karst, aiming at trend of the rocky desertification, comprehensive management, achievement maintenance, ecological industry development, ecological security, economic and social development, national targeted poverty alleviation, ecological civilization and other strategic and technological needs issues. Based on the national and Guizhou Province’s &quot;9th Five-Year&quot; to “12th Five-Year” scientific and technological plan achievements on genetics and control, grade classification and technology, mode and technical system of rocky desertification, etc, the program will focus on incremental basic frontier research, research and development of common key technologies, application demonstration and industrialization promotion for chain innovative design, integrated deployment, and sub-module advancement of integrated control of the rocky desertification and the ecological derivative industry. Among the program, project 6 and project 7 involve coupling mechanism, synergy mode and technical system of protection in the karst World Heritage sites, rocky desertification control in the buffer zone and ecotourism development in both.</td>
<td><a href="https://kygc.gznu.edu.cn/nr.jsp?urltype=news.ContentUrl&amp;wbtreeid=2113&amp;wbnewsid=4656">https://kygc.gznu.edu.cn/nr.jsp?urltype=news.ContentUrl&amp;wbtreeid=2113&amp;wbnewsid=4656</a>  </td>
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# REFERENCES

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<td>10</td>
<td>Local Governments. (2017).The 13th five-year national economic and social development plan of Shiping County, Shilin Yi Autonomous County, Huanjiang Maonan Autonomous County, Nanchuan District of Chongqing, Guilin City, Libo County, and Wulong County.</td>
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<td>Xiong Kangning. (2019). Annual report of the Key Project of National Research and Development Program of China in the 13th Five-year Plan Period “Ecological industry technology and demonstration of the karst plateau gorge rocky desertification control” (2016YFC0502600), Ministry of Science and Technology of P.R.China.</td>
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