IUCN Conservation Outlook Assessment 2014 **(archived)**
Finalised on 10 June 2014

Please note: this is an archived Conservation Outlook Assessment for Chengjiang Fossil Site. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Chengjiang Fossil Site

SITE INFORMATION

Country:
China
Inscribed in: 2012
Criteria:
(viii)

Site description:

A hilly 512 ha site in Yunnan province, Chengjiang's fossils present the most complete record of an early Cambrian marine community with exceptionally preserved biota, displaying the anatomy of hard and soft tissues in a very wide variety of organisms, invertebrate and vertebrate. They record the early establishment of a complex marine ecosystem. The site documents at least sixteen phyla and a variety of enigmatic groups as well as about 196 species, presenting exceptional testimony to the rapid diversification of life on Earth 530 million years ago, when almost all of today's major animal groups emerged. It opens a palaeobiological window of great significance to scholarship. © UNESCO

SUMMARY

2014 Conservation Outlook

Good

The site is protected under law and relatively effectively administered by a management authority with the guidance of comprehensive management plans. Former low-level threats have been overcome, but new threats such as the illegal collection of fossils and future demand for more infrastructure development associated with growing visitor numbers will require careful management.

Current state and trend of VALUES

Good
Trend: Stable

The current state of the outstanding universal geological values of the property is good and the trend is stable. The site is relatively limited in area and the fossil localities are inherently vulnerable to disturbance or damage. However, these have not proved to be a problem for protection of the site and its fossils to date, and no future problems are envisaged given the effective protection and management regime of the property. The property benefits from having no permanent resident population and few visitors, many of whom are scientists. There is, however, evidence of illegal collection and sale of fossils, which so far has not been addressed and which is of concern.

Overall THREATS

Low Threat

Current threats are few and a likely substantial increase in visitor numbers in the near future is the major potential threat to the property. Current threats from inappropriate tourism infrastructure development and inappropriate use of introduced species in re-forestation are partly recognized and should be mitigated. Former mining activities occurred in the buffer zone only. However, illegal collection and sale of fossils is a key threat to the site, which so far has

received little attention. Overall, the threat level to the outstanding geological values of the site is low.

Overall PROTECTION and MANAGEMENT

Mostly Effective

Overall the effectiveness of management of the property can be assessed as mostly effective. The protection laws, management system, research and environmental monitoring are of excellent standard. Funding and staffing appear adequate for present needs. Inappropriate visitor infrastructure development has caused concerns in the past but continuation of this is unlikely. The management authority will need to be vigilant regarding potential impacts from any future increase in visitation levels. There should be more engagement with the local community and more transparency about actions taken to protect the site. Improved protection is desirable for some fossil localities in the area surrounding the property.

FULL ASSESSMENT

Description of values

Values

World Heritage values

- **An exceptional fossil record of the rapid diversification of life on Earth during the early Cambrian period**
  Criterion:(viii)

  The palaeontological evidence of the site is unrivalled for its rich species diversity for early Cambrian times. To date at least 16 phyla, plus a variety of enigmatic groups, and about 200 species have been documented. Taxa recovered include algae, sponges and cnidarians along with numerous bilaterian phyla, including the earliest known chordates. The quality of fossil preservation is exquisite, including both the soft and hard tissues of animals with hard skeletons, along with a wide array of organisms that were entirely soft-bodied and, therefore, relatively unrepresented in the global fossil record. The fossils and rocks of the property, together, present a complete record of an early Cambrian marine community (Babcock et al., 2001; China, 2011; Dzik, 2004; Hagadorn, 2002; IUCN 2012; Hou et al. 2004;).

Assessment information

Threats

Current Threats

Low Threat

Current threats are few and can be rated as low to high in terms of their impacts. Mostly, they relate to former activities and impacts and effective mitigation measures are now partly in place.

► Mining/ Quarrying

Very Low Threat
Outside site

Until 2004 phosphate mining occurred in the buffer zone and mines were closed in 2008. The complex process of mine rehabilitation has begun but will take many years to complete (36COM. 8B.9; China, 2011; IUCN 2012).

► Tourism/ Recreation Areas

Low Threat
Inside site

Construction of a walkway involved deep excavation of a fossil locale and a museum was built over the site of the first fossil discoveries (36COM. 8B.9; China, 2011; IUCN 2012).

► Other Ecosystem Modifications

Low Threat
Inside site

Since 1997 there has been replanting as part of a forest restoration programme. Introduced species were used but recently this practice has been replaced by the use of native plants (IUCN, 2012).

► Other

High Threat
Inside site

So far, there is no effective action against illegal fossil collections, which cause the damage on the site and the loss of valuable fossil material (IUCN Consultation, 2014).

Potential Threats

Low Threat

A significant increase in visitor numbers and the development of relevant infrastructures in the near future is the major potential threat to the property.

▶ Tourism/ visitors/ recreation

Low Threat
Inside site

Visitor levels are currently very low (4-5,000 annually), but are expected to grow significantly to around 30-40,000 per annum (36COM. 8B.9; China, 2011; IUCN, 2012).

Protection and management

Assessing Protection and Management

▶ Relationships with local people

Some Concern

There has been little involvement with the local community (IUCN, 2012). A better engagement is needed to ensure local communities understand the protection policy and are able to participate in protection activities.

▶ Legal framework and enforcement

Some Concern

The property and its fossils are protected by national and provincial legislation. Enforcement is generally good; however, there is an increasing concern over illegal trade of fossil collections, which have received too little attention by local authorities (36COM. 8B.9; China, 2011; IUCN, 2012).

▶ Integration into regional and national planning systems

Data Deficient

.

► Management system

Highly Effective

The management system is rated as sufficient for current needs. Three management plans apply in the property (IUCN, 2012).

► Management effectiveness

Mostly Effective

Existing staffing and financial resources are sufficient to provide an effective response to management needs under current types and levels of demand (IUCN, 2012).

► Implementation of Committee decisions and recommendations

Data Deficient

.

► Boundaries

Highly Effective

The boundaries are appropriate. They are well delimited and signed (IUCN, 2012).

► Sustainable finance

Mostly Effective

Current funding is adequate (IUCN, 2012).

► Staff training and development

Some Concern

The 13 permanent staff and 16 part-time staff are adequate to cope with current management requirements (IUCN, 2012). Better staff training would be beneficial.

▶ Sustainable use

Data Deficient

.

▶ Education and interpretation programs

Mostly Effective

Very good curation and display of fossils in a purpose-built museum (IUCN, 2012).

▶ Tourism and interpretation

Mostly Effective

Low numbers of tourists visit the property and most international tourists are scientists. Interpretation is excellent (IUCN, 2012).

▶ Monitoring

Some Concern

The monitoring programme is extensive and well conducted (IUCN, 2012).

▶ Research

Highly Effective

The property has been the subject of intensive research since the first fossil discoveries were reported in the 1985 (Zhang & Hou, 1985). Recent high-profile Chengjiang research papers (Ma et al., 2012; Tanaka et al. 2013; Ma et al., 2014) made further breakthrough in evolutionary studies.

Overall assessment of protection and management

Mostly Effective

Overall the effectiveness of management of the property can be assessed as mostly effective. The protection laws, management system, research and environmental monitoring are of excellent standard. Funding and staffing appear adequate for present needs. Inappropriate visitor infrastructure development has caused concerns in the past but continuation of this is

unlikely. The management authority will need to be vigilant regarding potential impacts from any future increase in visitation levels. There should be more engagement with the local community and more transparency about actions taken to protect the site. Improved protection is desirable for some fossil localities in the area surrounding the property.

▶ **Assessment of the effectiveness of protection and management in addressing threats outside the site**
Mostly Effective

More planning, management effort and protection are required for the significant fossil localities outside the property that provide scientific context for the fossil assemblage in the property (IUCN, 2012).

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **An exceptional fossil record of the rapid diversification of life on Earth during the early Cambrian period**
Good
Trend:Stable

The site and its fossil localities are well protected and managed. There are no undesirable or harmful pressures on the property at present and none is expected. Future growth in visitor numbers could bring demand for more infrastructure development and consequent impacts, which would require effective management intervention (36COM. 8B.9; China, 2011; IUCN, 2012).

Summary of the Values

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

Trend: Stable

The current state of the outstanding universal geological values of the property is good and the trend is stable. The site is relatively limited in area and the fossil localities are inherently vulnerable to disturbance or damage. However, these have not proved to be a problem for protection of the site and its fossils to date, and no future problems are envisaged given the effective protection and management regime of the property. The property benefits from having no permanent resident population and few visitors, many of whom are scientists. There is, however, evidence of illegal collection and sale of fossils, which so far has not been addressed and which is of concern.

Additional information

Key conservation issues

► **.**

Local

.

Benefits

Understanding Benefits

► **Is the protected area valued for its nature conservation?**

Although it is a relatively small site and the original vegetation cover is much modified by previous human uses, the property provides effective protection for fossil localities that have internationally significant scientific and conservation values.

► **Importance for research**

The property is one of the world’s most significant fossil sites and of great

importance to the science of paleontology. Discovery and study of the fossils here have provided the best known picture of early Cambrian marine life and have revolutionized our understanding of the evolution of life on Earth. The fossil record is extremely well researched and reported in the scientific literature and the fossil assemblage is well curated and displayed.

Summary of benefits

Although it is a relatively small site with very specific scientific and conservation values, the property provides effective protection to a natural geological landscape of global importance, and study of its fossil assemblage has revolutionized our knowledge of the evolution of life on Earth, specifically with respect to our understanding of the flowering of early animal life some 530 million years ago.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	.		.

REFERENCES

№	References
1	36COM. 8B.9
2	Babcock, Loren E. et al., 2001. The Chengjiang Biota: record of Early Cambrian diversification of life and clues to exceptional preservation of fossils. GSA Today (February 2001): 4-9.
3	China, 2011. Ghengjiang Fossil Site, China World Heritage nomination.
4	Dzik, Jerzy 2004. Review of: Hou, Xian-Guang et al. 2003. The Cambrian fossils of Chengjiang, China: the flowering of early animal life. Journal of Sedimentary Geology.
5	Hagadorn, James W., 2002. Chengjiang:early record of the Cambrian explosion. Chapter 3, pp. 35-60 in: Bottjer, D.J. et al. (eds.), 2002. Exceptional fossil preservation: a unique view of the evolution of marine life. Columbia University Press, New York.
6	Hou, X. et al., 2004. The Cambrian fossils of Chengjiang, China—The Flowering of Early Animal Life. Blackwell Publishing, Oxford.
7	IUCN, 2012. Evaluation of the Chengjiang Fossil Site World Heritage nomination.
8	Ma, X. et al., 2012. Complex brain and optic lobes in an early Cambrian arthropod. Nature, 490: 258-261.
9	Ma, X. et al., 2014. An exceptionally preserved arthropod cardiovascular system from the early Cambrian. Nature Communications, 5: 3560. DOI: 10.1038/ncomms4560
10	Tanaka, G. et al., 2013. Chelicerate neural ground pattern in a Cambrian great appendage arthropod. Nature, 502: 364-367.
11	Zhang, W. & Hou, X. 1985. Preliminary notes on the occurance of the unusual trilobite Naraoia in Asia. Acta Palaeontologica Sinica, 24: 591-595.