IUCN Conservation Outlook Assessment 2017 **(archived)**
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Please note: this is an archived Conservation Outlook Assessment for Joggins Fossil Cliffs. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Joggins Fossil Cliffs

SITE INFORMATION

Country:
Canada
Inscribed in: 2008
Criteria:
(viii)

Site description:
The Joggins Fossil Cliffs, a 689 ha palaeontological site along the coast of Nova Scotia (eastern Canada), have been described as the “coal age Galápagos” due to their wealth of fossils from the Carboniferous period (354 to 290 million years ago). The rocks of this site are considered to be iconic for this period of the history of Earth and are the world’s thickest and most comprehensive record of the Pennsylvanian strata (dating back 318 to 303 million years) with the most complete known fossil record of terrestrial life from that time. These include the remains and tracks of very early animals and the rainforest in which they lived, left in situ, intact and undisturbed. With its 14.7 km of sea cliffs, low bluffs, rock platforms and beach, the site groups remains of three ecosystems: estuarine bay, floodplain rainforest and fire prone forested alluvial plain with freshwater pools. It offers the richest assemblage known of the fossil life in these three ecosystems with 96 genera and 148 species of fossils and 20 footprint groups. The site is listed as containing outstanding examples representing major stages in the history of Earth. © UNESCO

SUMMARY

2017 Conservation Outlook

Good

Joggins Fossil Cliffs is a model of high quality performance within the World Heritage Convention, protecting geological values of global significance whilst providing benefits to local people. The site is robust, in good and stable condition and effectively managed. Threats are low, and there is highly effective and creative management that has built and maintains community support for the conservation and presentation of this site. Provided adequate resources are maintained to assure the capacity for effective site management, the future conservation of this site is highly positive. Model approaches in Joggins related to community-based management and education should be more widely disseminated within the World Heritage Convention.

Current state and trend of VALUES

Good
Trend: Stable

Joggins Fossil Cliffs protects a coastal fossil record from the Coal Age of global significance. This fossil record is maintained by active natural coastal processes and is in good condition and available for scientific and educational use.

Overall THREATS

Low Threat

The current threats mostly derive from public access to the site, and are at low levels. All are well managed, with appropriate legal backing, and should continue to be so provided the site remains adequately resourced. There are few potential threats, not already subject to the management of the property.

Overall PROTECTION and MANAGEMENT

Highly Effective

The management of Joggins Fossil Cliffs is highly effective, with a dedicated and creative local team responsible for this work, supported by regional and national expertise. Examples of good practice include the strong community processes that are the hallmark of the management of this site, and its major commitment to education, including the demonstration of this WHS as a model for sustainable development and the provision of social and economic benefits to the local community, alongside the protection and presentation of the site.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Continued scientific research**
Criterion:(viii)

The property has played a vital role in the development of seminal geological and evolutionary principles, including through the work of Sir Charles Lyell and Charles Darwin, for which the site has been referred to as the "coal age Galápagos" (SoOUV, 2008).

▶ **Ex situ fossil record**
Criterion:(viii)

Fossil material exposed by coastal erosion is available for study, and subject to regulated scientific collection and appropriate public and educational use. Important specimens are collected and curated to avoid losses to science (IUCN, 2008).

▶ **In situ fossil record of terrestrial life in the “Coal Age”**
Criterion:(viii)

The "grand exposure" of rocks at Joggins Fossil Cliffs contains the best and most complete known fossil record of terrestrial life in the iconic "Coal Age": the Pennsylvanian (or Carboniferous) period in Earth's history. The site bears witness to the first reptiles in Earth history, which are the earliest representatives of the amniotes, a group of animals that includes reptiles, dinosaurs, birds, and mammals. The site offers the richest assemblage known of the fossil life in these three ecosystems with 96 genera and 148

species of fossils and 20 footprint groups. (SoOUV, 2008). Stratigraphy and fossil record in cliffs are in good condition, and available for study and subject to regulated scientific collection.

Assessment information

Threats

Current Threats

Low Threat

The current threats mostly derive from public access to the site, and are at low levels. All are well managed, with appropriate legal backing, and should continue to be so provided the site remains adequately resourced.

▶ Other Activities

Low Threat
Inside site, localised(<5%)

Collection of fossils is subject to regulations that are effectively enforced, and there is no evidence of significant losses (IUCN, 2008).

▶ Tourism/ visitors/ recreation

Low Threat
Inside site, localised(<5%)
Outside site

Visitor use is well controlled and remains at relatively low levels (IUCN, 2008). The Joggins Fossil Institute Annual Report 2014-2015 provides an estimated figure of 20,000 visitors.

▶ Housing/ Urban Areas

Very Low Threat
Outside site

The property is largely unsuitable for coastal development and is legally

protected from it, notably at the provincial level through the provisions of the Special Places Protection Act and at the municipal level by the Cliffs and Shoreline Setbacks and the Prohibited Uses and Structures legislation.. A narrow buffer zone is also defined which separates the property from several private residences (IUCN, 2008). No up-to-date information is available on this, but it can be assumed that this threat has not increased.

Potential Threats

Very Low Threat

There are few potential threats, not already subject to the management of the property. To the extent they exist their impacts are not known, but appear to be likely to be low, given the site is already demonstrably robust.

► Temperature extremes, Storms/Flooding

Low Threat
Inside site

Scale of impacts not know, but as a very active coastline this site is already relatively robust to potential impacts.

► Erosion and Siltation/ Deposition

Very Low Threat
Inside site, scattered(5-15%)

Some factors, including coastal erosion through wind, water and storms, are both beneficial for the property because they reveal new fossils, and damaging as they can destroy fossils. These factors are being monitored by the Joggins Fossils Institute and important fossils can be collected before they get destroyed (State Party of Canada, 2013).

Protection and management

Assessing Protection and Management

► Relationships with local people

Highly Effective

The nomination for inscription on the World Heritage List had been developed with very strong local support (IUCN, 2008; Nomination, 2007) and the property continues to have very positive relationships with local people.

► Legal framework

Highly Effective

Adequate legislation is in place, with some continuing needs to maintain effective balance of legal protection of fossil remains, with adequate enforcement and assurance of collection and curation of important specimens. The property is protected under a range of provincial and municipal laws and regulations, including the Provincial Special Places Protection Act, Beaches Act, Minerals Act and the land-use planning and zoning by laws of the Municipality of Cumberland (IUCN, 2008; Nomination, 2007).

► Enforcement

Mostly Effective

The most recent periodic report (2013) noted that there was acceptable capacity and resources to enforce legislation, although some deficiencies remained (State Party of Canada, 2013). However, no detailed and more up-to-date information is available.

► Integration into regional and national planning systems

Data Deficient

Data deficient

► Management system

Highly Effective

Clear and effective management system is in place which can serve as a model of local engagement (IUCN, 2008; Nomination, 2007). Management is implemented through the Joggins Fossil Institute, a non-for-profit society. It is governed by an Advisory Board of Directors and advised by a Scientific Advisory Committee which provides important relationships with scientists

from the Nova Scotia Department for Natural Resources (IUCN, 2008).

▶ Management effectiveness

Highly Effective

Management was evaluated as highly effective at the time of inscription (IUCN, 2008).

▶ Implementation of Committee decisions and recommendations

Highly Effective

The only Decision taken by the World Heritage Committee on this property was the one inscribing it on the World Heritage List which included only one recommendation, namely that "the State Party widely publicise the results of its monitoring of fossil resources produced by natural erosion and the development of educational and research collecting policies, which could serve as a model for such management elsewhere" (World Heritage Committee, 2008).

▶ Boundaries

Highly Effective

Boundaries of the property are clearly defined and include all areas necessary to fully display the fossil record of Joggins (World Heritage Committee, 2008). The landward and seaward boundaries are tied to the natural process related to the values of the property (IUCN, 2008). The boundaries are well known by local residents and landowners (State Party of Canada, 2013).

▶ Sustainable finance

Mostly Effective

Consistent funding has been achieved but requires regular renewal of support. (IUCN, 2008; Nomination, 2007). In 2014-2015 the site reported a total revenue of 562,828 Canadian dollars, with provincial funding being the main source (Joggins Fossil Institute Annual Report 2014-2015). The budget figures remained stable compared to 2013-2014.

► Staff training and development

Highly Effective

Highly effective professional team oversees the management of the property (IUCN, 2008; Nomination, 2007). The Joggins Fossil Institute also involves local volunteers in its work.

► Sustainable use

Highly Effective

The site manages sustainable use of the fossil resource, and in addition its visitor services model wider approaches to environmental sustainability. The main visitor facilities are LEED certificated with on site renewable energy in use, and local produce used in the visitor centre (IUCN, 2008; Nomination, 2007).

► Education and interpretation programs

Highly Effective

Strong educational programmes are in place and a number of activities are being offered, including educational group visits and day camps for children. A new exhibit (Fossil Finders) was opened in 2015. The exhibit is participatory and will be updated as new fossils get discovered and the visitors would be able to see their finds on display (Joggins Fossil Institute Annual Report 2015-2016). The staff of the Institute also deliver talks and presentations to community, school and professional groups.

► Tourism and visitation management

Highly Effective

Creative approaches are being used, centred on a new visitor centre that was constructed to support the site on inscription. Estimated 20,000 visitors come to Joggins Fossil Cliffs annually (Joggins Fossil Institute Annual Report 2014-2015 and 2015-2016).

► Monitoring

Highly Effective

Monitoring was evaluated as highly effective at the time of inscription (IUCN,

2008).

► Research

Highly Effective

A Scientific Advisory Committee (SAC) is part of the management structure of the property and there is an ongoing research interest (IUCN, 2008). The members of the SAC come from two government departments and four universities. A Research Associate Programme was created to support ongoing research at the site. Formal research cooperation remains established between the Joggins Fossil Institute, Acadia University and Mount Allison University (Joggins Fossil Institute Annual Report 2014-2015). Recent scientific papers based on the research undertaken at the site include for example: Carpenter et al. (2015) and Prokop et al. (2017).

Overall assessment of protection and management

Highly Effective

The management of Joggins Fossil Cliffs is highly effective, with a dedicated and creative local team responsible for this work, supported by regional and national expertise. Examples of good practice include the strong community processes that are the hallmark of the management of this site, and its major commitment to education, including the demonstration of this WHS as a model for sustainable development and the provision of social and economic benefits to the local community, alongside the protection and presentation of the site.

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

Highly Effective

There is both adequate legal protection extending beyond the site, and integrating its conservation into local land-use planning, and a strong outreach programme from the site at local and regional levels.

► Best practice examples

a) Community led processes b) Boundary design tied to values c) Interpretive and educational offer modeling the role of WHS as beacons for promoting

sustainable development approaches.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Continued scientific research**
Good
Trend:Stable

The good status of this value is evidenced by the continuing scientific use of the site with recent scientific publications, and professional expertise supporting the site (Joggins Fossil Institute Annual Report 2015-2016).

▶ **Ex situ fossil record**
Good
Trend:Stable

Ex situ fossil record was evaluated as well preserved at the time of inscription (IUCN, 2008) and this has not changed since.

▶ **In situ fossil record of terrestrial life in the “Coal Age”**
Good
Trend:Stable

Naturally maintained coastline of the site containing its fossil record remains well preserved with adequate and effective management in place. The fossil record is maintained by active natural coastal processes and is in good condition and available for scientific and educational use.

Summary of the Values

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

Trend: Stable

Joggins Fossil Cliffs protects a coastal fossil record from the Coal Age of global significance. This fossil record is maintained by active natural coastal processes and is in good condition and available for scientific and educational use.

Additional information

Benefits

Understanding Benefits

▶ **Cultural and spiritual values, History and tradition**

The site celebrates the local heritage of the communities of Joggins, and is deeply integrated into the life of the community. It provides an important focus for local heritage and history.

▶ **Health and recreation, Outdoor recreation and tourism**

The site has a notable tourism role in the local community, though is not a mass tourism venue.

▶ **Knowledge, Importance for research**

The knowledge produced by the site, in relation to the history of life on Earth is of the highest global significance, and helped inform major developments in geological ideas.

Summary of benefits

The site performs strongly in providing benefits to the local community in relation to direct and indirect economic and social contributions. It provides a global benefit by protecting an irreplaceable site of the highest importance for

our understanding of the history of Life on Earth.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Joggins Fossil Cliffs		The principal actor in the conservation of the property.

REFERENCES

№	References
1	Carpenter, D., Falcon-Lang, H., Benton, M. and Grey, M. 2015. Early Pennsylvanian (Langsettian) fish assemblages from the Joggins Formation, Canada, and their implications for palaeoecology and palaeogeography. Palaeontology. DOI:10.1111/pala.12164
2	IUCN (2008). World Heritage Nomination - IUCN Technical Evaluation, Joggins Fossil Cliffs (Canada). Accessed 21 September 2017.
3	Joggins Fossil Cliffs, 2007. Nomination of The Joggins Fossil Cliffs for Inscription on the World Heritage List.
4	Joggins Fossil Institute. Annual Report 2014-2015.
5	Joggins Fossil Institute. Annual Report 2015-2016.
6	Prokop, J., Pecharová, M., Nel, A., Grey, M., Hörnschemeyer, T. (2017). A remarkable insect from the Pennsylvanian of the Joggins Formation in Nova Scotia, Canada: insights into unusual venation of Brodiidae and nymphs of Megasecoptera. Journal of Systematic Palaeontology, Volume 15 2017 - Issue 12, pages 1051-1065.
7	State Party of Canada (2013). Periodic Report Second Cycle Section II: Joggins Fossil Cliffs. Paris, France: UNESCO World Heritage Centre. Accessed 21 September 2017
8	World Heritage Committee (2008). Decision 32COM 8B.9. Joggins Fossil Cliffs Statement of Outstanding Universal Value (Canada). Accessed 21 September 2017.