

Designation of the Joggins Fossil Cliffs as a UNESCO World Heritage Site

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Introduction

The hope that the celebrated coastal cliff section at Joggins might one day be inscribed on the list of UNESCO World Heritage sites was realized on 7 July 2008 at the 32nd Session of the World Heritage Committee in Québec City. There, at 1800 hr EST, a rare event unfolded as the committee accepted Canada's nomination of Joggins by acclamation, one of very few sites to be so adopted in the history of the Convention, on the strength of its recommendation by the evaluating body, the IUCN (World Conservation Union).

The inscribed property is a sweeping, 14.7 km long section of coastal cliffs (Fig. 1) north and

south of the village of Joggins, Cumberland County, on the Bay of Fundy and centred at latitude 45° 42' 35" N and longitude 64° 26' 09" W (Fig. 2). The stratigraphic section comprises 4 442 m of strata assigned to the Shepody, Claremont, Boss Point, Little River, Joggins, Springhill Mines and Ragged Reef formations. The section represents approximately 15 million years of earth history, and includes the globally significant Mississippian-Pennsylvanian boundary of the Carboniferous Period at the contact of the Claremont and Boss Point formations.

The 'classic section', where the famous paleontological discoveries of Lyell and Dawson were made, lies within the Joggins Formation.



Figure 1. The Joggins Fossil Cliffs.

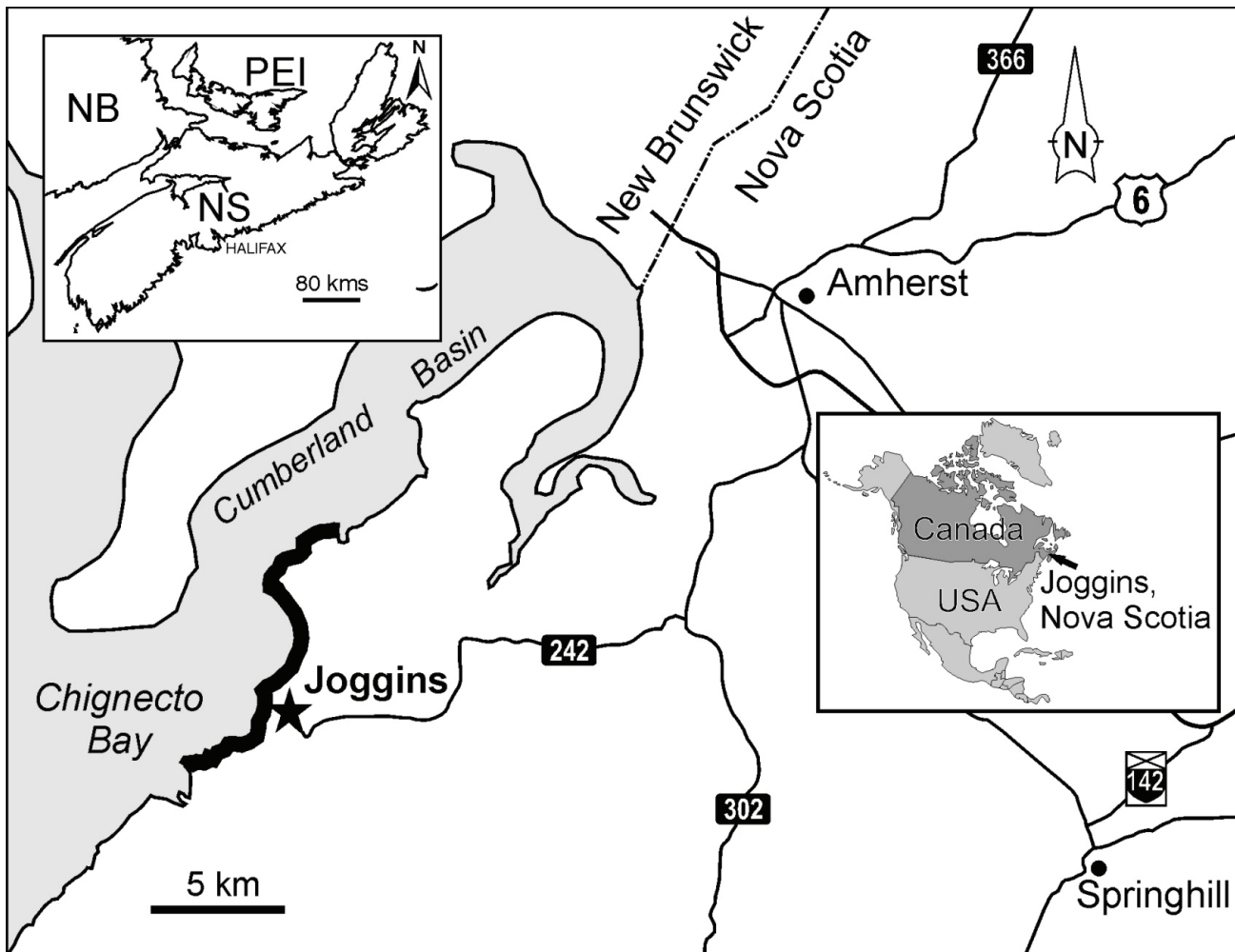


Figure 2. Location map of the Joggins Fossil Cliffs World Heritage Site.

Reference to the significance of the fossil record is made in the draft decision of the World Heritage Committee (below). This record includes many fossil forests of the iconic ‘coal swamp’ trees of the period and an unrivalled record of the denizens of these primeval forests, including trackways of the largest terrestrial invertebrate known to humankind, *Arthropleura*, and the first known reptile, *Hylonomus lyelli*, which is also the oldest representative of the amniotes - terrestrial vertebrates that no longer needed water in which to reproduce - including reptiles, dinosaurs, birds and mammals.

The statement of outstanding universal value for Joggins, the essence of its justification as a World Heritage Site, rests on three ‘pillars’: the fossil record, the unsurpassed exposure, and its place in the annals of science (Calder and Boon, 2007; Fig. 3).

The Road to World Heritage: a Brief Synopsis

A full century before the adoption of the World Heritage Convention in 1972, Sir Charles Lyell imparted an enduring blessing on the cliffs of Joggins. In his 1871 edition of *Elements of Geology*, Lyell (1871), widely recognized as the founder of geology, described the sweeping coastal section as “the finest example in the world” of the Carboniferous ‘Coal Age’.

The path to World Heritage involved the author for at least 16 years, and a formal committee to explore World Heritage designation was struck by the Cumberland Regional Economic Development Agency (CREDA) a decade before the decision of the World Heritage Committee. The quest gained momentum as first awareness, and then confidence,



Figure 3. The three pillars of the outstanding universal value of the Joggins Fossil Cliffs, representing the fossil record, unrivalled exposure, and its place in the history of science.

grew in the prospects of inscription. The timeline from the first protective designation through scoping the case, consultation, consensus building, and preparation of the nomination is depicted in Figure 4. For a more detailed account of the nomination history and recommendations for similar nominations, see Calder (2007).

Evaluation: Site Visit

Following receipt of the nomination at the World Heritage Centre in Paris for the annual deadline of February 1, a site visit was undertaken by the IUCN (Fig. 5) in October of that year (2007). Over a five day period, team leader Tim Badman (IUCN) and Wesley Hill (International Union of Geological Sciences and Geological Society of America) viewed the site on ground and by helicopter, conducted formal and informal meetings with representatives of the community, and were addressed by members of municipal, provincial and federal government, including the Premier of Nova Scotia the Honourable Rodney MacDonald. The site visit is a strategic component of the evaluation of a World Heritage nomination, which also includes off-site review of the nomination documents by members of the IUCN and in the

case of nominations under criterion (viii), invited representatives of the IUGS.

Draft Decision Proposed by the IUCN to the World Heritage Committee

The IUCN - or in the case of cultural sites, the International Committee on Monuments and Sites (ICOMOS) - prepares a draft decision for consideration of the World Heritage Committee, which may or may not be adopted. The draft decision prepared for the Joggins Fossil Cliffs was one of the most forcefully supportive on record, and is recorded here *verbatim* (UNESCO, 2008, p. 8-9):

Draft Decision: 32 COM 8B.9

The World Heritage Committee,

1. *Having examined Documents WHC-08/32.COM/8B and WHC-08/32.COM/INF/8B2,*
2. *Inscribes The Joggins Fossil Cliffs, Canada, on the World*

The Road to World Heritage Nomination of The Joggins Fossil Cliffs

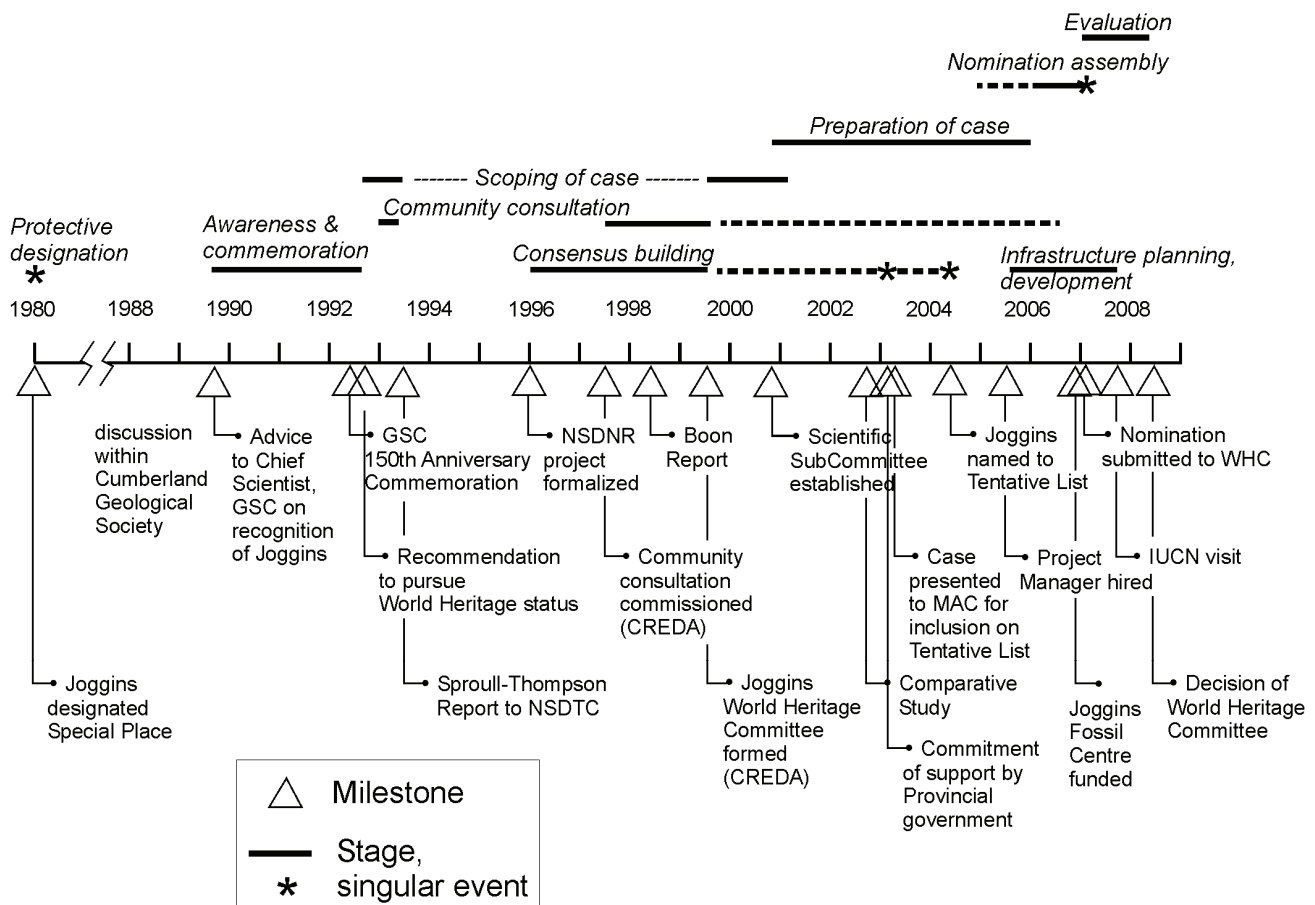


Figure 4. Timeline of the path to World Heritage inscription of the Joggins Fossil Cliffs (after Calder, 2008).

*Heritage List on the basis of
criterion (viii);*
3. *Adopts the following Statement
of Universal Value:*

Values

*The Joggins Fossil Cliffs have
been termed the “coal age
Galápagos” and are the world
reference site for the “Coal Age”.
Their complete and accessible
fossil-bearing rock exposures
provide the best evidence known of
the iconic features of the
Pennsylvanian (or Carboniferous)
period of Earth History.*

Criterion (viii): *Earth’s*

*history, geological and
geomorphic features and
processes: 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
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. Upright fossil trees are
preserved at a series of levels in*



Figure 5. The IUCN evaluation mission to Joggins, October, 2007. From left to right: Brian Hebert (Joggins Fossil Institute); John Calder (Nova Scotia Department of Natural Resources); Tim Badman (World Conservation Union); Wesley Hill (International Union of Geological Sciences/Geological Society of America); Gilles Seutin (Parks Canada).

the cliffs together with animal, plant and trace fossils that provide environmental context and enable a complete reconstruction to be made of the extensive fossil forests that dominated land at this time, and are now the source of most of the world's coal deposits. 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".

Integrity

The boundaries of the property are clearly defined in relation to logical stratigraphic criteria and include all of the areas necessary to fully display the fossil record of Joggins including the cliff face and foreshore rock exposures, and include both the most fossiliferous strata and younger and older rocks that provide geological context. The inland extent of the property is defined based on the top of the cliffs and this is a fully justifiable and logical basis to cope with the dynamic nature of this coastal

property. A relatively narrow buffer zone is defined, which is not part of the inscribed property, but is sufficient to control coastal development which could otherwise threaten the values of the property.

Requirements for Protection and Management

The property has effective legal protection and has the strong support of all levels of government, including in relation to the provision of funding. Some aspects of the legislation, such as for the licensing of fossil collection are cumbersome and would benefit from review, although can be better implemented if site managers are empowered to do so. The site is well resourced, including through the provision of a new visitor centre, and is managed in a way that can be considered to set international standards. The effective process of community involvement and partnerships between scientists, museums and economic interests are also noted, and the biggest challenge of the property will be to maintain the level of performance and resources required in the future.

4. Notes the very high quality of documentation of the nomination and the process of community engagement in its preparation, over a period of almost ten years, as models in the preparation of nominations and in effective management of World Heritage properties:

5 Recommends 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.

Decision of the World Heritage Committee

In light of the very strong and unequivocal recommendation of the reviewing body (IUCN) to inscribe Joggins, the acting Chair of the World Heritage Committee, representing Israel, invited the members of the committee to inscribe the site by acclamation, a rare event in the history of the World Heritage Convention. The decision subsequently adopted by the World Heritage Committee at its 32nd Session (Fig. 6) was to inscribe the Joggins Fossil Cliffs as a natural World Heritage Site, on the basis of Criterion (viii). Present for the decision which was adopted by acclamation, were Rhonda Kelly (Executive Director, CREDA), Jenna Boon (Director, Joggins Fossil Institute) and the author, in addition to the Parks Canada Agency delegation representing Canada on the World Heritage Committee.

Joggins as World Heritage Site: the Road Ahead

With inscription, the Joggins Fossil Cliffs became Canada's fifteenth World Heritage Site (Table 1), and formally recognized as the world's most outstanding example of the Carboniferous 'Coal Age'. Central to the enduring stewardship of the property is the presence on site of the \$9 million Joggins Fossil Centre (Fig. 7), built with input from three levels of government, which hosts the offices of the Joggins Fossil Institute. The centre, designed by WHW Architects, Halifax, and built to the highest environmental standards, opened on Earth Day, April 22, 2008. The centre has since been a recipient of the Lieutenant Governor's Award for Architecture. Conveyance of the significance of Joggins as a World Heritage Site was entrusted to Design+Communications, Montreal, who worked faithfully with the author as scientific advisor in producing a world standard in geological and historical interpretation.

It may be that 2008 will be seen as the pivotal year for Joggins as its history unfolds in its new role as a World Heritage Site. The road ahead holds



Figure. 6. Deliberations of the World Heritage Committee at Québec City, July 2008.

Table 1. World Heritage Sites in Canada.

<i>Natural</i>	<i>Cultural</i>
Canadian Rocky Mountain Parks (British Columbia and Alberta)	L'Anse aux Meadows National Historic Site (Newfoundland and Labrador)
Dinosaur Provincial Park (Alberta)	Head-Smashed-In Buffalo Jump (Alberta)
Joggins Fossil Cliffs (Nova Scotia)	Historic District of Québec (Québec)
Gros Morne National Park (Newfoundland and Labrador)	Old Town Lunenburg (Nova Scotia)
Kluane (incl. Wrangell-St. Elias/Glacier Bay/Tatshenshini-Atsek) (Yukon and British Columbia)	Rideau Canal (Ontario and Québec)
Nahanni National Park Reserve (Northwest Territories)	SGaang Gwaii (Anthony Island) British Columbia)
Parc de Miguasha (Québec)	
Waterton-Glacier International Peace Park (Alberta)	
Wood Buffalo National Park (Alberta and Northwest Territories)	



Figure 7. The award-winning Joggins Fossil Centre, newly opened in April 2008.

both promise and challenge. The sense of community stewardship and of pride in the inscription, commitment from all levels of government, and the comprehensive, insightful planning that accompanied its nomination all bode well for the future success of Joggins as a World Heritage Site. Perhaps the most enduring legacy of World Heritage inscription of Joggins will be the return of hope to a former coal mining town and its people.

References

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- Lyell, C. 1871. The Student's Elements of Geology; John Murray, London, 624 p.
- UNESCO, 2008: Item 8 of the Provisional Agenda: Establishment of the World Heritage List and of the List of World Heritage in Danger. 8.B Nominations to the World Heritage List. United Nations Educational, Scientific and Cultural Organization. Convention Concerning the Protection of the World Cultural and Natural Heritage, World Heritage Committee, Thirty Second Session, Quebec City, Canada, 2-10 July, 2008. WHC-08/32.COM/8B, Paris, 22 May 2008, 40 p.