

Introduction to Wisconsin's Niagara Escarpment

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The Niagara Escarpment is the steep, nearly vertical, face of the most prominent of a series of asymmetrical ridges, or cuestas, that form the Ridges and Lowlands Geographic Province of eastern Wisconsin (fig. 1). In places, it is a striking physiographic feature that appears picturesque from the land or water below (fig. 2 and 3) and which provides impressive vistas of the bay of Green Bay, the Fox River Valley, and Lake Winnebago. At other locations, it is rounded and subdued having been reduced by weathering and erosion. The escarpment has been long valued for its natural beauty, and the citizens of Wisconsin are fortunate that measures have been taken to protect segments from development. A number of state, county, and town parks are located on or adjacent to the escarpment, from Rock Island State Park in the

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north to at least Ledge County Park in Dodge County in the south. These public spaces are priceless: they preserve and provide public access to areas that could only be admired from distant points if they were in private ownership. In addition to



Figure 2. Eagle Bluff from the water.

Figure 1. Generalized map of Wisconsin's escarpments.

Adapted from Schultz, 2004.



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Figure 3. View of islands from the escarpment at Peninsula State Park. Door County.

its scenic amenities, the escarpment or “the Ledge,” as it is often called, is also biologically, economically, and hydrologically significant. The term escarpment, or *cuesta*, refers to a ridge that is steep on one side and gradually sloping on the other side. The Niagara

Escarpment is arguably one of the premier landforms of our state (fig. 4).

A number of local and regional conference proceedings and reports focused on the escarpment have been published (for example, Hershbell, 1989; Palmquist, 1989; Schutte and Walter, 1997; Kasprzak and Walter, 2001; and Anderson and others, 2002). More recently, Mikulic and others (2010) reviewed the geology of the escarpment on the Door Peninsula. In January 2010, the Niagara Escarpment Resource Network sponsored a conference (The Niagara Escarpment: What Is It? And Why Should I Care?) on the University of Wisconsin-Green Bay campus. That event brought together a wide range of contributors and was well attended. This collection of papers was inspired by that conference and by the designation by the

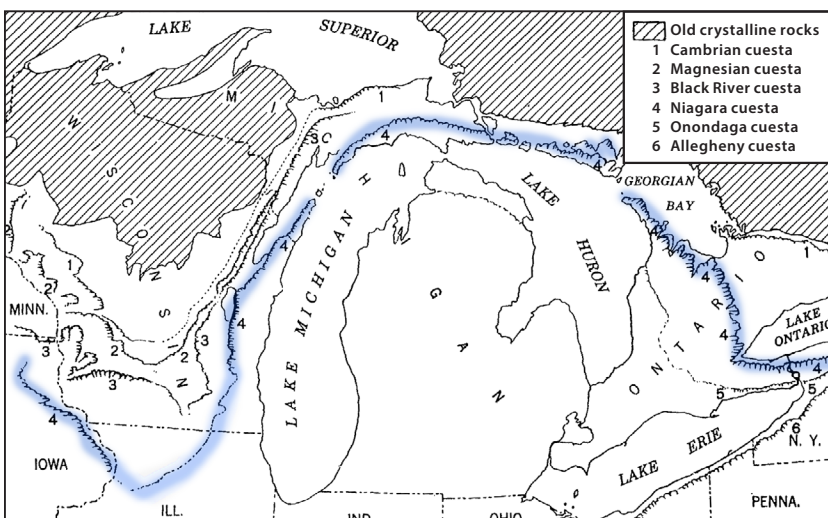


Figure 4. The Niagara *cuesta* (highlighted in blue) and other less prominent *cuestas* in the sedimentary rocks of the Great Lakes region.

From Trewartha and others, *Elements of Geography*, copyright McGraw-Hill Education.

Wisconsin legislature of 2010 as The Year of the Escarpment.

The origin of the escarpment is complex, and the appearance of the landform varies along its extent. The escarpment is frequently interrupted by valleys or re-entrants, with some segments dominated by high, nearly vertical cliffs and others formed by rounded low ridges (fig. 5). Those different and distinct aspects are the result of both long-standing geological relationships and past and present geomorphic processes.

The papers in this volume cover the following topics:

- **Part 1 – Geology.** Luczaj (2013) summarizes the geologic history of the area and the stratigraphic and structural relationships that are basic to an understanding of the formation and modification of the escarpment. He also provides important new information on faults that cut the escarpment and touches on the issues of terminology that remain.
- **Part 2 – Processes that have shaped the escarpment.** Stieglitz (2016) reviews the many factors that have combined to shape the escarpment as it appears today. Some of the features result from processes presently modifying the landform, whereas others are relicts formed by processes and geological agents of the past. People have also affected the escarpment's attributes and appearance as we build on or near the feature. Because the stone is easily accessible, quarries have long operated on the escarpment and in several locations they have significantly changed its appearance. Examples abound, but two of the largest are the now-inactive quarries at High Cliff State Park in Calumet County and Olde Stone Quarry County Park near Sturgeon Bay.
- **Part 3 – Biota.** The escarpment is habitat for several rare flora and fauna species, such as ancient cedar trees and Pleistocene relict snails. The escarpment system is ecologically important at multiple

scales but particularly at the small-to-micro scale that shelters those and perhaps other rare taxa (Howe, Wolf, and Fewless, 2016).

- **Part 4 – Bats.** The escarpment also has value as the site of hibernacula for bats, of particular importance in the face of the threat of white-nose syndrome (Novy, 2016). That disease has devastated bat populations in the eastern United States and Canada and is a major concern

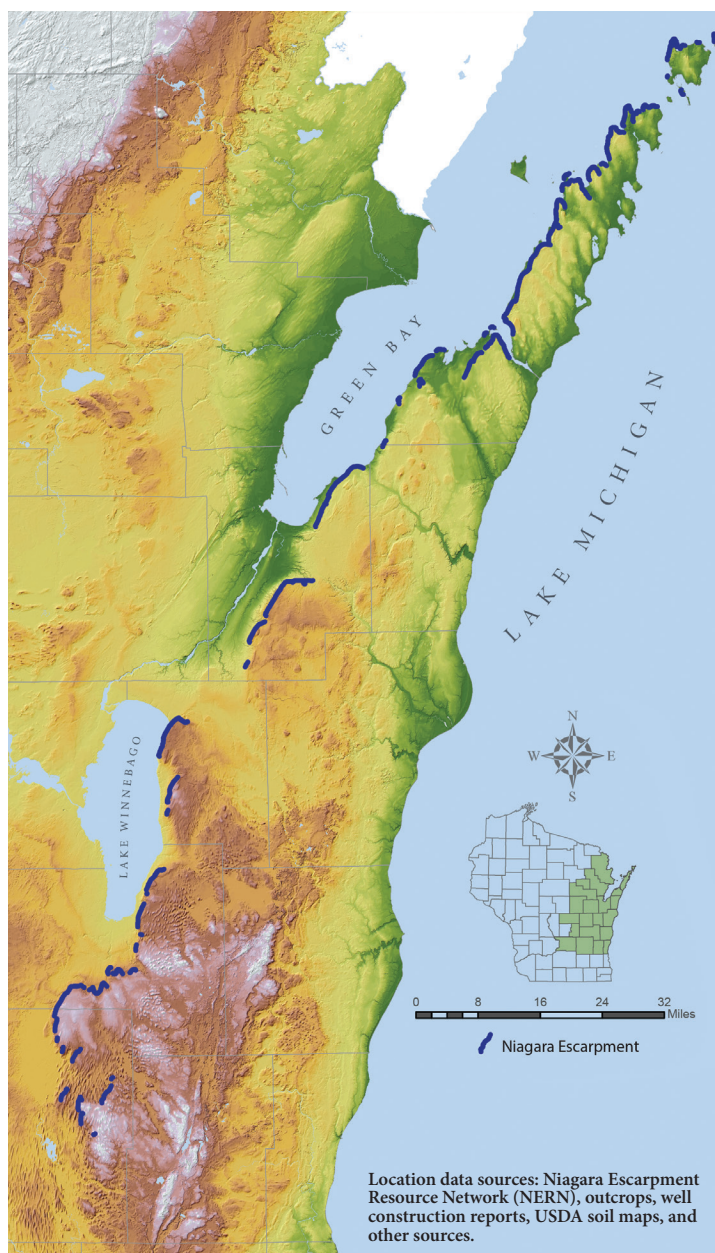


Figure 5. Digital elevation model with hillshade showing the location of the Niagara Escarpment in Wisconsin.

because of the importance of bats for insect control; the disease was confirmed in Wisconsin in 2014.

- **Part 5 – Caves and karst.** Zachariasen (2016) presents a caver's view of the types of caves in eastern Wisconsin and the efforts undertaken to ensure access for exploration and research while providing protection of fragile physical features and biological ecosystems.
- **Part 6 – Conservation geology ethic.** The international context of the Wisconsin escarpment and the concept of the Great Arc are discussed by Fowle (2016). The escarpment continues into Canada, and programs and policies in place in Ontario can serve to inform both promotional and preservation efforts in Wisconsin.

Collectively, the papers in this volume provide an overview of a major landscape feature of our state. The collection clearly establishes the concept that the Niagara Escarpment's ecosystem encompasses the cliff face as well as the areas behind and below. Individually, the papers address, explain, clarify, and highlight many aspects of the landform, its value, and the challenges that remain in its conservation and management. In sum, the Niagara Escarpment is a precious, fragile, and irreplaceable treasure that deserves to be preserved so that future generations may also enjoy its unique beauty and charm.

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