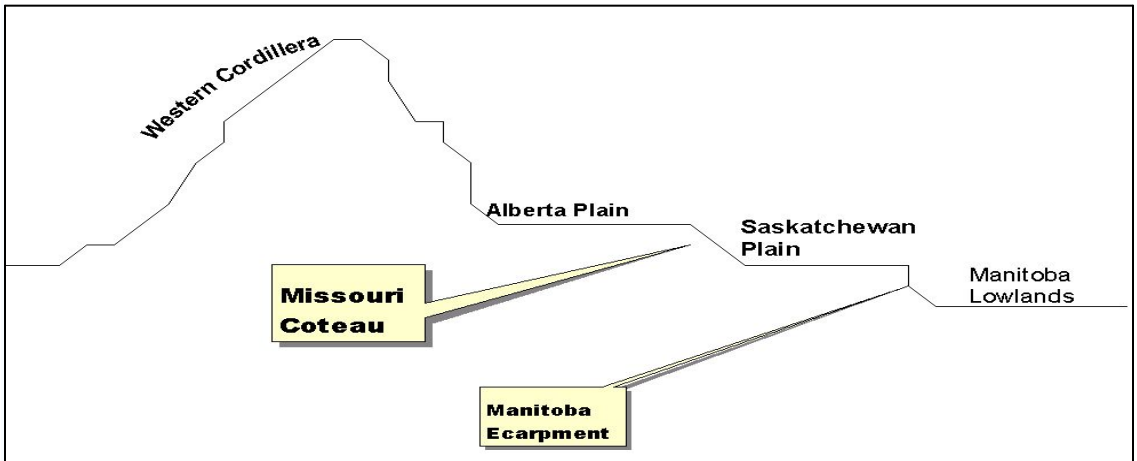
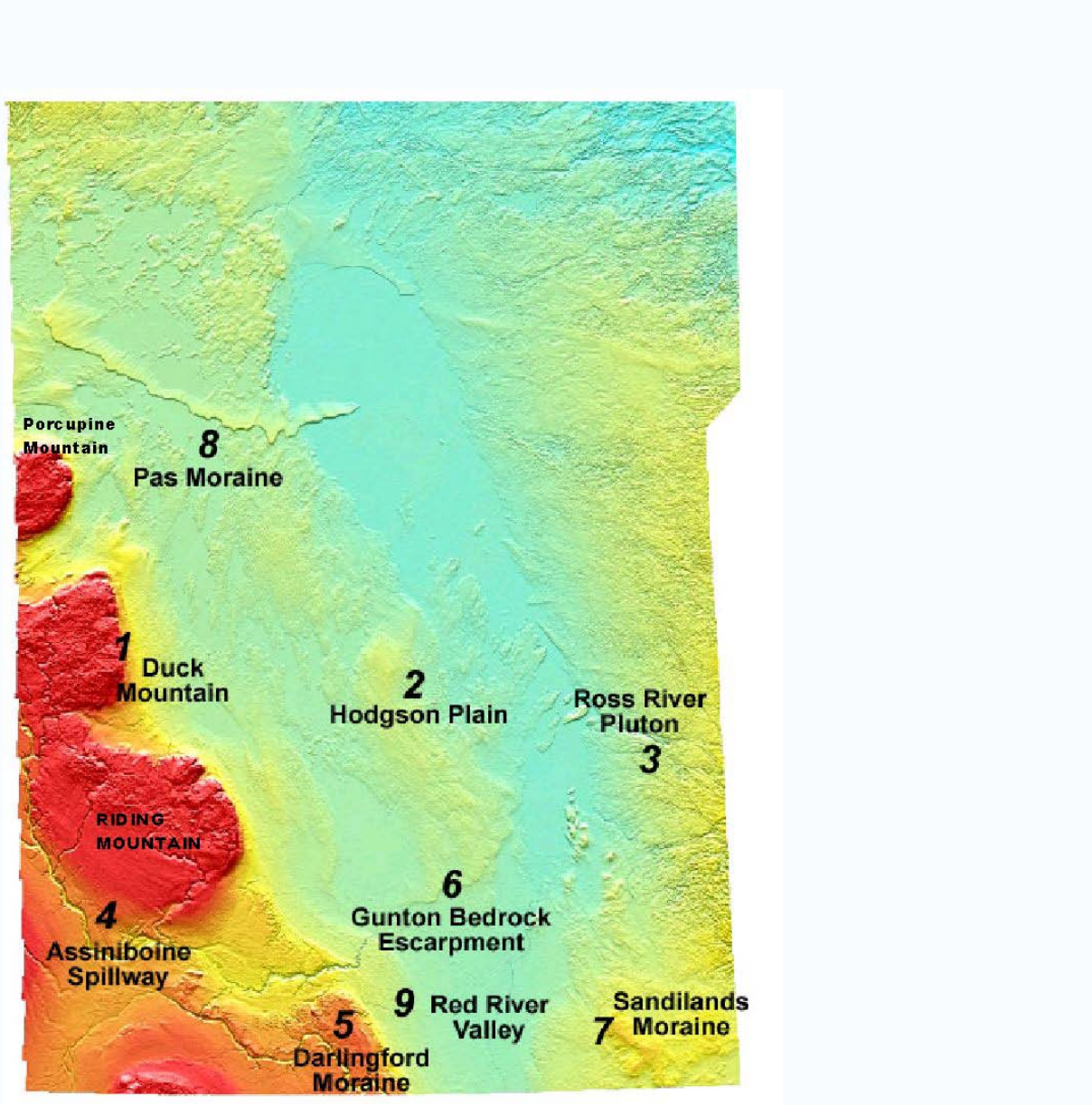
I. The Creation of the Manitoba Escarpment



PROFILE OF WESTERN CANADA (70 MILLION. YEARS AGO)

The Interior Plains area of Canada was covered with an inland sea for most of its early formative period. Water carrying millions of tons of sediment poured out of the Western Cordillera and deposited the material on the floor of an ancient sea that existed on the eastern side of the mountains. The heaviest and largest quantities of these eroded materials were deposited close to the foot of the mountains in very deep, thick layers, forming the Alberta Plain. Less material and finer in texture was carried further away, forming the Saskatchewan Plain. As the mountains of the Western Cordillera continued to erode, only the very finest (and smallest quantity) of eroded sediment reached Manitoba to settle on the Lowland that had finally risen from the sea. The great rivers that carried those materials (the North and South Saskatchewan, and Churchill rivers) are still carrying sediments from the mountains a tea spoon full at a time.
So, we can see that the current lowland area of Manitoba has been the result of erosion, deposition and *lithification* of sedimentary rock.
The physical character of the escarpments in western Canada was established even before the glacial age. However, these escarpments did not escape the force and fury of the ice sheets that were to affect them. The **last** of four great ice sheets to cover Manitoba, the Wisconsin ice sheet, left its mark on this province, by creating thousands of lakes and establishing the current drainage systems. Using the scouring action that is characteristic of large glaciers, the Wisconsin ice sheet dug deep gouges into the escarpment and pushed the materials into irregular piles and ridges which we can still see today.

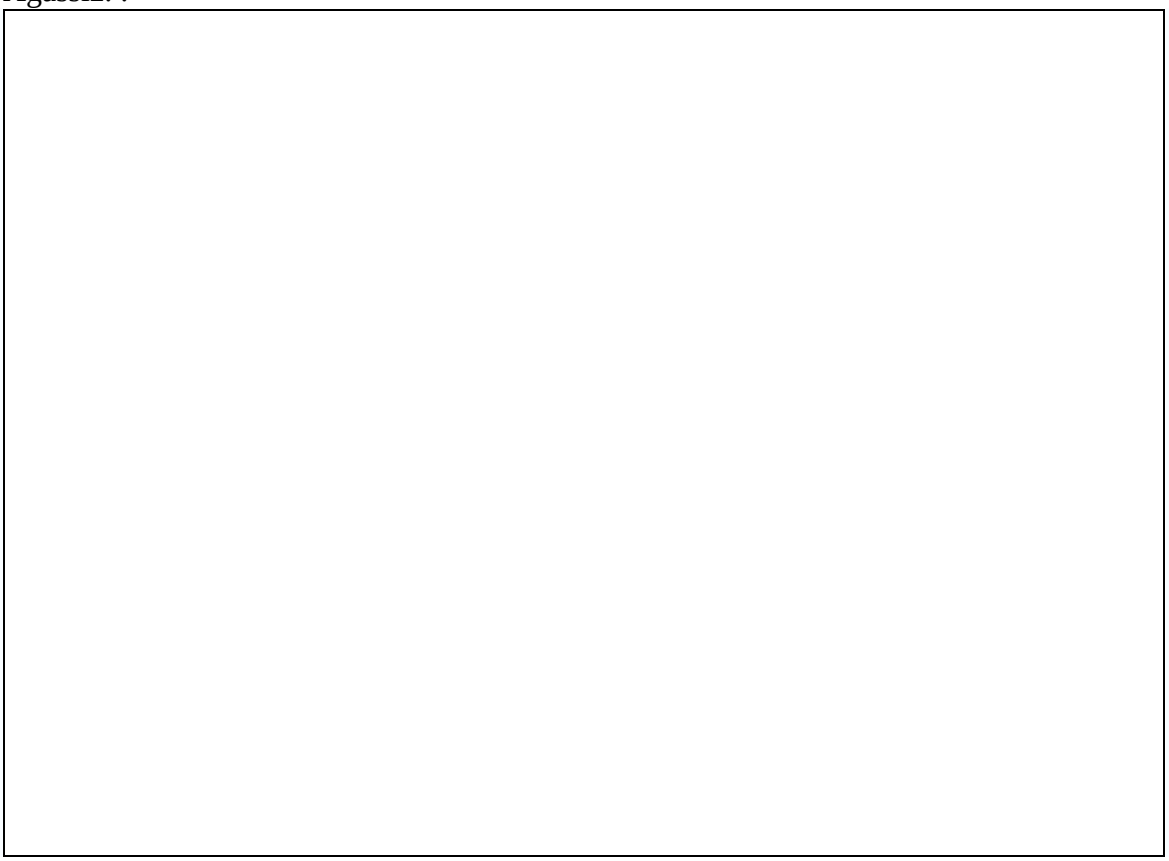


The Manitoba Escarpment is the single most prominent landform in the province. The highest part of this feature is Baldy Mountain in the Duck Mountain section, standing at over 900 meters. The initial feature owes its existence to the way that Canada was formed, hundreds of million years ago.

I. Glacial Lake Agassiz

In the vast area of land in central to southern Manitoba, at an elevation less than 325 meters above sea level, lies the Manitoba Lowlands, the floor of an ancient inland sea. Less than 13,000 years ago this land was being gouged, scraped and sheared beneath 3,500 meters of ice. This part of the "ice age", known as the Wisconsin Ice Period, ended when the ice gradually melted about 11,000 years ago. What was left in the advent of this huge glacier was a land scraped

clean of its soil, vegetation and wildlife but covered by a great post-glacial lake called Lake Agassiz. .



At its greatest extent, Lake Agassiz created an expanse of water larger than any lake currently existing in the world. Larger than the Caspian sea, this lake was of fresh water, filled with a variety of life. For the greatest part of its early life Lake Agassiz drained to the south and east, scouring large valleys and canyons into the land. (Glacial River Warren and the Minnesota River, a tributary to the Mississippi River)

As Lake Agassiz drained, and with the continuing melting of the Wisconsin Ice Sheet, the melt water gradually shifted its drainage, this time to the North. The land once covered with Lake Agassiz has been left with only its remnants, Lake Winnipeg, Lake Manitoba, and Lake Winnipegosis. The rivers that currently flow in this part of Manitoba now drain water into Lake Winnipeg and then north into Hudson Bay via the Nelson River. There are also hundreds of smaller lakes that pock the surface of the land. These “kettle lakes” were created by the large pieces of ice that became covered with sediment, and being sheltered from the sun, melted slowly. As the ice melted, the land sank and the holes filled with water. These lakes vary in size from large ponds and sloughs, to lakes 10-15 kilometers in diameter. The Manitoba lowlands (that area between the Ontario border and the top of the Manitoba escarpment), is covered with many of these lakes.

History and File links: http://en.wikipedia.org/wiki

http://en.wikipedia.org/wiki/Lake_Agassiz#Conception

Another very important legacy of Lake Agassiz is the extremely rich soils found over the large extent of the lowlands. During the thousands of years that the land was covered by Lake Agassiz, the many rivers that drained into the lake deposited thick layers of soil, and silt collectively known as *lacustrine* deposits. The Assiniboine and Red River valleys are good examples of agricultural land that benefit from these soils.

The Manitoba Escarpment was sculpted by the shifting movements of ice that covered Manitoba during this period. Many post glacial features can be found in the many hills and valleys of the province. Drumlins, eskers, kettle lakes, alluvial fans, and old beach ridges left by Lake Agassiz can still be found on the escarpment. Deep valleys and shear cliffs which resulted from the action of ice can also be found on the edges of this disturbed landscape.

1. TERMS TO KNOW: Define the following terms in complete sentences using the

5 W's. (who, what, when, where and why) and **how** was it done.(See the links below)

http://www.dabrowski.ca/projects/pukaskwa/glacial_features.htm

and http://www.physicalgeography.net/fundamentals/10af.html

Glacier	Erosion	Glacial Till
Moraine	Drumlin	Esker
Knob and Kettle	alluvium	Continental Glacier
Sediment	Lacustrine deposits	Cordillera
Lithification	Glacial spillway	erratics
Till	Strand Lines	Scouring

2. What actions are used by ice to change the landscape? (describe some of the erosion methods that ice can use to change the land