
CONTINENTAL DIVIDES IN NORTH DAKOTA AND NORTH AMERICA

by
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To the uninitiated eye, the countryside between Valley City and Jamestown is seemingly among the most unremarkable stretches of Interstate 94 (I-94), not just in North Dakota, but along its entire route from Chicago to Seattle. Granted, the terrain here is pretty flat with gentle undulations amounting to less relief than one finds on the waves of the open ocean. And yes, some travelers battle with insomnia in this stretch where the view cannot seem plainer (nor more planar), although the Red River Valley is arguably plainer and indisputably more planar. And just when the landscape cannot seem any more unremarkable, a highway sign proclaims in oxymoronic fashion (Fig. 1):

Continental Divide
Elevation 1490 feet.



Fig. 1. View of the continental divide from I-94 in eastern North Dakota (photograph by Mark A. Gonzalez).

To many travelers of I-94, the sign appears to be a mistake, or perhaps a self-deprecating joke dreamt up by the North Dakota Tourism Office to make light of one of the flattest landscapes in the world. In reality, the sign is no mistake and no joke. I suspect that the perception of error is due, in part, to the misconceptions contained in countless textbooks and maps from reputable map makers, who propagate a myth that there is only one continental divide in the United States and North America. Too many geography textbooks and maps show only one continental divide—the one along the crest of the Rocky Mountains. Indeed, most sources even refer to it as *The Continental Divide*, treating it as a singular and unique feature, furthermore as a formal place name complete with capital letters.

This leads to some basic questions: What are continental divides, and where are they located on the North American

continent? My objectives here are to discuss various concepts incorporated into different definitions of continental divide; to discuss the continental divide that runs in part through North Dakota; and to describe the other continental divides of the North American continent. I will also discuss some of the more interesting features of continental divides, such as triple points, closed basins, and the dynamic nature of continental divides.

Drainage Divides and Drainage Basins

What is a continental divide? To address this question, we must back up and first define the terms “drainage basin” and “drainage divide.” A drainage basin is the area drained by a river or lake. All the surface runoff within a drainage basin will drain eventually into a specific river or lake (Fig. 2).

A drainage divide is the boundary of a drainage basin; it is the boundary that physically separates the drainage of one drainage basin from that of another (Fig. 2). Precipitation on one side of a divide will drain into one basin, whereas precipitation on the other side will drain into another basin. [Note: This simplified view of a drainage divide works well for nearly all surface waters, but does not address those situations where groundwater can flow in the subsurface from an area beneath one drainage basin into another drainage basin, a complex situation that in itself would constitute another article.]

Continental Divide

The term “continental divide” refers to a particular type of drainage divide. Unfortunately, various references provide different definitions for continental divide. Consequently, there



Fig. 2. Schematic diagram showing a drainage divide, the boundary of a drainage basin.

is no clear consensus, and some notable disagreements, on what constitutes a continental divide. In examining a variety of definitions, some concepts are repeatedly used (or misused). Some of the major concepts include: direction of stream flow, flow to different oceans and/or different seas, flow to different sides of a continent, and presence of high or mountainous ground. Let's examine the value or utility of each of these criteria.

Many definitions contain the idea that a continental divide separates waters that flow in opposite directions. This stipulation seems obvious, but is actually quite unnecessary and potentially ambiguous. For example, situations can be found where streams flow generally parallel to each other, yet are on opposite sides of a continental divide; and in converse, numerous cases can be identified where streams, which do flow in opposite directions, are not separated by a continental divide. Therefore, the phrase "opposite directions" is ambiguous and serves no constructive purpose in defining a continental divide. A more meaningful stipulation is that a continental divide separates major streams that ultimately flow in divergent paths and will never flow into each other before entering an ocean or sea.

Many definitions either explicitly state, or implicitly imply, that continental divides separate waters that flow to different oceans. By this rather restrictive definition, it is obvious that the North American continent must have more than one continental divide, because three oceans surround the continent. Therefore, there must be a continental divide between the drainages of the Pacific and Atlantic oceans, between the drainages of the Pacific and Arctic oceans, and between the drainages of the Arctic and Atlantic oceans. This point alone is sufficient to forever abolish the formalized place name, *The Continental Divide*, from all geography textbooks and references. Clearly, no single, unique divide qualifies for this singular place name on the North American continent.

Other definitions substitute the restrictive idea of different oceans with a less restrictive idea of different seas and/or coastlines on different sides of a continent, which in the case of North America seems appropriate. For example, both the Gulf of St. Lawrence and the Gulf of Mexico are seas that are connected to the same ocean, the Atlantic Ocean. But in examining the major drainages of the North American continent, it is evident that precipitation falling in or near the Great Lakes will flow either north and east through the St. Lawrence Seaway, or west and south through the Mississippi River basin. More on this divide below.

Several dictionaries contain within their definition of continental divide the requirement that the continental divides follow "an extensive stretch of high ground" or "an extensive ridge of mountains" (e.g., *The American Heritage Dictionary of the English Language*, 2000; *Wordsmyth Educational Dictionary*, 2002). This requirement is unnecessary, misleading, and completely inappropriate. Many places along

the best-known continental divide of North America, which roughly coincides along much of its trace with the crest of the Rocky Mountains, are not mountainous. Some stretches of the divide are gently sloping or planar. In fact, many of the early western trappers, traders, and explorers crossed this continental divide at South Pass in southwestern Wyoming without noticing that they had indeed crossed from the Gulf of Mexico to the Pacific Ocean drainage systems. The climb over South Pass is so gradual that it was the point on the Oregon Trail where emigrants with heavily laden Conestoga wagons crossed the continental divide. Reaches of this continental divide in New Mexico and western Alaska are relatively flat too. Any stipulation for high ground or mountainous terrain is best stricken from all definitions of continental divide.

Some definitions require that waters flow great distances from the continental divide. Yet in at least three places along the so-called Great Divide of the western parts of North and South America, the continental divide is separating waters that drain a few miles or less into coastlines that are a few tens of miles, or less, apart! At the very northern terminus of the Great Divide at the Cape Prince of Wales at the tip of Seward Peninsula, the demarcation between the Chukchi Sea of the Arctic Ocean and the Bering Sea of the Pacific Ocean is an arbitrary line on a beach. Similarly, at the southern terminus of the Great Divide in Tierra del Fuego, the demarcation between the Atlantic and Pacific oceans is an arbitrary line on a beach. And at the Isthmus of Panama, the coastlines of the Atlantic and Pacific oceans are within a few tens of miles apart.

Whereas general dictionaries of the English language commonly fail to provide an acceptable definition of continental divide, those specialized dictionaries with strong emphasis on the natural sciences commonly provide simpler and more appropriate definitions of continental divide. For example, Bates and Jackson (1980) define continental divide as "a drainage divide that separates streams flowing toward opposite sides of a continent, often into different oceans..." Similarly, the North American Lake Management Society (2002) defines continental divide as "a drainage divide separating the rivers which flow toward opposite sides of a continent." Neither definition specifies how many sides there are to a continent. These definitions have no requirement for the existence of high ground, extensive ridges, or mountainous terrain. Nor does either necessarily require that the streams drain into different oceans!

In view of the various definitions used, my prerogative is to identify continental divides using two simple, general criteria. One, a continental divide separates major streams that ultimately flow in divergent paths and will not join each other before they enter an ocean or sea. Two, a continental divide separates surface waters that ultimately flow to different oceans, different seas, or different coastlines on different sides of a continent. From these criteria, the North American

continent has at least four distinct continental divides that separate drainages of the Pacific Ocean, Arctic Ocean, Hudson Bay, Gulf of St. Lawrence, Gulf of Mexico, and Atlantic Seaboard (Fig. 3). Three of these divides have pre-existing formal names: the Great Divide, the Northern Divide, and the Eastern Divide. The fourth divide is herein referred to as the St. Lawrence Seaway Divide. These divides are described below.

The Great Divide

In the conterminous United States, the crest of the Rocky Mountains divides waters into generally eastward-flowing streams, bound for the Gulf of Mexico, and generally westward-flowing streams, bound for the Pacific Ocean or Sea of Cortez (a.k.a. Gulf of California; Fig. 3). In Canada, the crest of the Rocky Mountains divides waters that flow into the Hudson Bay, Beaufort Sea, or the Arctic Ocean, from waters that flow to the Pacific Ocean (Fig. 3).

Many refer to this as *The Continental Divide*. But this term is totally unacceptable because it implies that there is a single continental divide that is unique to North America.

Others, me included, prefer the name, Great Divide, which is more fitting and suitable. The Great Divide is distinguished by high elevations along much (though not all) of its course. Also, it is a divide of great length, running from Tierra del Fuego near the southern tip of South America, through the Isthmus of Panama to the coastal plains of Seward Peninsula in northwestern Alaska. It is a continental divide of not only North America, but also of Central and South America.

Scenery is not in short supply along the Great Divide, which is adorned with splendors, such as the Hanging Garden, China Wall, the Dinwoody Glacier and its satellite glaciers high in the Wind River Range, the mountain majesties of the Collegiate Range, and the volcanic fabrications of El Malpais in New Mexico. One of my favorite spots along the Great Divide is the Highline Trail near Logan Pass in Glacier National Park. Highline Trail traverses a long ridge, known as Garden Wall, a photogenic alpine meadow with statuesque glacial-carved cliffs of jagged sedimentary rocks resting in the shadows of the Great Divide. Many nature calendars include a photograph of the Garden Wall when the Bear Grass and

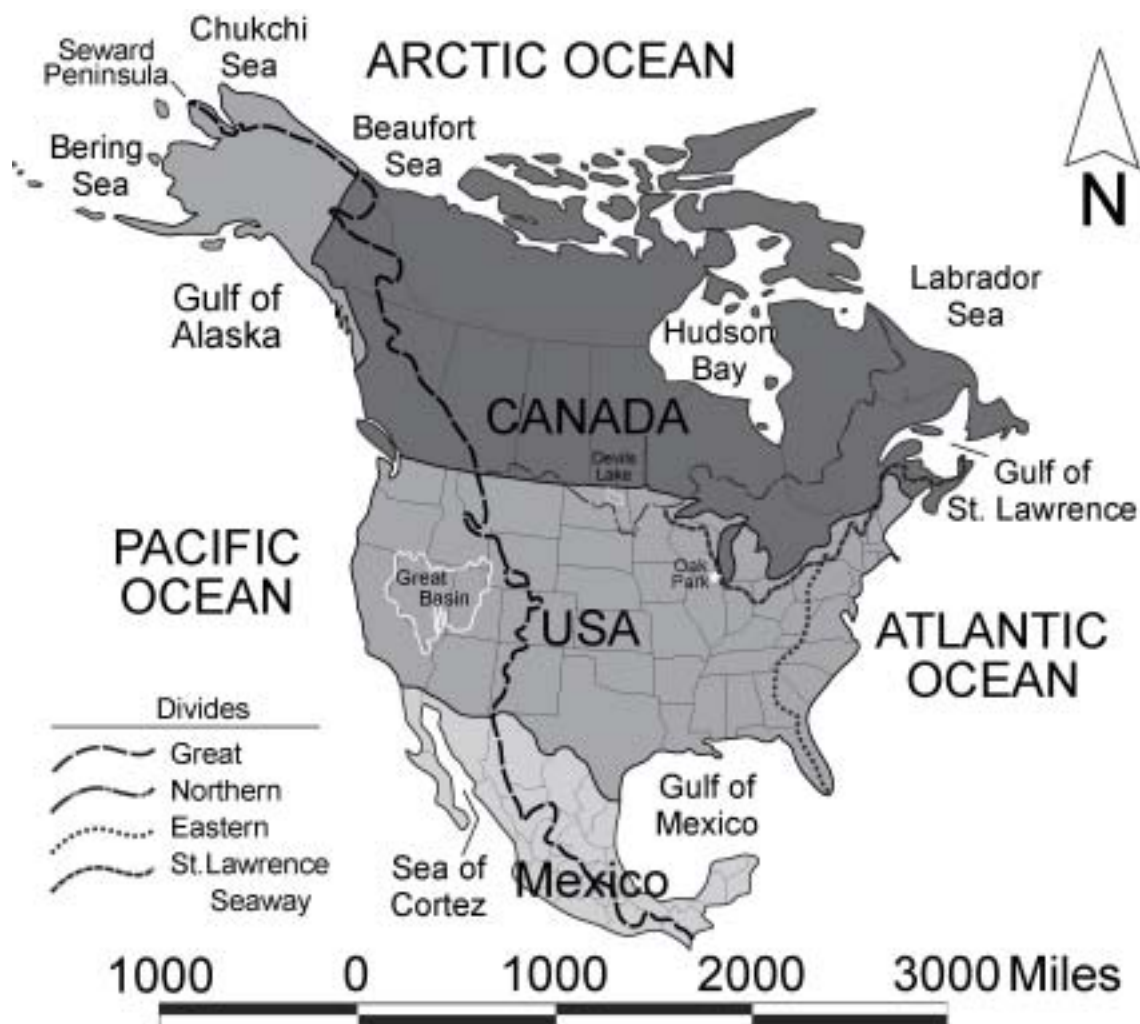


Fig. 3. Continental divides of North America include the so-called Great Divide, the Northern Divide, the Eastern Divide, and the St. Lawrence Seaway Divide.

alpine varieties of lupines are in full bloom. It is certainly among the most beautiful patches anywhere on Earth. Near Dinwoody Glacier is Grasshopper Glacier, named because a horde of grasshoppers was trapped and fossilized in the glacial ice!

Place names along the Great Divide speak to the typical climate at great elevations: Never Summer Mountains, Snowdrift Lake, Snowbank Lake, Ice Lake, Glacier Peak. Other features bear the names of alpine denizens, such as Ptarmigan Lake (lots of these along the divide), Ouzel Lake, Junco Lake, Pipit Lake, Bighorn Lake, and Grizzly Peak. Others conjure images of powerful alpine storms, battering the towering crags of the divide, such as Thunder Peak, Nimbus Peak, Ice Mountain, Blizzard Hill, Thunderbolt Mountain, Storm Mountain.

The Northern, or Laurentian, Divide

An examination of the major drainage basins, or watersheds, of the North American continent shows that the headwaters of several major drainage basins bear no relation to the Great Divide. For example, the headwaters of the Mississippi River system, the Ohio River system, the Nelson/Red-River-of-the-North system, and Great Lakes system (or St. Lawrence Seaway) originate deep in the interior of the North American continent and far from the Rocky Mountains and the Great Divide. Nevertheless, these basins drain into different oceans or seas on different sides of the continent.

The drainage divide, which separates drainages to the Hudson Bay and Arctic Ocean from all other drainages in North America, is known as the Northern Divide. In northern Minnesota, the Northern Divide is commonly known as the Laurentian Divide. The Northern Divide shares the same path as the Great Divide from Seward Peninsula to Triple Divide Peak, Montana. From Triple Divide Peak, the Northern Divide trends to the east through Montana, Alberta, Saskatchewan, North Dakota, South Dakota, and Minnesota. The Laurentian Divide in Minnesota follows an especially prominent ridge that runs for 120 miles from just east of Grand Rapids to Hoyt Lake. The Chippewa or Ojibwe Indians referred to this stretch of the Laurentian Divide as the sleeping giant, or Mesabi. The Mesabi Range is well known for the high-grade iron ore that was mined for decades. From northern Minnesota, the Northern Divide continues north and east across parts of Ontario and Quebec. It eventually demarcates the boundary between Quebec and Newfoundland and Labrador. It terminates at the coastline marking the boundary between the Labrador Sea and Hudson Bay.

North Dakotans will readily recognize the approximate trace of the Northern Divide across the state by examining the state's major drainages. Streams in the west, southwest, and south-central parts of North Dakota, such as the James, Cannonball, Cedar, Heart, Knife, and Little Missouri rivers, flow to the Missouri

River, which in turn joins the Mississippi River and eventually flows to the Gulf of Mexico. In contrast, streams of the northwest, north, and eastern parts of the state, such as the Souris River, the Red River of the North, and all their tributaries, including the Sheyenne, Goose, Maple, Pembina, Tongue, and Turtle rivers, flow to Hudson Bay (Fig. 4). In the southern part of the state, the continental divide runs between the James and the Sheyenne valleys from the border with South Dakota northward toward Harvey. South of Harvey, the divide angles westward and roughly follows a crest in the Missouri Coteau that is slightly west and south of the Missouri Escarpment.

The Northern Divide is not just of geographic and hydrologic importance, but it has political significance too. When the Louisiana Purchase was added to the United States in 1803, the Northern Divide served as the boundary between the territory of the United States and Great Britain (Canada). The present-day boundary between the United States and Canada was not established until 1818, when the Treaty of Ghent set the international boundary at 49° N latitude.

The Northern Divide still has important political ramifications, because water in North Dakota drains into Canada. For example, Manitoba is citing international water laws, treaties, and compacts in its concerns over the Northwest Water Pipeline, which diverts water from the Missouri River to Minot, the proposed Garrison Diversion, which would divert Missouri River water to all of eastern North Dakota, and the planned Devils Lake outlet, which would transfer water from a closed basin to the Sheyenne/Red River system.

The Eastern Divide

Many people have argued that the crest of the Appalachian Mountains is also a continental divide, commonly referred to as the Eastern Divide. The Eastern Divide does separate eastward flowing streams, which cross the Piedmont and Coastal Plain and empty into the Atlantic Ocean, from



Fig. 4. Map of the interior of North America illustrating the continental divides and major drainage basins of the area.

westward flowing streams, which join the Mississippi River and eventually empty into the Gulf of Mexico (Fig. 3). Clearly the crest of the Appalachian Mountains divides streams that flow toward different and distant coastlines of the continent. Some critics do not recognize the Eastern Divide as a continental divide, arguing that the Gulf of Mexico is part of the Atlantic Ocean. These individuals recognize only waters flowing into different oceans as being separated by continental divides. The definition adopted here for discussion purposes states only that waters flow to different coastlines on different sides of a continent, which may be in the same, or different, oceans.

The St. Lawrence Seaway Divide

Again, some people will raise the same objection used against an Eastern Divide to argue against a divide between the Atlantic Ocean and the Gulf of St. Lawrence as well as the divide between the Gulf of Mexico and the Gulf of St. Lawrence. However, other definitions, which merely require that continental divides separate divergent waters destined for different sides of a continent, apply here.

For example, let's take the case of Oak Park, a suburb on the west side of Chicago, Illinois. *[Note: The following material is drawn exclusively from the work of William Dring (2002). I encourage interested readers to read his outstanding article on the Oak Park Continental Divide for more information.]* The St. Lawrence Seaway Divide runs, in part, through Oak Park along a slightly elevated ridge—an old beach ridge of Lake Michigan. The crest of this ridge is 17 feet higher than the mean elevation of Lake Michigan. On the east side of the ridge, water drains toward Lake Michigan through the St. Lawrence Seaway to the Gulf of St. Lawrence (Fig. 3). Water on the west side will travel to the Des Plaines River then to the Illinois River before passing to the Mississippi River and Gulf of Mexico (Fig. 3). Oak Park provides a clear example of where precipitation that falls inches apart on the ground will take radically divergent paths through different river systems, none of which will ever merge before they empty into the sea. When they do empty into the sea, these waters are on distant coastlines on different sides of a continent.

The continental divide through Oak Park and the greater Chicago area was significant in early exploration of the continent's interior. French voyageurs, who traveled primarily by canoe along the waterways of the interior, were interested in finding passage between the St. Lawrence River and Great Lakes and the Mississippi River drainage. Such a passage would permit water navigation from Montreal to New Orleans. In 1673, French explorers, Louis Joliet and Father Jacques Marquette, were the first Europeans to use the Chicago Portage, thanks to some navigational tips from native Indians (Dring, 2002). Joliet noted in his reports that a canal of half a league (one and one-half miles) across the Chicago Portage would allow easy navigation from Lake Erie to the Gulf of Mexico (Dring, 2002).

This divide and the Chicago Portage have witnessed another remarkable chapter in history too. The low-lying areas on the east side of the divide became the outlets for the sanitary drains of the Chicago metropolitan area. With pumps, the dirty water could be diverted into the Illinois and Michigan Canal, which had been excavated in 1848. This approach to waste disposal was the classic (paraphrased in a Chicago accent), "Dilution is da solution to da pollution." However, Chicago's population grew from about 100 in 1830 to 50,000 by 1850 and 1.6 million by 1900 (Dring, 2002). The volume of waste greatly exceeded the capacity of the Illinois and Michigan Canal, and Chicago was besieged with cholera outbreaks, the worst occurring in 1854 and 1885. During the latter, 80,000 people died of cholera (Dring, 2002). A new canal, the Sanitary Canal, was authorized in 1889, and by 1900 the Sanitary Canal diverted water from Lake Michigan across the continental divide and to the Des Plaines River. Of course, the Sanitary Canal also sent the effluent of Chicago across the continental divide and down the Des Plaines River too—out of sight, out of mind. In effect, the Sanitary Canal reversed the flow direction of the Chicago River. It used engineering to change the location of the "natural" continental divide and replace it with a man-made divide.

Assorted Facts and Features of Continental Divides

Triple Points

A triple point, or triple divide, is the place where two continental divides intersect and water drains into three different watersheds. Five widely-recognized triple divides exist in the United States, including: Triple Divide Peak, Montana, The Hill of Three Waters, Minnesota, Three Waters Mountain, Wyoming, an unnamed hilltop near Gold, Pennsylvania, and the unofficially named Headwaters Hill, Colorado.

Triple Divide Peak in Glacier National Park, Montana, marks the intersection of the Great Divide and Northern Divide. Water is diverted from Triple Divide Peak into the Pacific-bound Columbia basin, the Gulf of Mexico-bound Missouri basin, and the Hudson Bay-bound Saskatchewan and Nelson drainages.

Another triple point exists in northern Minnesota near Hibbing. Here the Northern Divide intersects the St. Lawrence Seaway Divide. From this point, water flows in three directions, north to Hudson Bay, south to the Gulf of Mexico, and east to the Gulf of St. Lawrence. The Chippewa Indians referred to the location as "The Hill of Three Waters" or "The Top of the World" and frequently held their council meetings there for tribes living within about a 100-mile radius. The site is not publicly accessible due to mining operations. Its official platting is Section 26, Township 58, Range 21. (Hibbing Chamber of Commerce, 2001.)

Another triple point exists atop an unnamed peak near Gold, Pennsylvania, where waters separate into the

Mississippi, Great Lakes, and Susquehanna drainages. Hopefully, someone will champion a fitting name for so distinguished a peak.

Two other peaks have been suggested as triple points: Headwater Hill in south-central Colorado, and Three Waters Mountain in western Wyoming. Three Waters Mountain in Wyoming is the source of the Columbia, Colorado, and Missouri-Mississippi river systems. Technically, both the Columbia and Colorado rivers flow into the Pacific Ocean, although the Colorado River empties into the Sea of Cortez before its waters co-mingle with those of the Pacific Ocean. From Headwater Hill, water diverges into the Colorado River, the Rio Grande drainage, and the Arkansas-Mississippi drainage. However, both the Rio Grande and Arkansas drain into the Gulf of Mexico, making the case for triple-point status of Headwater Hill somewhat less certain than the other four triple points. By the definition I have adopted herein, the Sea of Cortez and the mouth of the Columbia River would be distinct coastlines, and the Three Water Mountain would qualify as a triple point. In contrast, the mouths of the Rio Grande and Mississippi River share the same coastline—the Gulf of Mexico. Therefore, the status of Headwater Hill as a triple divide is more dubious than that of the other four triple-points.

Closed Basins

To various extents, some geography texts have pointed out that not all of North America has drainage to an ocean. For example, the Great Divide Basin, which sprawls across much of Nevada, and parts of Wyoming, Colorado, California, Utah, Idaho, and Oregon is internally drained (Fig. 3). Internal drainage means that no river carries water out of the basin. Also, the Great Divide actually bifurcates in Wyoming creating another closed basin (Fig. 3). Another sizeable, closed basin exists in the Lake Estancia basin of central New Mexico. And extensive parts of southern Saskatchewan and Alberta are closed basins.

No geography text that I have found shows that the Devils Lake basin and parts of the Missouri Coteau province in North Dakota are closed basins. Because these basins have no external drainage, they are not technically part of any watershed that drains to the ocean. They are in effect rimmed by a continental divide. As discussed below, these basins are only temporarily closed as water may spill into an externally draining river if the water level rises high enough.

The Fourth Dimension of Continental Divides

Lost thus far in this treatise on continental divides is the fourth dimension, time. The entire discussion has examined only the continental divides as observed today. However, the number and position of continental divides is strongly affected by climatic and tectonic forces, which can raise mountain ranges and alter drainage patterns. Let's explore how climatic forces have affected the continental divides and drainage in North Dakota.

In the 1930s, North Dakota suffered a major drought. Lake levels fell in the region. The water level in Devils Lake fell to 1401 feet above mean sea level. In 1993, a wet interval began in northeastern North Dakota and the lake rose to 1448 feet above mean sea level by 2001 (it has since dropped slightly). If the lake should rise to an elevation of 1459 feet, as it has in the geologic past (Murphy et al., 1997), water will spill by natural processes out of the lake basin and into the Sheyenne River, which eventually flows to Hudson Bay. The rise and fall of Devils Lake in response to natural climatic fluctuations illustrates a case where closed basins can become integrated into through-flowing, ocean-bound drainages.

Another example of climate-induced changes in continental drainages is preserved in the history of glacial Lake Agassiz, once the largest (in surface area) freshwater lake in North America. Toward the end of the last Ice Age, continental glaciers covered much of North America, particularly the Canadian Shield and northern tier of states in the United States. North-flowing drainages, such as the Red River of the North and Nelson River, were blocked by the continental glaciers. Water ponded to form an enormous inland lake, glacial Lake Agassiz. Water rose in glacial Lake Agassiz until it spilled over into one of three outlets: a northwestern, eastern, and southern outlet. The northwest outlet shunted Lake Agassiz water to glacial Lake McConnell (located in the Northwest Territory of Canada), which in turn spilled over and drained to the Arctic Ocean. The eastern outlet delivered water to the Great Lakes and the St. Lawrence Seaway. The southern outlet delivered water through Lake Traverse and Big Stone Lake on the South Dakota/Minnesota border and into the Minnesota River, which joins the Mississippi River at Minneapolis, Minnesota. Each of these three outlets drained water from glacial Lake Agassiz at different times, depending upon which paths were obstructed by glacial advances, the degree of isostatic rebound related to crustal adjustments from glacial and water loading on the earth's crust, and the depth of water in Lake Agassiz. These multiple drainage routes to the Arctic Ocean, Hudson Bay, Gulf of St. Lawrence, and Gulf of Mexico illustrate how dynamic continental divides can be in response to climatic forces and isostatic adjustments in the crust following deglacial unloading. [Note: A recent article by T.G. Fisher (2003) provides a scientific review of the history of drainage changes in glacial Lake Agassiz. His work includes numerous other citations on the topic.]

In recent decades, humans have altered natural drainage divides by pumping and transferring water from one basin to others, sometimes across continental divides. The example of the Chicago Sanitary Canal has already been mentioned. In Colorado, water has been diverted from the West Slope of the state across the Great Divide to quench the growing thirst of the highly populated Front Range.

Summary

The notion that there is a single, unique continental divide in North America is untenable. This notion is based on a poor understanding of the geography of North America and on the unfortunate propagation of misinformation in introductory geography texts. The continental divide, which is commonly referred to as “*The Continental Divide*,” is perhaps more appropriately called the Great Divide, reflecting the great elevations along much of its trace and its great length from Seward Peninsula, Alaska, to Tierra del Fuego near the southern tip of South America.

Other continental divides include the Northern Divide, the Eastern Divide, and the St. Lawrence Seaway Divide. The Northern Divide runs from the Labrador Sea in northern Quebec through the continent’s deep interior including Minnesota and the Dakotas, to Triple Divide Peak in Glacier National Park, Montana, where it joins and parallels the Great Divide to the Bering Sea and Chukchi Sea off the coast of Alaska. The Eastern Divide separates waters draining to the Gulf of Mexico and Gulf of St. Lawrence from those draining across the Atlantic Piedmont to the Atlantic Ocean. The St. Lawrence Seaway Divide separates the waters of the Great Lakes basins and St. Lawrence River from those of Hudson Bay, Gulf of Mexico, and Atlantic Seaboard.

Furthermore, it is a myth that continental divides must coincide with mountainous areas. Even some reaches of the Great Divide are devoid of mountains. The Northern Divide is relatively flat through much of the prairie states and provinces, as is the St. Lawrence Seaway Divide through much of Illinois and Indiana. The Eastern Divide has little relief in all of Florida.

Finally, the position of a continental divide is not static; rather, it is dynamic and changes in response to tectonic forces, isostatic adjustments in the earth’s crust, climatic forces that can alter drainage patterns or block outlets through the growth and decay of continental glaciers, and human forces, such as the case of the Sanitary Canal and its effect on St. Lawrence Divide through the Chicago metropolitan area.

A more liberal and enlightened definition of a continental divide is one that examines the major drainages of an entire continent. It defines a continental divide as a drainage divide that separates waters flowing to different oceans, seas, or coastlines on different sides of a continent. The most restrictive reading of this definition would argue that there are at least three continental divides on the North American Continent—one separating drainages of the Pacific and Atlantic oceans, another separating drainages of the Pacific and Arctic Oceans, and a third separating drainages of the Arctic and Atlantic oceans. A more liberal interpretation of the definition provided herein would also recognize that water originating in the heartland of North America, but taking radically divergent

paths through the Great Lakes/St. Lawrence Seaway versus the Gulf of Mexico, would also constitute a continental-scale drainage divide, even though waters of the Gulf of St. Lawrence and Gulf of Mexico eventually commingle with water of the Atlantic Ocean.

At some point, individuals will have to settle for themselves which seas and coastlines are distinctly different enough to constitute different sides of a continent. For example, are the Sea of Cortez and the Colorado River basin distinct (and separated by a continental divide) from the Columbia River system that empties into the Pacific Ocean at the Washington-Oregon border? Is the Mackenzie River, which enters the Arctic Ocean northwest of the Canadian Archipelago, distinct and separated by a continental divide from the Nelson River, which flows into the Hudson Bay at Churchill, Manitoba? Does the drainage divide circumscribing the closed drainage of the Great Basin constitute another continental divide, one separating ocean-bound from continent-bound drainages?

The next time you travel the undulating topography of the Missouri Coteau and feel the urge to stifle a yawn, pay attention to the streams you encounter. From the top of countless, nameless hills and the crests of undulating ridges in the dead-ice moraines of the Missouri Coteau, one can look at waters headed in opposite directions. Some waters will travel north into the icy realm of Hudson Bay. Whereas others will flow south to the subtropical shores of the Gulf of Mexico.

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