Geologic Map of Devils Lake

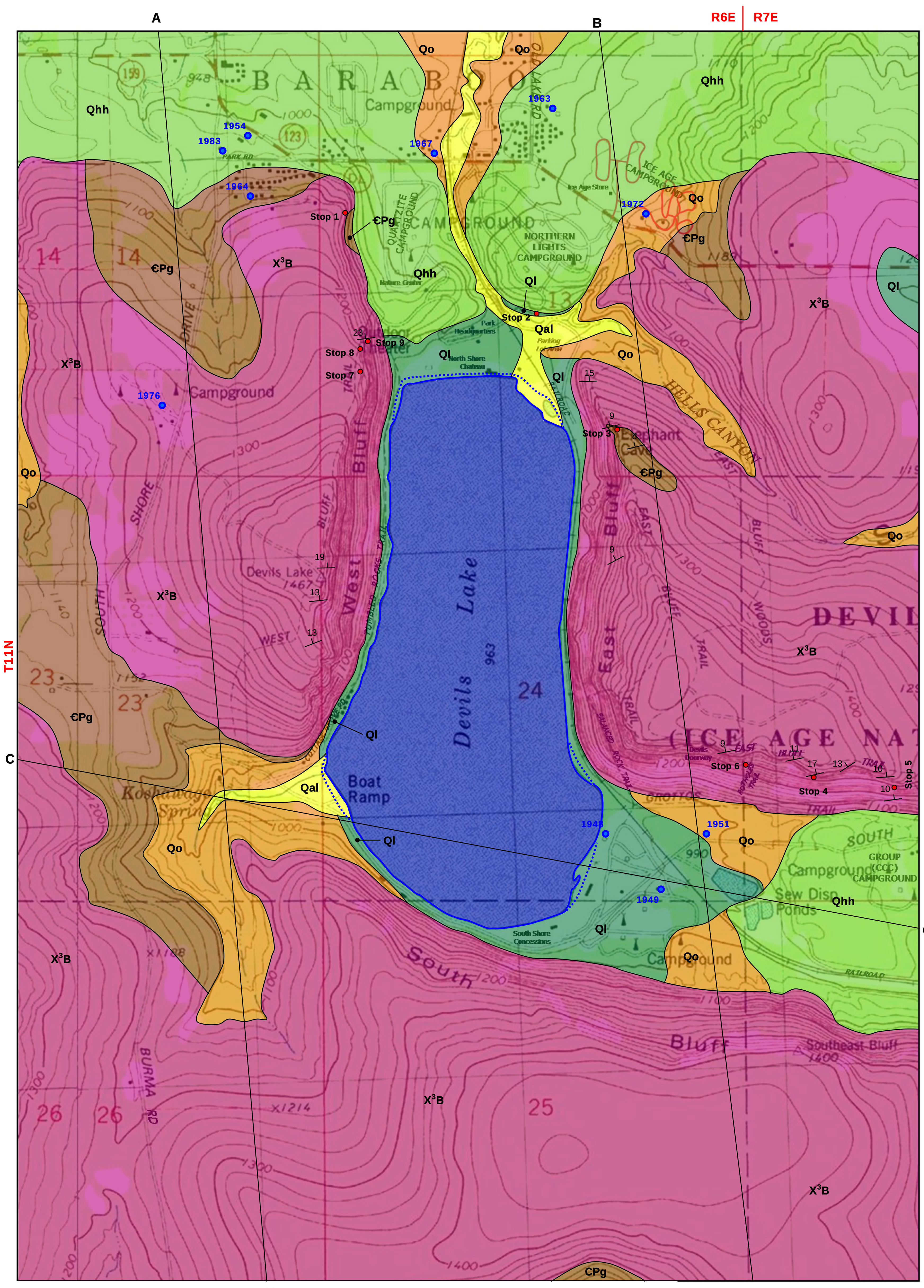
Sauk County, Wisconsin, United States
T11N R6E and R7E
2013

Steven D.J. Baumann, Michelle J. Abrams

Publication Number: M-072013-1A

Midwest Institute of Geosciences and Engineering

Geologic Map



500 meters

2000 feet

Contour Interval = 20 feet

TRUE NORTH

MAGNETIC NORTH -2.3° 2013 Datum

MAP SCALE = 1:12000

MAP AREA = 6.059 miles²

Geologic Map, Units, and Cross Section Legend

1989 Potable Well Location with Year Drilled

Exaggerated Dip of Bedding within a Geologic Unit (Cross Sections Only)

Unconformity

45 Strike and Dip of Bedding

Geologic Contact

Approximate Geologic Contact

A — A' Cross Section Line

Base of Talus Zone (Cross Sections Only)

Stop 1 Location of Significant Outcrop (mentioned in text on page 2)

Normal Lakeshore Position

2013 Lakeshore Position

Figures Legend

N72E 33NW Location of Strike and Dip

26 S59E Direction of Fold Plunge

S_0 Location of Stress Field

Yellow Line = Contact Between Geologic Units

Photo looking south-southeast from the West Bluff Trail, over Devils Lake. The talus piles are visible on the opposite bluff, in the upper left of the photo. In the foreground is a small isolated quartzite stock poised to tumble downhill. Eventually it will fall due to winter freeze-thaw conditions and become part of the talus that covers the bluffs.

Photo was taken by Steven D.J. Baumann on June 30, 2013.
The photo was taken from GPS coordinates: 43.41953° -89.73872°.

Geologic Map and Cross Section Units

Geologic Time Scale (Mya = years ago)	Lithostratigraphic Scale		Geologic Description
Phanerozoic Eon, Cenozoic Era, Quaternary Period, 0.03 Mya to Present	* Mason Group	Qal	*** Cahokia Formation:** Unconsolidated, light brown, laminated to thin bedded, fine to medium grained, SAND, SILT, and dark brown CLAY, with some rounded pebbles (0-15 feet thick)
		Ql	***Quaternary Lake Deposits*:** Unconsolidated, pale yellow brown to pinkish gray, laminated CLAYS and SILTS, with fine sand and black organic rich layers, pebbly at the base (0-75 feet thick)
	* Wedron Group	Qhh	**Holy Hill Formation, Horicon Member:** Unconsolidated, pale pinkish brown to gray, fine sandy DIAMICTON, with rounded pebbles of limestone, quartzite, and granite (0-120 feet thick)
		Qo	***Quaternary Outwash Deposits*:** Unconsolidated, reddish brown to light brown, subangular to rounded pebbly to boulder rich, bedded, SAND, with minor silts and clays (0-80 feet thick)
		Qd	***Quaternary Diamicton (Undivided)*:** Unconsolidated, brownish, sandy CLAY, known only from well logs, exact age unknown (0-40 feet thick) *cross section only*
Phanerozoic Eon, Cenozoic Era, Tertiary Period?, 64 to 2.0 Mya		Cu	**Cenozoic, Undivided:** Unconsolidated to slightly indurated, bluish gray and red CLAY, and intebedded red to brown SAND, gravelly at the base, known only from well logs, exact age is unknown (0-150 feet thick) *cross sections only*
Phanerozoic Eon, Paleozoic Era, Cambrian Period, 500 to 490 Mya	Trempealeau Group	€Pg	**Trempealeau Group, Parfreys Glen Formation:** Moderately indurated, pale yellow to pinkish, bedded to cross-bedded, subangular to rounded, medium to coarse grained QUARTZ ARENITE, with 2 inch to 4 foot beds of purple quartzite conglomerate (0-190 feet thick)
Proterozoic Eon, Paleoproterozoic Era, Statherian Period, 1,720 to 1,670 Mya		X³B	**Baraboo Formation:** Extremely hard, purplish to pinkish gray, thin to medium bedded to crossbedded, medium to coarse crystalline QUARTZITE, with thick beds of grayish purple phyllite, ripple marks common(>4,500 feet thick)

NOTES: * = *Adopted nomenclature from Illinois. Italicized units are informal.*

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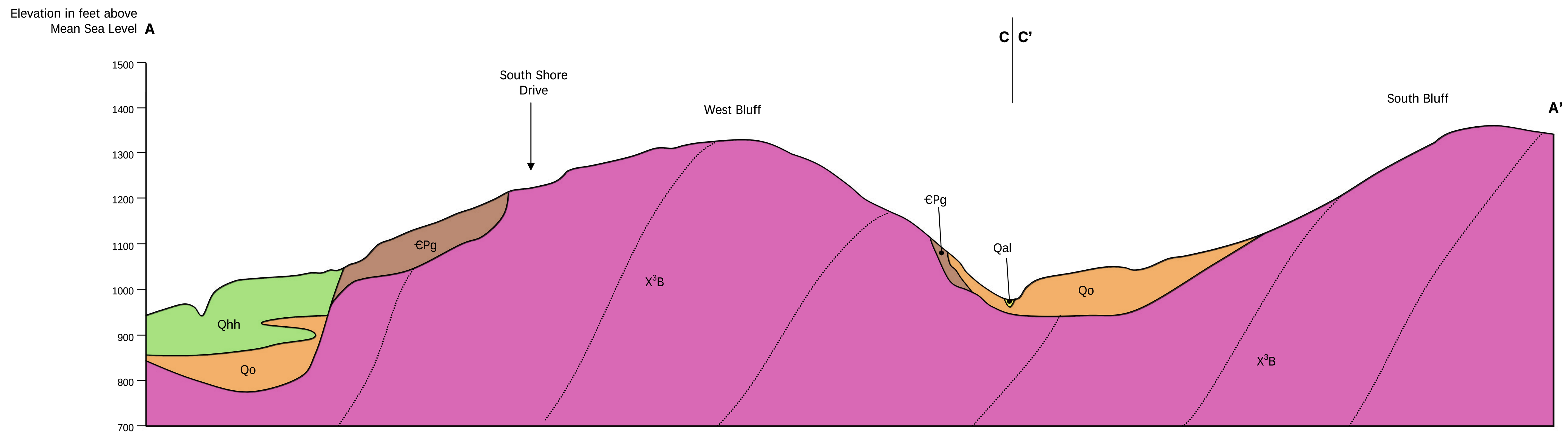
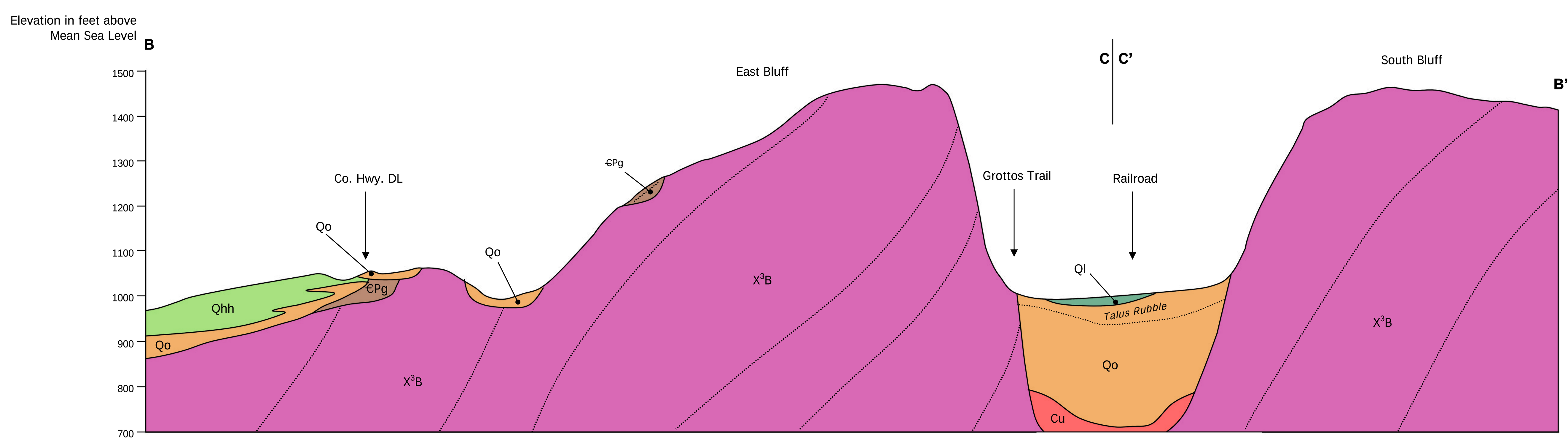
Cross Sections



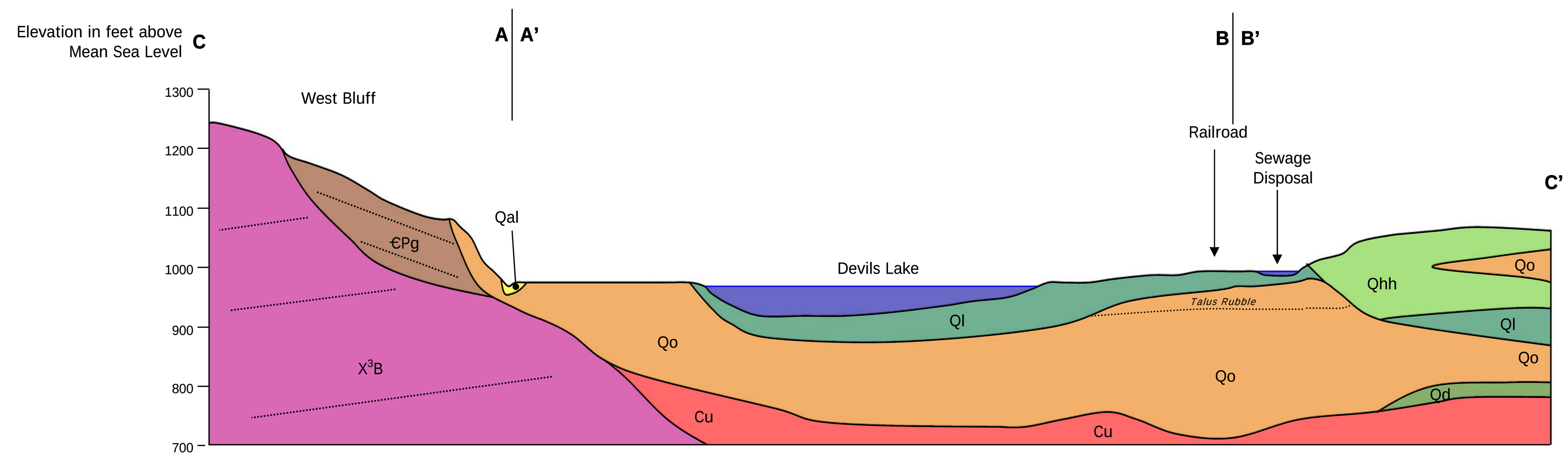
VERTICAL EXAGGERATION = 5x

HORIZONTAL SCALE = MAP SCALE



VERTICAL EXAGGERATION = 5x

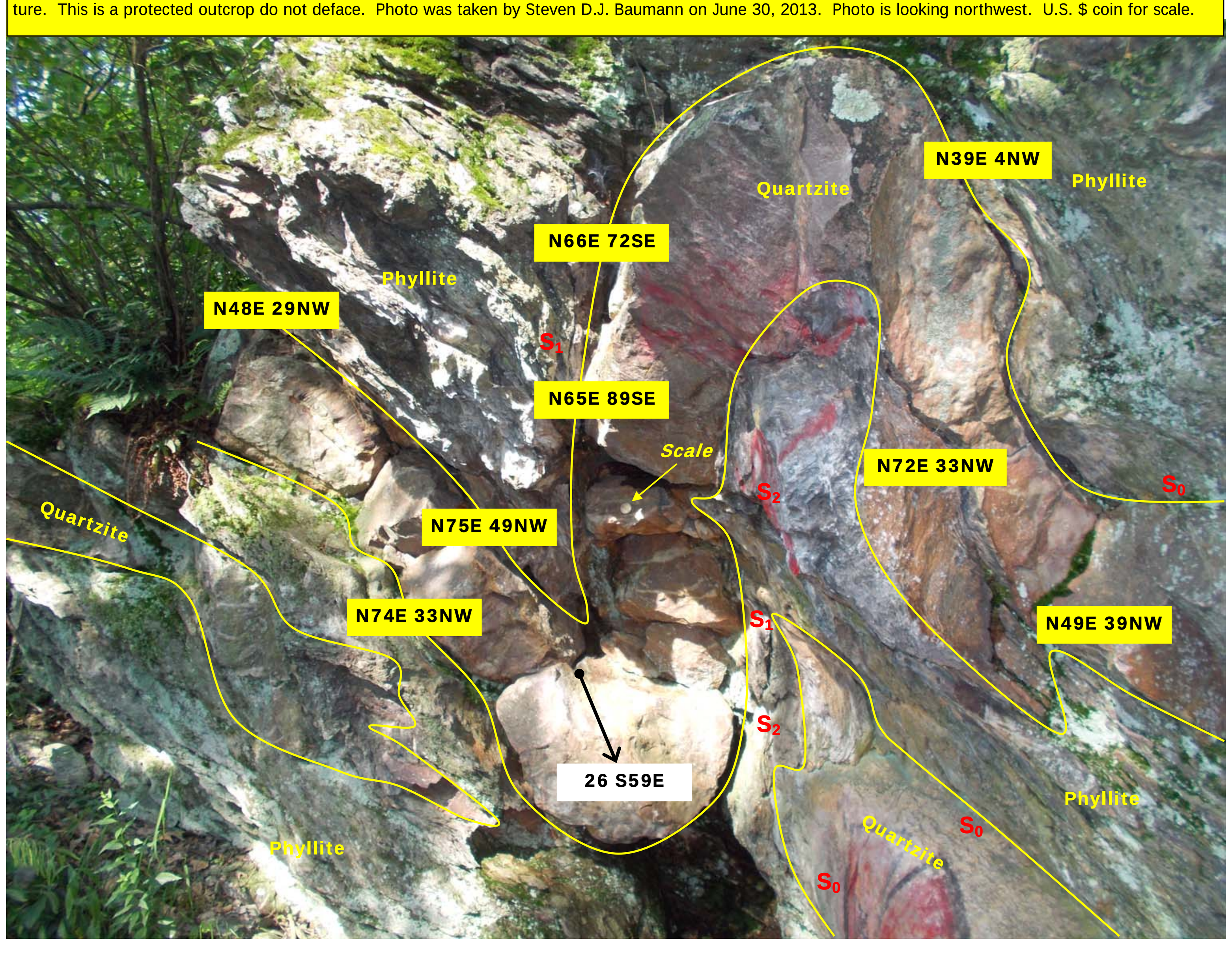
HORIZONTAL SCALE = MAP SCALE



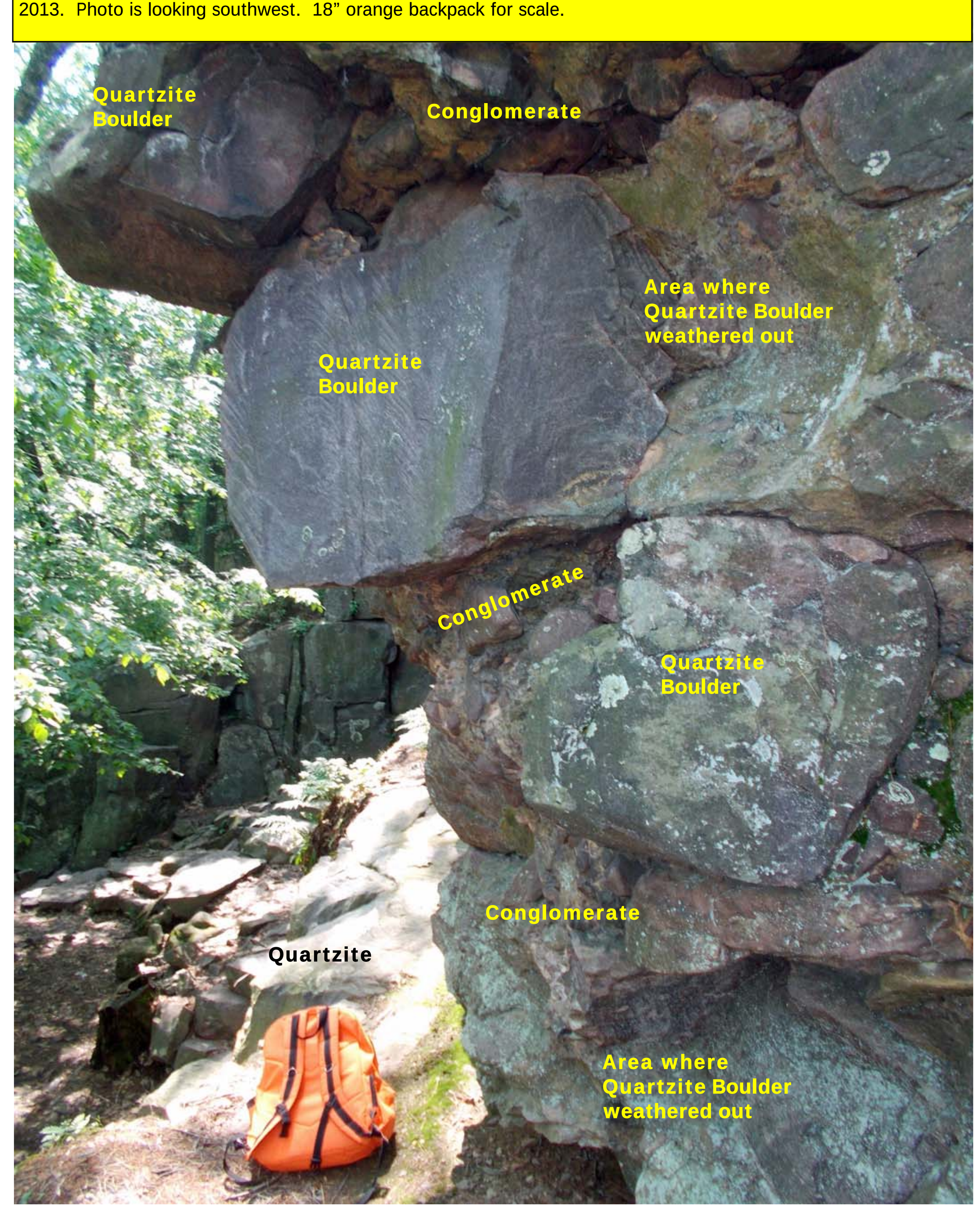
VERTICAL EXAGGERATION = 5x

HORIZONTAL SCALE = MAP SCALE

<u>Figure 1: Stop1: Boudinage Structure within Phyllite that Reflects the Larger Baraboo Syncline</u> GPS: 43.43292° -89.73750°
This outcrop is one of the most studied outcrops in the Baraboo Area. It is a Boudinage structure within Phyllite. The Boudinage is unique because it has been deformed in the exact same manner as the larger Baraboo Syncline in which it sits. This is an example of a small asymmetrical structure reflecting the larger structure. This is a protected outcrop do not deface. Photo was taken by Steven D.J. Baumann on June 30, 2013. Photo is looking northwest. U.S. $ coin for scale.



<u>Figure 2: Stop 3: Basal Cambrian Conglomerate at Elephant Rock</u> GPS: 43.42554° -89.72513°
Most of Elephant Rock is made up of the conglomerate of the Parfreys Glen Formation. Here it contains subangular boulders several feet wide. The orange backpack sits on the top of the Baraboo Formation, right on top of the unconformity with the overlying Parfreys Glen Formation. Photo was taken by Steven D.J. Baumann on June 30, 2013. Photo is looking southwest. 18" orange backpack for scale.



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Introduction

Devils Lake and the surrounding Baraboo Area has been of great interest to geologists, naturalists, and earth scholars since the late 19th Century. It is often referred to as a "geologic laboratory". In geology, there is very little you can accomplish in a laboratory setting. Most of what geologists do is based off data gathered in the field. Devils Lake has many different landforms that have captured the interest of scientist. The geologic history dates back at least 1.7 billion years ago. The area was first mapped by Dalziel and Dott in 1970, and their map is still used to teach students throughout the Midwest. The only drawback is that the map scale is regional (1:62 500), it also does not separate out any of the glacial deposits. In 1990 Clayton and Attig created a geologic map of Sauk county, which includes Devils Lake. They addressed the glacial deposits and even named a few newly recognized geologic units, which have been immensely helpful in deciphering the geology at Devils Lake. However, their map has even a smaller scale (1:100 000) then the 1970 map. The authors of this map felt that there is more than sufficient data to generate a large scale map of the Devils Lake area. The map presented here is at a 1:12 000 scale. Devils Lake is a remnant from glacial times. The glaciers plugged any egress of water out of the lake. No streams exit Devils Lake. There are two year round streams that enter the lake. One from the north and the other from the southwest. The Lake itself is shallow. Only averaging about 15 feet deep. However, it is about 45 feet at its deepest. The modern elevation of Devils Lake is at about 963 feet above mean sea level. However, it can be as much as 966 feet during years with heavy rain. 2013 has seen above average precipitation. As a result, the small pond that appears at the northeast corner of the lake is actually presently attached to the lake.

Discussion

The focus of this map is on the exposed and subsurface geology of the Devils Lake area. Devils Lake is the old course of the Wisconsin River before its diversion during the most recent glacial cycle. The actual valley is believed to be much older. Perhaps dating back to Precambrian times. Possibly 600 million to 1.3 billion years ago. Some well data was used in order to generate cross sections. The wells used are plotted on the geologic map. Some of the descriptions were a bit vague, but the overall data from the wells was good enough to generate cross sections. Most of the field work was conducted on June 25, June 30, 2013, and July 7, 2013. Standard geologic mapping materials were used. Such as a Brunton Compass, GPS, field map, protractor, notebook, and camera. Both the glacial and bedrock geology was studied in detail. The data herein relies heavily on the work conducted by Dalziel, Dott, Clayton, and Attig.

Stratigraphy

The oldest rocks exposed in the area are part of the Precambrian (Paleoproterozoic) Baraboo Formation. Stratigraphically, Devils Lake exposes the middle part of the Baraboo Formation. This rock is locally purplish to red in color and is only exposed extensively within the map area. It is easily distinguished from other rocks by its extreme hardness and color. It also appears as pebbles to boulders in the younger sandstones. The Baraboo Formation was deposited in on a flat marine shelf about 1.7 billion years ago as pure quartz sand. That sand was later buried and metamorphosed into quartzite. The red and purple color is due to the presence of iron (less than 2.5% of the rock) probably precipitated from groundwater activity before metamorphism. The Baraboo Formation is one of the most heavily studied formations in the Midwest. It was here that the basics for modern structural geology were first figured out. Figure 1 shows one such outcrop that was instrumental in figuring out the regional geology. The outcrop contains a small structure that mimics the trend and shape of the larger Baraboo Syncline.

Above the Baraboo Formation lies thick, relatively pure Cambrian Sandstone that strongly resembles the Tunnel City and Jordon Formations. However, the presence of large, rounded, purple quartzite pebbles to cobbles, have justified the naming of the sandstone and conglomerate as the Parfreys Glen Formation (Clayton, 1990). The Parfreys Glen Formation was designated as a new unit because of the intertonguing relationship with the sandstones and the difficulty in correlating the sandstones with other sandstones outside of the area. The Parfreys Glen Formation is a lithological unit independent of time. Locally, it was deposited around 490 to 500 million years ago, during the Late Cambrian. However, in the surrounding greater Baraboo Area it may be as young as 470 million years old (Late Ordovician), above an elevation of 1,400 feet. The sandstone is mostly a pale colored, crossbedded, quartz arenite and contains pebbles to large boulders (see Figure 2). Locally, it does not contain any fossils to determine a precise age. It was deposited during a time when the Baraboo Quartzite stood as islands in an advancing sea. The sandstone and conglomerate was deposited near the shore of the Baraboo Islands (Hanson, 1970). The Parfreys Glen Formation was deposited in turbulent water susceptible to tropical storms and wave action. The sandstone was deposited during tranquil times and the conglomerate was deposited during storm events.

After the Paleozoic seas withdrew the area, the landscape was subjected to a long period of erosion and stream development, almost exhuming the Baraboo Quartzite as it stood during the Cambrian. It was during this time that sands and clays of unknown age were deposited. They are labeled as "Cenozoic Undivided" on the cross sections. The deposits are only known from well data and do not crop out anywhere around Devils Lake. It is likely that they were deposited by the Wisconsin River, before Devils Lake existed. These deposits are pre-glacial. However, they may be even older than Cenozoic, possibly even Mesozoic.

The next youngest unit is a thin layer of glacial till present only above the Cenozoic deposits in the east-west trending valley. It is known only from one well drilled in 1949 in the C.C.C. camping area, just outside of the mapped area. The unit is described as "hardpan sandy till" and maybe older than all of the other glacial units exposed at the surface. The Holy Hill Formation (mostly a sandy diamicton) is part of the Johnstown End Moraine (Syverson, 2000). To the west of Devils Lake, the land remained unglaciated. To the east, glacial ice stood several hundred feet high. Devils Lake sits near the edge of where the glacial ice stood about 30,000 years ago. The close proximity to the ice sheets led to the deposition of glacial outwash and glacial lake deposits in the area. The lake deposits in the area are were likely deposited in ancient glacial Lake Wisconsin, which existed 13,300 to 20,000 years ago before catastrophically draining north. Other than the outwash and lake deposits (Figure 3), the glacial sediments are poorly exposed. Well logs and topography had to be used to map these deposits (geologic map and cross sections). Illinois Group nomenclature was adopted for the Holy Hill and Cahokia Formations. Illinois nomenclature was not adopted for undivided diamicton, lake, and outwash deposits. Primarily because some of these deposits may be older than Wisconsinan in age.

Structure

Modern Structural Geology owes its existence to the Baraboo Area. It was the detailed study of the Baraboo Formation in the late 19th and early 20th Centuries where complex metamorphic stress fields were first figured out. There are complex folds throughout the area. However, significant faulting is lacking throughout the Baraboo Area. Devils Lake sits on what is referred to as the "South Limb" of a giant syncline comprised of the Baraboo Formation at the surface. It is this large structure that controlled later Paleozoic marine deposits as well as recent glacial sediments. Locally, the Baraboo Formation dips about 10 to 25 degrees, roughly north to northwest. This is almost opposite of the Paleozoic sediments, which were deposited on top of the quartzite after a long period (more than 1 billion years) of erosion. This type of relationship is called an angular unconformity. This unconformity is present at the base of the Cambrian sandstones as well as the base of the relatively flat glacial deposits. The Baraboo Formation was deposited roughly 1.67 to 1.72 billion years ago. It was then buried and metamorphosed around 1.60 billion years ago. It was then again altered by deep hydrothermal activity about 1.45 billion years ago, during the Wolf River Hydrothermal Event (Baumann, 2013).

The Cambrian sandstones and conglomerates generally follow the surface dip of the quartzite. They also have filled old fractures that existed hundreds of millions of years ago (Figures 4A, 4B, 5A, 5B). It is possible that some of the fracture fill conglomerate is Precambrian, based on the matrix being indistinguishable from the quartzite. It may have been emplaced after the Baraboo Formation was metamorphosed, exhumed, and initially eroded. Eventually the seas totally covered the Baraboo quartzite, most likely during the Silurian. Once the seas withdrew, erosion resumed, reexposing the quartzite much as it was 600 million years ago. Now the Cambrian sandstones only exist as valley fill or as erosional remnants on the top of the quartzite. Elephant Rock is one such remnant. Even from a distance one can see that the West, East, and South Bluffs are covered with large and loose boulders called "talus" (see Figure 6). This talus was formed by frost wedging at the end of the last glacial period. Some of it is even present in the subsurface (see Cross Sections). The talus was only mapped in the subsurface as part of outwash deposits. Along the bluffs it is mapped as the Baraboo Formation. Another interesting feature are potholes present in the quartzite. They are most visible on the southern part of the East Bluff (along Pothole Trail) and the northern part of the West Bluff (see Figures 7 and 8). They were likely gouged out by ancient pre-glacial rivers. Dott recorded the presence of Mesozoic/Cenozoic gravels present in some of the potholes on the East Bluff. The gravels were not mapped during our evaluation.

The quartzite hills at Devils Lake were not glaciated during the most recent glacial period. However, there are sporadic structures along the west bluff that strongly resemble glacial striations. The markings resemble striations and trend unlike fractures, cleavage, and tension gashes. One such location is depicted in Figure 9. If these are indeed glacial striations, then they ust represent ice that moved through the area before the Wisconsinan glaciers.

Economics

The rocks themselves in the area of Devils Lake have little economic use, other than the quartzite, which is mined on the North Limb for aggregate. No known minerals exist in decent concentration and accessibility to be economically viable. However, groundwater is and important local economic resource. The groundwater table is generally high in the area. This means most wells can be set less than 300 feet. The Baraboo Formation is an excellent groundwater filter and produces high quality drinking water. The problem is that it is extremely difficult to drill into. The overlying Cambrian sandstones also produce good quality water, where buried, and are easier to drill through. Most local water wells are set in either the base of the Cambrian sandstone or within the glacial outwash and diamicton deposits. The quality of water in the glacial deposits is generally good where drilled near quartzite of high elevation. However, water quality in glacial deposits on topographic highs above the quartzite, are of lower quality. This is due to surface water infiltrating the groundwater.

Conclusions

Devils Lake is a rich area to study a long range of geologic time. The geologic relationships fall in the middle range of complexity. If you are unfamiliar with the geology of the Baraboo Area, it can be a bit difficult, but not impossible to decipher. Devils Lake is one of the best places the best place to see the relationships within the Baraboo Formation. Here the Baraboo Formation is very well exposed. The rocks range from metamorphic to unconsolidated sediments. The area was shaped by wind, water, fire, and ice. The Baraboo Area is a rare location where a great variability in geologic processes can be observed.

References

Baumann, S.D.J., 2013, *Precambrian Geologic Events in the Mid-continent of North America*, Midwest Institute of Geosciences and Engineering, G-012011-1E

Clayton, L., 1990, *Geology of Sauk County Wisconsin*, University of Wisconsin, Information Circular 67

Dalziel, I.W.D., 1970, *Geology of the Baraboo District Wisconsin*, University of Wisconsin, Information Circular 14

Medaris, L.G., 2001, Igneous Basement of the Baraboo Range, Institute on Lake Superior Geology, 47th Annual Meeting, Part 2 Field Trip Guidebook pp. 4-13

Ostrom, M.E., 1967, *Paleozoic Stratigraphic Nomenclature for Wisconsin*, University of Wisconsin, Information Circular 8

Syverson, K.M., 2002, *The Quaternary of Wisconsin: A Review of Stratigraphy and Glaciation History*, Department of Geology, University of Wisconsin

Figure 7: Stop 6: Potholes on East Bluff GPS: 43.41417° -89.71855°
Potholes present at about 1280 feet above mean sea level. Photo was taken by Steven D.J. Baumann on June 30, 2013. Photo is looking west. 18" orange backpack for scale.

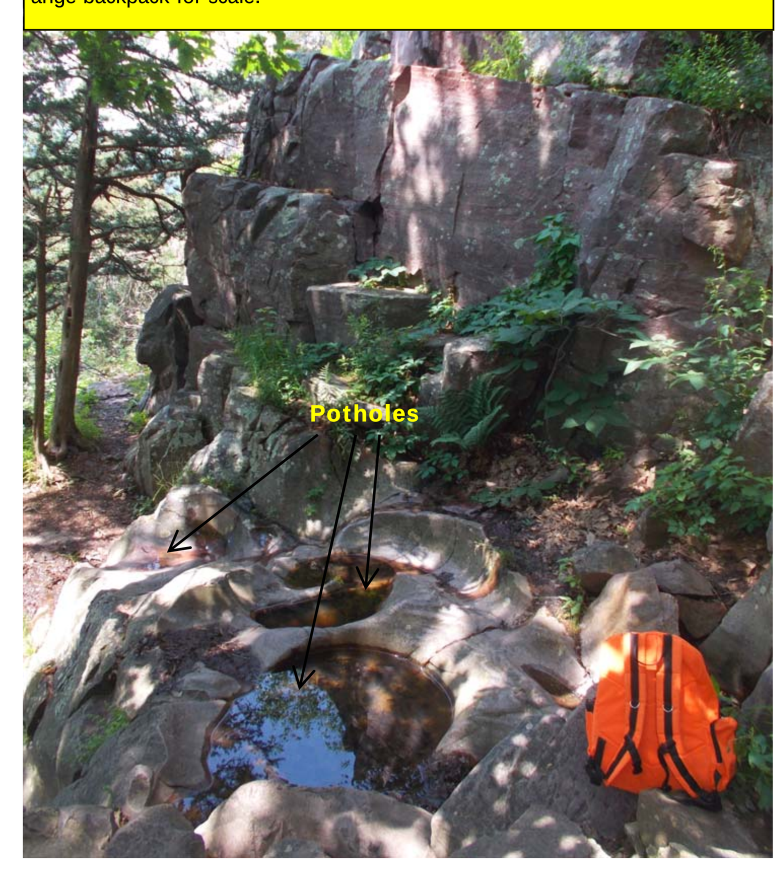


Figure 6: Stop 5: Talus Piles GPS: 43.41297° -89.71201°
This overlook shows the talus along the C.C.C. trail. The boulders pictured range from a foot to larger than 8 feet in size. Photo was taken by Steven D.J. Baumann on June 30, 2013. Photo is looking west.

Figure 3: Stop 2: Glacial Lake Deposits GPS: 43.42915° -89.72887°
This is a small outcrop of laminated glacial lake deposits. The deposits here are somewhat laminated slack water lake deposits. Photo was taken by Steven D.J. Baumann on June 30, 2013. Photo is looking north.

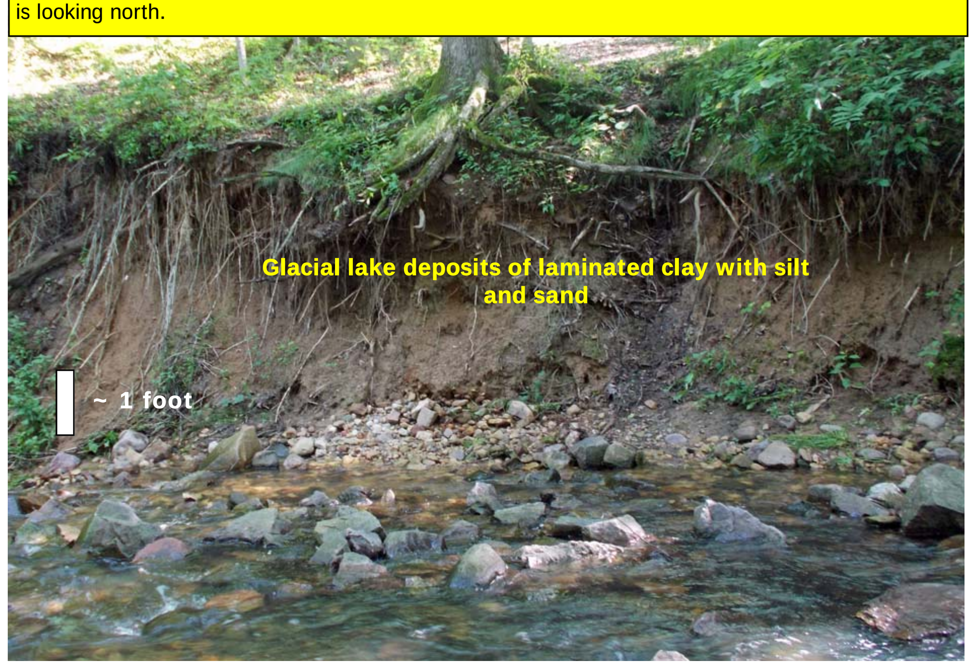


Figure 4A and 4B: Stop 4: Cambrian Sandstone Fracture Fill in the Baraboo Quartzite GPS: 43.41376° -89.71501°
Figure 4A shows the Cambrian sandstone fill present in a fracture. The photo is looking along strike. Figure 4B shows a close up of the sandstone in the exhumed fracture perpendicular to strike, at the same location as Figure 4A. U.S. $ coin for scale. Photos were taken by Steven D.J. Baumann on June 30, 2013.

Figure 5A: Stop 9: Cambrian Conglomerate Fracture Fill in the Baraboo Quartzite GPS: 43.42823° -89.73674°
Conglomerate fracture fill in the quartzite. 10" wide orange pelican case for scale. Photo was taken by Steven D.J. Baumann on June 25, 2013.

Figure 5B: Stop 9: Cambrian Conglomerate Fracture Fill in the Baraboo Quartzite
GPS: 43.42772° -89.73686°
Conglomerate fracture fill in the quartzite, just south of Stop 9. 18" wide orange backpack for scale. Photo was taken by Steven D.J. Baumann on July7, 2013. .

Figure 9: Stop 8: Glacial Striations? on the Baraboo Quartzite GPS: 43.42818° -89.73705°
Possible glacial striations. The trend of the marks is 13°S58W. This trend is different then other structural features. Yellow arrows highlight the possible direction of ice flow. Meter for scale. Photos were taken by Steven D.J. Baumann on July 7, 2013.

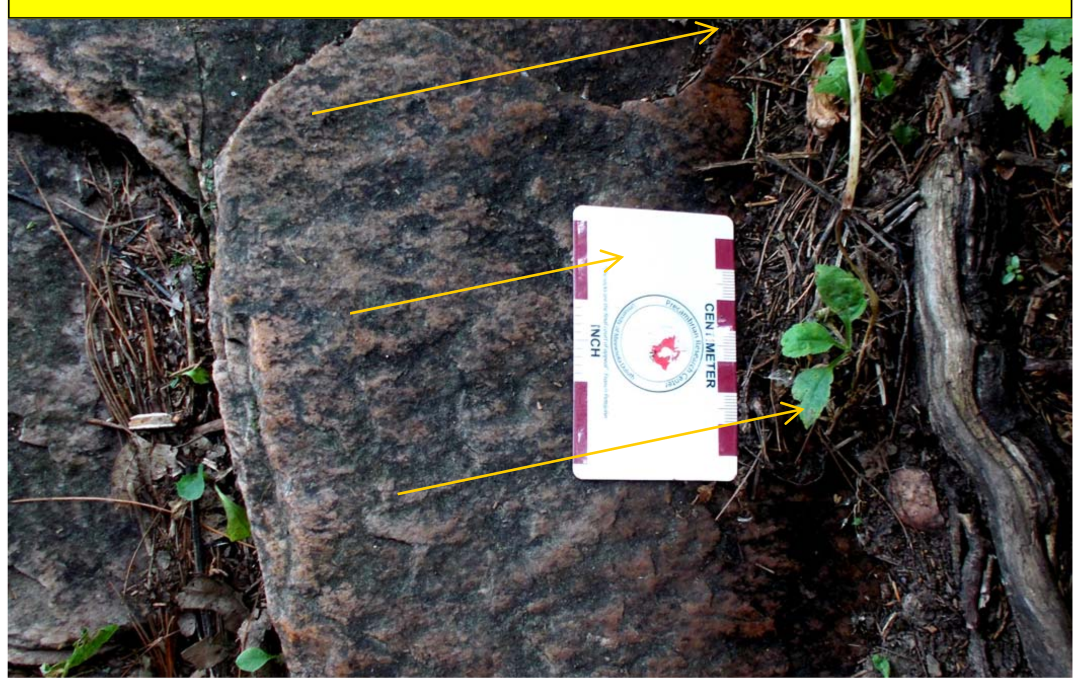
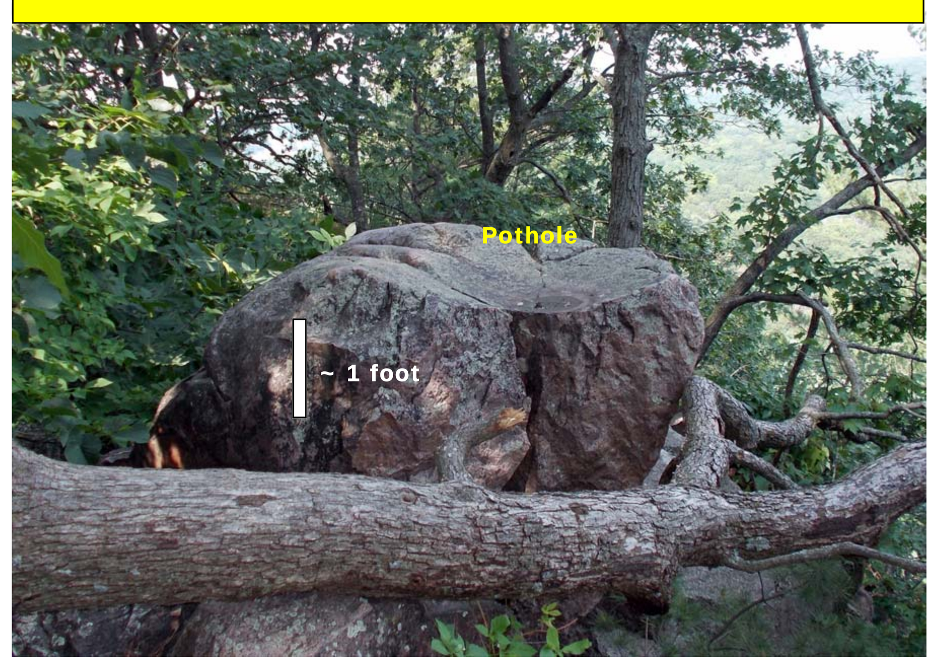


Figure 8: Stop 7: Potholes on East Bluff GPS: 43.42720° -89.73678°
Potholes present at about 1260 feet above mean sea level. Photo was taken by Steven D.J. Baumann on June 30, 2013. Photo is looking northeast.



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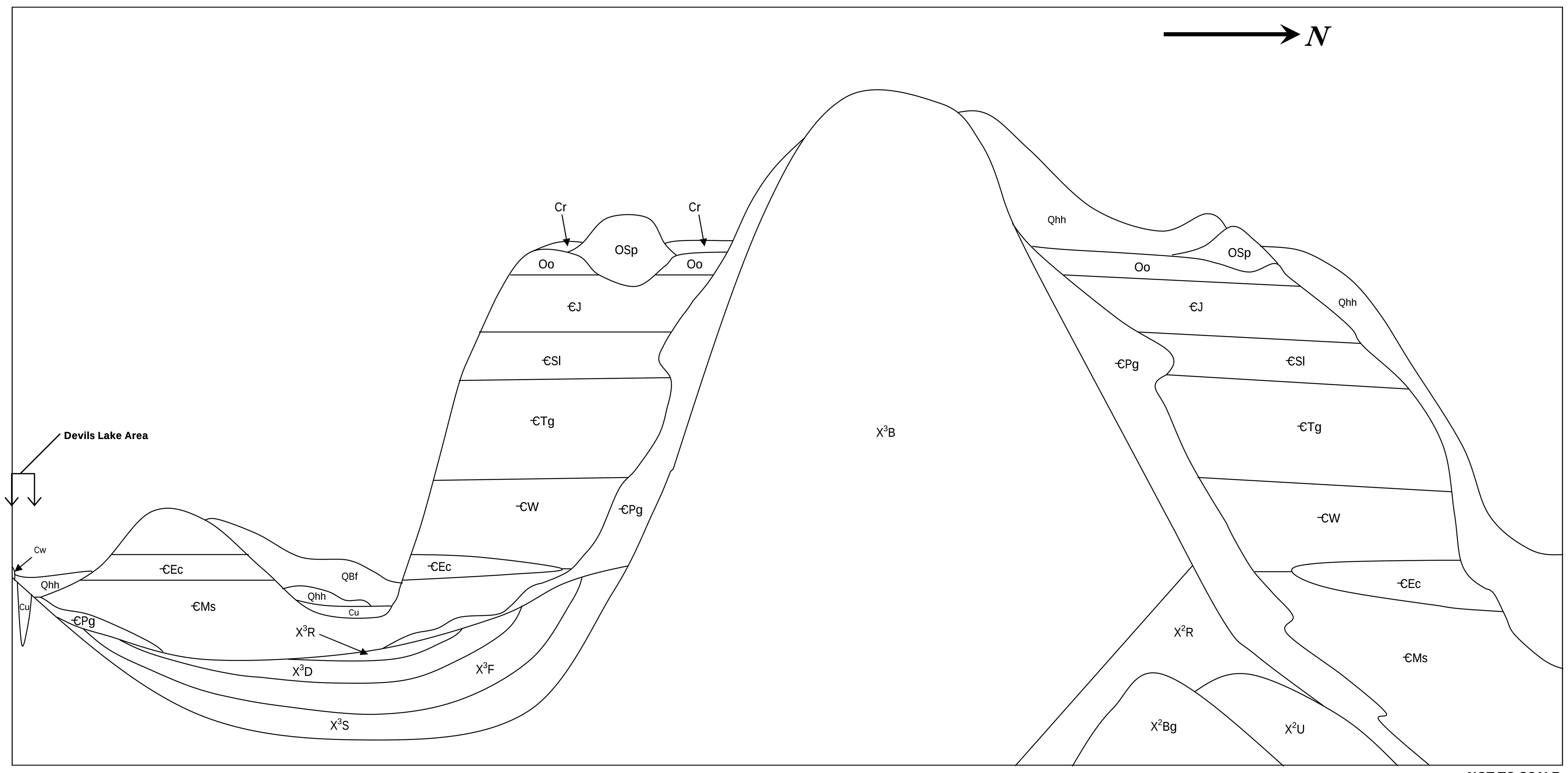
Geometric Relationships of Lithostratigraphic Units in the Baraboo Area



Adapted from Clayton 1990

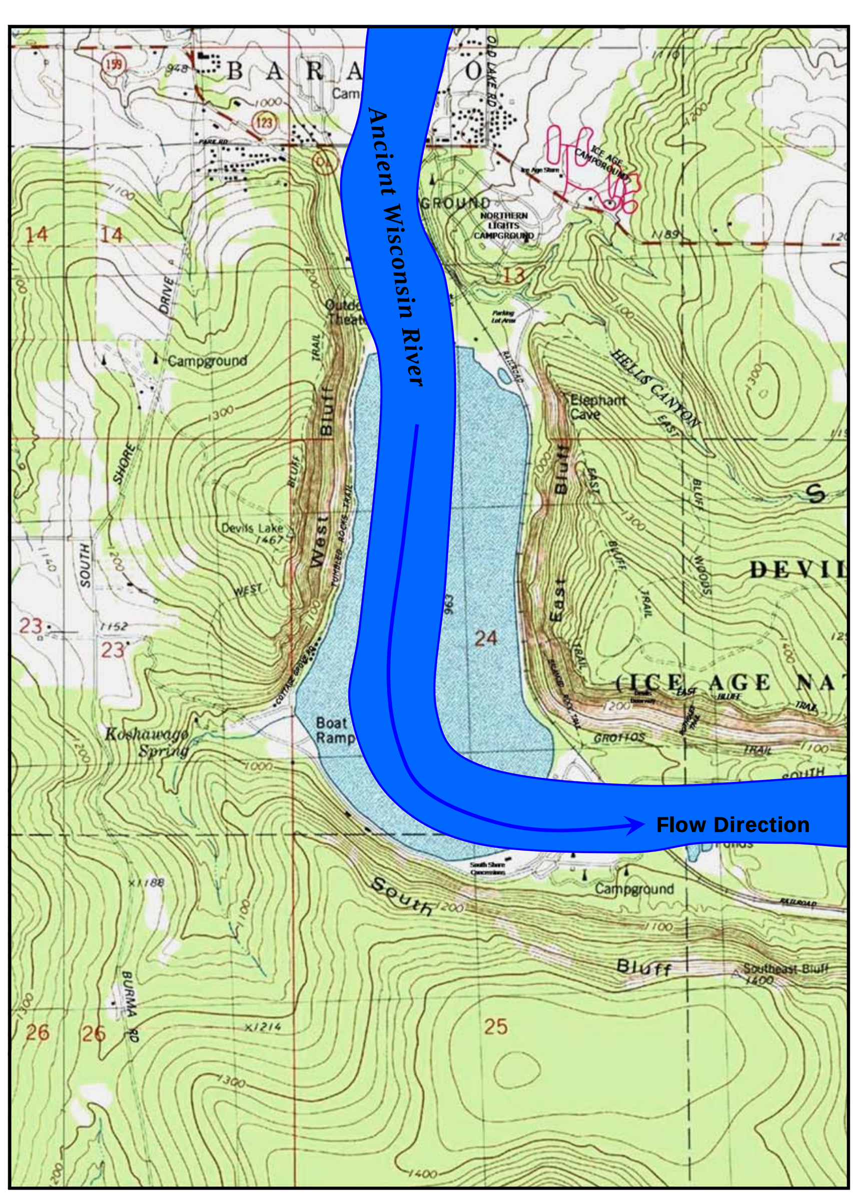
NOT TO SCALE

Lithostratigraphic Symbol	Unit Name (Geologic Age)
QBf	Big Flats Formation (Quaternary)
Qhh	Holy Hill Formation and related deposits (Quaternary)
Cr	Rountree Formation (Cenozoic)
Cw	Windrow Formation (Mesozoic?-Cenozoic)
Cu	Cenozoic undivided (Mesozoic?-Cenozoic)
OSp	Saint Peter Formation (Ordovician)
Oo	Oneota Formation (Ordovician)
€Sl	Saint Lawrence Formation (Cambrian)
€Tg	Tunnel City Group (Cambrian)
€W	Wonewoc Formation (Cambrian)
€Ec	Eau Claire Formation (Cambrian)
€Ms	Mount Simon Formation (Cambrian)
€Pg	Rarfreys Glen Formation (Cambrian-Ordovician)
X^3R	Rowley Creek Slate (Paleoproterozoic)
X^3D	Dake Quartzite (Paleoproterozoic)
X^3F	Freedom Formation (Late Early Proterozoic)
X^3S	Seeley Formation (Late Early Proterozoic)
X^3B	Baraboo Formation (Late Early Proterozoic)
X^2U	Pre-Baraboo Formation Undivided (Middle Early Proterozoic)
X^2Bg	Baxter Hollow Granite (Middle Early Proterozoic)
X^2R	Baraboo Rhyolites (Middle Early Proterozoic)

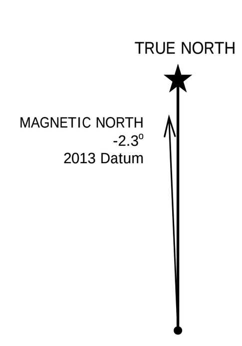
Units known to be present at Devils Lake are in red. Outwash and lake deposits are included in the Holy Hill Formation.

The above diagram shows the basic relationships between geologic units in the Baraboo Area. The approximate position of Devils Lake is indicated. This representation is not meant to be used as a cross section. Precambrian Paleoporterozoic units are designated with X^2 or X^3. X^2 units are older then X^3 units. IT is based off Clayton's 1990 diagram. However, it has been expanded to include the South Range. It is now known (Medaris, 2001) that the Baxter Hollow Granite is older than the Baraboo Formation, based on paleosol development discovered in a drill core. Clayton's 1990 figure has the Baxter Hollow Granite intruding the Baraboo Formation. Other changes include the addition of the "Cenozoic undivided" deeply buried in the Devils Lake valley and the renaming of the Horicon Formation (now a member of the Holy Hill Formation) as the Holy Hill Formation.

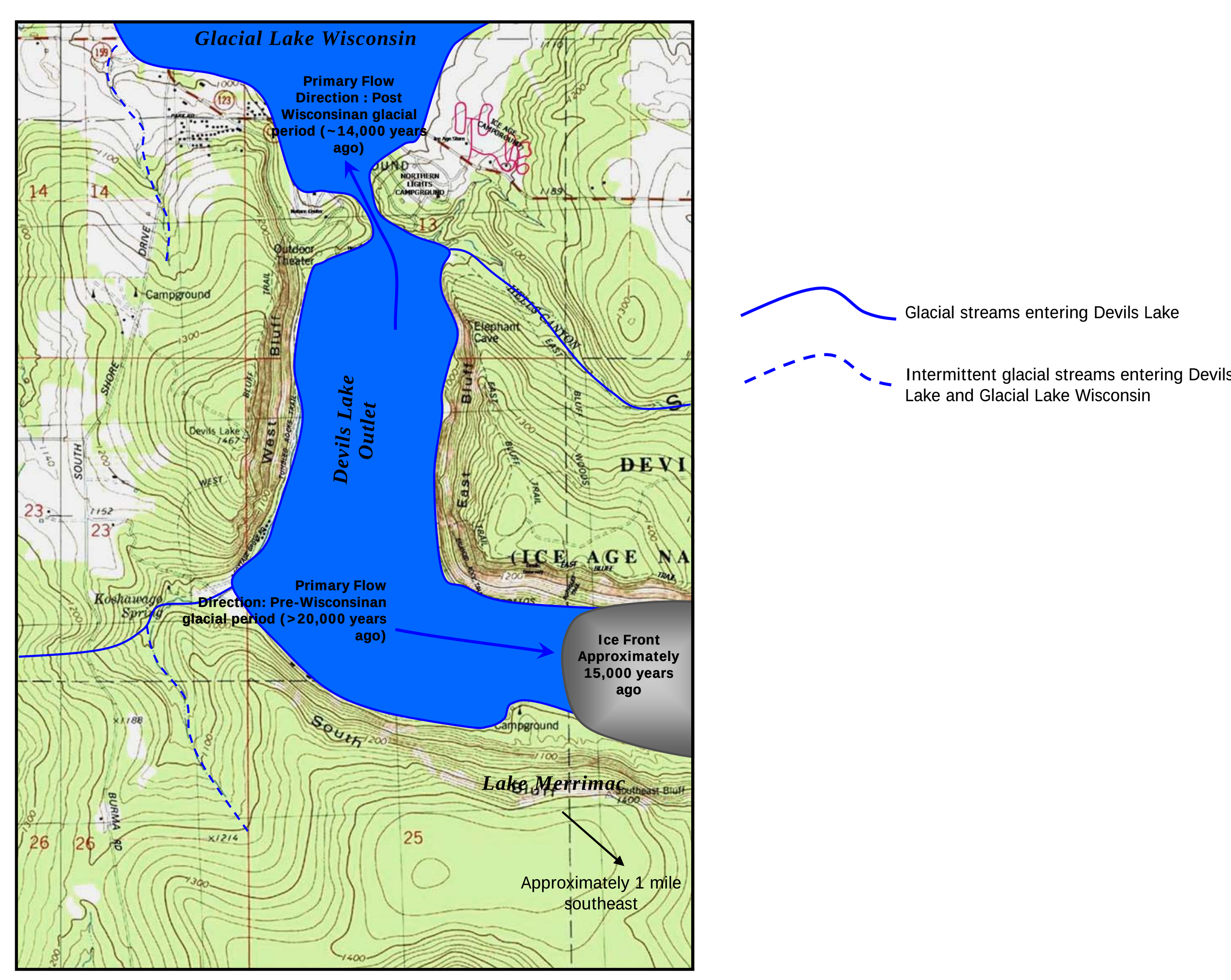
Devils Lake Geography Approximately 1,000,000 Years Ago



2000 feet



Devils Lake Geography Approximately 14,000-50,000 Years Ago



2000 feet

The above diagram depicts the path of the Ancient Wisconsin River through what is now the Devils Lake valley. Before the glaciers altered the course of the modern Wisconsin River, Devils Lake did not exist. The present level of Devils Lake is approximately 963 feet above Mean Sea Level. When the Ancient Wisconsin River flowed through the Devils Lake Valley, it was much lower in elevation, the valley narrower, and the cliffs appeared to be much taller. The elevation of the Ancient Wisconsin River was probably around 725-740 feet above mean sea level.

The Ancient Wisconsin River is not solely responsible for creating the Devils Lake Valley. The valley's beginnings probably date back to at least one billion years ago, when the Baraboo Formation was land locked and erosion was dominant. The topography was similar to as it appears today. The valley probably started out a set of fractures that widened with time. By the time the Cambrian seas moved in an began to deposit the Parfreys Glen Formation, a proto-valley had already formed. As the Cambrian seas rose, hurricanes helped to deepen and widen the valley even further. Eventually the Ordovician seas had totally submerged the Baraboo Area and the filling of sediments in the valley was well underway.

When the seas retreated, probably during the Silurian, erosion once again began to grip the Baraboo Area. By one million years ago most of the quartzite hills stood as they once did at the end of the Precambrian and the Ancient Wisconsin River passed through the valley.

More recently Devils Lake was an outlet for now extinct glacial lakes. Prior to 30,000 years ago Devils Lake likely existed as small glacial lake that flowed east through the southeast corner of the modern lake into the area that would eventually contain Lake Merrimac (located southeast of the above map).

About 15,000 years ago, the Johnstown Phase glacier blocked any southeast flow out of Devils Lake. This ice sheet probably raised the level of Devils Lake to about 990-995 feet above mean sea level. As the glacier wasted east, it left a pile of diamicton and rubble. This clogged the southeast corner of Devils Lake, preventing any flow into Lake Merrimac. As a result, Devils Lake began to drain north into Glacial Lake Wisconsin.

Modern Devils Lake took shape about 13,500 years ago when Glacial Lake Wisconsin catastrophically drained north of the Wisconsin Dells area. As a result Devils Lake briefly empted north until it reached its present level. The modern Devils Lake has no exit streams. The only way that water leaves the lake is by evaporation or seepage into the groundwater.

The future of Devils Lake is predictable, barring heavy human interference or the readvancement of glacial ice. Devils Lake is shallow never reaching more than 50 feet deep. It is typical of small shallow lakes left by the ice age. By comparison, the deepest of the Chain o' Lakes in Northern Illinois is about 45 feet deep, yet on average the lakes are no more 15 feet deep. However, Devils Lake at its deepest point is deeper than Lake Winnebago in Wisconsin. Lake Winnebago takes up a huge area (area = 137,000 acres), but is only 21-23 feet at its deepest and only averages about 16 feet deep. Eventually Devils Lake will slowly fill in from sand and silt from the steams that enter it. Organic debris will also help fill in the lake as it decays and falls to the bottom. Eventually Devils Lake will be reduced to a marsh before it finally fills in. If things persist the way they do, it should take another 1,000 to 2,000 years for Devils Lake to disappear. Eventually it may end up hosting another river as erosion cuts away at the glacial diamicton at the southeast end of the Lake.