Chapter 38

Dam-Breach Hypothesis for the Origin of Grand Canyon

The Grand Canyon is probably the most recognized scenic landform in the world (Figure 38.1). It is considered a showcase for uniformitarian geology and claimed to be evidence against the Flood paradigm.[1] Yet, scientists have been trying for over 150 years to explain its origin. They occasionally come to a "consensus" on its origin or on some aspect of the canyon, which they think solves one or more of the mysteries. However, consensus is quickly shattered.[2,3,4]

Figure 38.1. Grand Canyon, northern Arizona (view north from Yavapai Observation Station, South Rim). The side Canyon is Bright Angel Canyon, caused by the Bright Angel Fault and which the North Kaibab trail runs down.

[1] Strahler, A.N., 1987. *Science and Earth History: The Evolution/Creation Controversy*. Prometheus Books, Buffalo, NY.
[2] Oard, M.J., 2010. The origin of Grand Canyon Part I: Uniformitarian fails to explain Grand Canyon. *Creation Research Society Quarterly* 46(3):185–200.
[3] Oard, M.J., 2009. How old is Grand Canyon? *Journal of Creation* 23(2):17–24.
[4] Oard, M.J., 2014. Controversy over the uniformitarian age of Grand Canyon. *Journal of Creation* 28(2):11–16.

Creationists have been attempting to explain the origin of Grand Canyon within biblical earth history. Some consider the Cenozoic Era post-Flood, and since the canyon originated in the Late Cenozoic, the "dam-breach hypothesis" was developed. [5,6] How solid is this hypothesis? Is the evidence for a dam breach solid enough to support the Cenozoic as post-Flood at least in the Grand Canyon area? After demonstrating that uniformitarian scientists cannot explain the canyon, I will summarize two seemingly fatal arguments against the dam-breach hypothesis. This consequently decreases the significance of Grand Canyon as evidence of the late Cenozoic being post-Flood.[7]

Uniformitarian Difficulties

If uniformitarianism were true, geologists should easily discover the origin of the Grand Canyon. They have spent an inordinate amount of effort to do so, ever since John Wesley Powell's first courageous trip down the Green and Colorado Rivers in 1869.[8] Their hypotheses have come and gone—none fit the data.[2] In a popular book on the geology of Grand Canyon, Greer Price admitted:

> But while the principles of erosion, like so much of geology, are simple, the detailed history of the Colorado River and its canyons remains elusive and difficult to grasp.[9]

In another recent book, Wayne Ranney repeatedly noted how little is actually known about the origin of Grand Canyon:

> The canyon's birth is shrouded in hazy mystery, cloaked in intrigue, and filled with enigmatic puzzles. And although the Grand Canyon is one of the world's most recognizable landscapes, it is remarkable how little is known about the details of its origin.[10]

Information provided at Grand Canyon National Park declares the canyon is a result of millions of years of erosion by the Colorado River. The essence of this hypothesis is uniformitarianism—present-day rates operating over eons. This can be called the *little water over a lot of time* hypothesis, while catastrophic models would be called the *lot of water over a short time* hypothesis. It appears no two geologists agree on the actual details of the canyon's origin.[11]

The local geology of the Colorado Plateau presents what is perhaps the most fundamental question *any* hypothesis must address: Why does the Colorado River flow through the high plateaus on the southwest Colorado Plateau rather than around them? There was no fault system directing the canyon's path, except possibly short segments such as southeast of the Shivwits Plateau which may have been influenced by the Hurricane Fault or an offshoot of that fault. It is no small matter that the river breaches the high Kaibab Plateau. The Grand Canyon is *not* located

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[5] Austin, S.A., 1994. How was Grand Canyon eroded? In:Austin, S.A. (editor), *Grand Canyon – Monument to Catastrophism*, Institute for Creation Research, Dallas, TX, pp. 83-110.
[6] Brown, W., 2008. *In the Beginning: Compelling Evidence for Creation and the Flood*, 8th edition, Center for Scientific Creation, Phoenix, AZ.
[7] Oard, M.J., 2014. *A Grand Origin for Grand Canyon*. Creation Research Society ebook, Creation Research Society, Chino Valley, AZ.
[8] Powell, J.W., 1895. *The Exploration of the Colorado River and Its Canyons* (Republished by Dover in 1961). Dover Publishing, New York, NY.
[9] Price, L.G., 1999. *An Introduction to Grand Canyon Geology*. Grand Canyon Association, Grand Canyon, AZ, p. 7.
[10] Ranney, W., 2005. *Carving Grand Canyon: Evidence, Theories, and Mystery*. Grand Canyon Association, Grand Canyon, AZ, p. 11.
[11] Powell, J.L., 2005. *Grand Canyon: Solving Earth's Grandest Puzzle*. PI Press, New York, NY.

at the lowest point through the plateau. The lowest point is about 5,750 feet (1,750 m) above msl, at the northern end of the plateau, but the canyon was carved at an *intermediate* altitude, about 7,300 feet (2,225 m) above msl on the south rim and 8,300 feet (2,530 m) above msl on the North Rim (the top of the plateau slopes southward). Ranney described the puzzle:

> Oddly enough, the Grand Canyon is located in a place where it seemingly shouldn't be. Some twenty miles east of Grand Canyon Village the Colorado River turns sharply ninety degrees, from a southern course to a western one and into the heart of the uplifted Kaibab Plateau… It appears to cut right through this uplifted wall of rock, which lies three thousand feet above the adjacent Marble Platform to the east.[12]

The Marble Platform is over 3,000 feet (915 m) higher than the Colorado River. This leads to another fundamental question: which came first, the canyon or the river?

Geologists have developed three main explanations for the origin of the Grand Canyon: (1) the antecedent stream, (2) stream piracy, and (3) lake spillover. Early on, a few geologists thought it might be explained by superimposition—the hypothesis that rivers maintain their course while eroding vertically down through underlying rocks, resulting in a river flowing through ridges and mountains. This idea was quickly discarded.

The lake spillover is the idea that lakes ponded east of the Kaibab Plateau eventually spilled over the Kaibab Plateau carving the Grand Canyon. This was an old idea developed by Blackwelder long ago and recently revised.[3] One problem with lake spillover is that the Biddahochi Formation does not support a large lake trapped southeast of the Kaibab Plateau (see below),[13] and the Grand Canyon is not carved at the low point across the plateau (see above). So, the revival of the spillover hypothesis is also not doing well either.[3,4]

> Any such lake [southeast of the Kaibab Plateau], even if it were as deep and areally extensive as would be needed, seems more likely to have drained to the north and south of the modern canyon in avoidance of the structurally high crest of the Kaibab arch…"[14]

Early geological pioneers thought it would be easy to determine the origin of Grand Canyon. After all, it was supposedly a simple deduction from the uniformitarian principle. But, in a recent book, James Powell lamented:

> Surprisingly, what had seemed to the pioneers to be an easy geological puzzle to solve proved just the opposite…. [John Wesley] Powell and Dutton would have been taken aback to learn that, sixty-five years after the Major's [John Wesley Powell] maiden voyage, the river's age and history were still open questions. They would have been astounded to find that the origin of the Grand Canyon was the subject of a conference held in 1964, which reached consensus but not unanimity, and that yet another convened in the year 2000, with the *same* result (emphasis mine).[15]

Could it be their difficulty discerning the origin of Grand Canyon lies in their paradigm—the absolute belief in uniformitarianism?

Fatal Problems with the Dam-Breach Hypothesis

The dam-breach hypothesis was developed in the mid-1980s, and proposes the formation of two or three post-Flood lakes northeast and southeast of the Kaibab Plateau in basins of the

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[12] Ranney, Ref. 10, p. 20.
[13] Dickinson, W.R., 2013. Rejection of the lake spillover model for initial incision of the Grand Canyon, and discussion of alternatives. *Geosphere* 9(1):1–20.
[14] Wernicke, B., 2011. The California River and its role in carving Grand Canyon. *GSA Bulletin* 123(7/8):1294.
[15] Powell, Ref. 11, pp. 4–5, 161.

Colorado Plateau (Figure 38.2). Among about a dozen serious geological problems, two seem fatal to the hypothesis. These are the lack of evidence for the lakes and the long tributary canyons of Kanab and Havasu Creeks.[7,16]

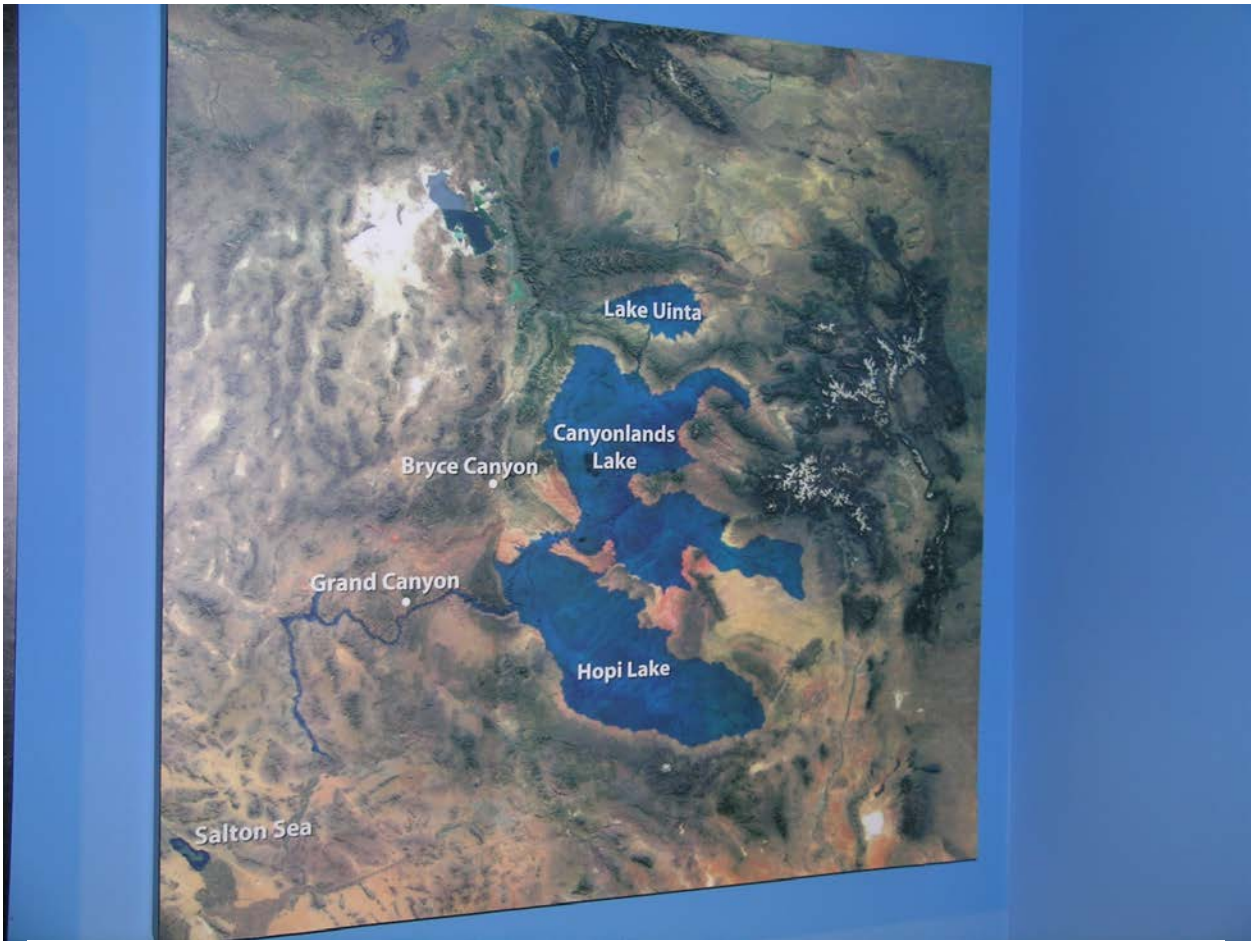

Figure 38.2. The three lakes that supposedly breached to carve Grand Canyon (from AiG museum display).

The "Lakes"

"Lake Hopi," theoretically occupied the Little Colorado River Valley southeast of the eastern Grand Canyon. The name for this lake was borrowed from uniformitarian scientists, who think that there was a Miocene/Pliocene lake there. This is based on their interpretation of the Bidahochi Formation found on the northern and eastern sides of the basin.[17]

"Canyonlands Lake" is thought to have been located northeast of Grand Canyon.[18] It has also been called "Grand Lake" by Brown.[19] Both authors suggest that the waters of this lake

[16] Oard, M.J., 2010. The Origin of Grand Canyon Part II: Fatal problems with the dam-breach hypothesis. *Creation Research Society Quarterly* 46(4):290–307.
[17] Scarborough, R., 1989. Cenozoic erosion and sedimentation in Arizona; in: Jenney, J.P. and Reynolds S.J. (editors), *Geologic Evolution of Arizona, Arizona Geological Society Digest 17*, Arizona Geological Society, Tucson, AZ, pp. 515-537.
[18] Austin, S.A., 1994. How was Grand Canyon eroded? In: Austin, S.A. (editor), *Grand Canyon – Monument to Catastrophism*, Institute for Creation Research, Dallas, TX, pp. 83-110.
[19] Brown, W., 2008. *In the Beginning: Compelling Evidence for Creation and the Flood*, 8th edition. Center for Scientific Creation, Phoenix, AZ.

were dammed by the Vermillion-Echo Cliffs northeast of the Marble Platform, rather than the Kaibab Plateau. This would have to be the case because the low spot on the northern Kaibab Plateau is 5,750 feet (1,750 m) above msl. This low spot is farther northeast than shown in Figure 38.2 and seems a point of contention between Austin, Brown, and other advocates of the dam-breach hypothesis. The Vermillion-Echo Cliffs were once assumed to have been connected on a northwest-southeast line. A reconstruction of the area with a lake surface level of 5,700 ft (1,737 m) would flood the Marble Platform,[18,20] as seen in Figure 38.2. Any higher and the lake overtops the low spot. There is no indication of its being overtopped by a lake.

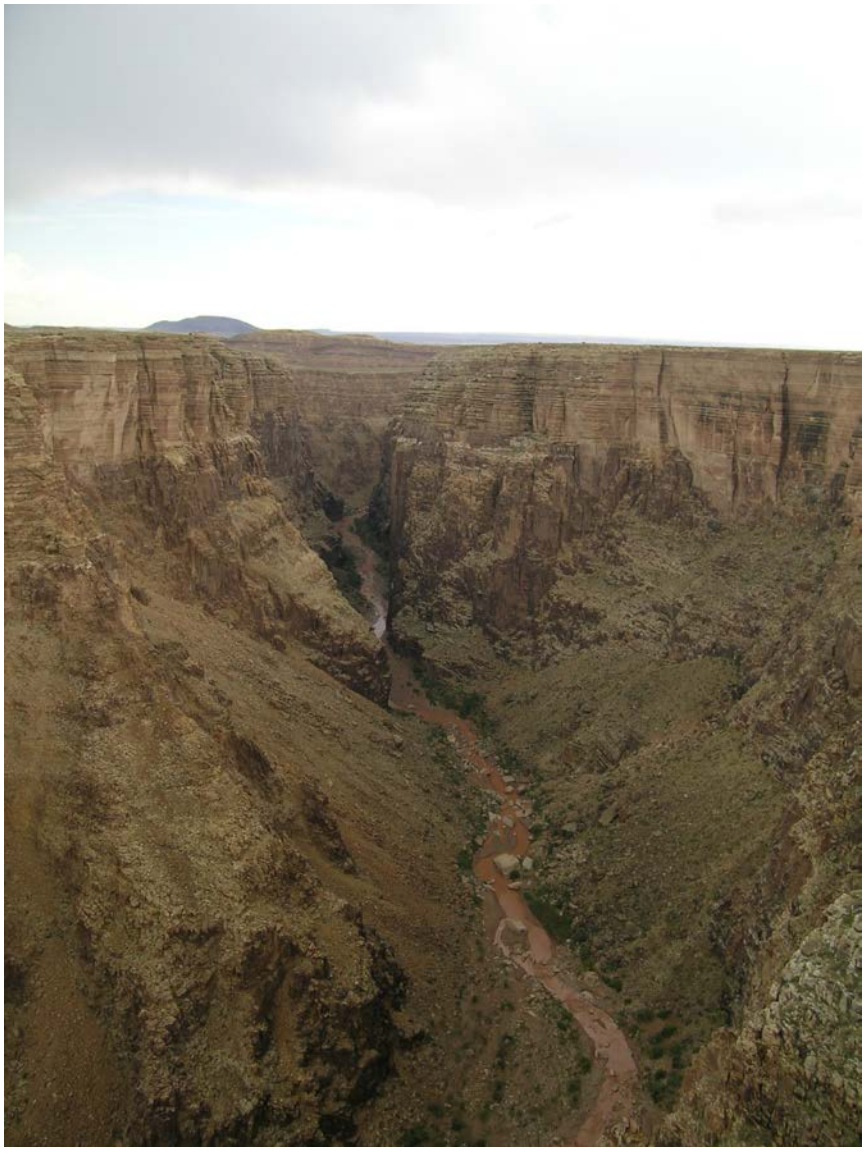

Figure 38.3. The narrow valley of the Little Colorado River Valley at a scenic overlook at milepost 285.7 on highway 64. The canyon at this point is a slot-like canyon about 1,200 feet (365 m) deep.

[20] Holroyd, III, E.W., 1994. A remote sensing search for extinct lake shore lines on the Colorado Plateau; in: Walsh, R.E. (editor), *Proceedings of the Third International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 243-254.

The third lake, one that is mentioned only in Austin's model of the dam-breach hypothesis, is Lake Vernal. It occupied the present location of the Green River Formation south of the Uinta Mountains. It is based on assuming that post-Flood lakes deposited the Green River Formation. However, there are numerous problems with the Green River Formation as being deposited in a post-Flood lake (see Chapter 36). The Green River Formation is clearly a Flood deposit. So, this "lake" is disqualified from consideration.

No Evidence for the lakes

Obviously, there needs to be evidence of upstream lakes if there was any breach. However, there is little to none, unlike the lakes west and northwest of the Colorado Plateau, where abundant evidence exists. There is no sedimentary evidence for Grand Lake. Its proponents and those uniformitarian scientists who accept the spillover hypothesis (see above), admit the absence of "Grand Lake" sediments.

Little or no evidence of sediments has been found for Lake Hopi. There should be hundreds of feet of sediments filling up the low areas of the "former lake" since many of the sedimentary rocks in the region are soft and easily erodible. The outlet of Lake Hopi would have been the canyon of the Little Colorado River Valley (Figure 38.3). It is too narrow to have eroded much of the bottom sediment of Lake Hopi, if the dam-breach really occurred. Austin claims the Bidahochi Formation in the Little Colorado River Valley contains the sedimentary remains of Lake Hopi.[18] The difficulty is the formation is high along the northeast part of the valley and even higher than the supposed top of Lake Hopi. Geologists generally think only a small part of the formation was deposited by a lake, and that this lake was only a small desert lake.[21,22] Most of the formation is volcanic or laid down in moving water. Unless the Bidahochi Formation can be reinterpreted, there does not seem to be enough sediment to justify a lake as large as the proposed Lake Hopi. Not only is the formation too high, it is not where it should be, in the middle of the valley filling up the low points, as occurs with modern lakes today.

In contrast, glacial Lake Missoula left abundant sediments in the broad basin of northwestern Montana. These are found where we would expect, at the lowest elevations northwest of Missoula. This is in spite of the fact that the lake sediments were eroded from the narrow valleys of western Montana by current velocities of up to 60 mph (97 kph) when the lake drained.

In addition to the missing sediments, the proposed lakes left no geomorphological markers. All lakes have shorelines, and when rivers flow into lakes they form deltas. If a lake empties, the shorelines and deltas will remain; carved or deposited on the surrounding hills. The Flood ended around 4,500 years ago. The lakes breached several hundred years later. That leaves slightly more than four millennia to erode the evidence for the lakes, which is not enough time to erase all traces of these lakes, as is clearly seen in the remains of other pluvial lakes west of the Colorado Plateau. In contrast to the proposed Grand Canyon source lakes, the shorelines of

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[21] Dallegge, T.A., Ort, M.H., McIntosh, W.C., and Perkins, M.E., 2001. Age and depositional basin morphology of the Bidahochi Formation and implications for the ancestral upper Colorado River; in: Young, R.A. and Spamer E.E. (editors), *Colorado River Origin and Evolution: Proceedings of a Symposium Held at Grand Canyon National Park in June, 2000*, Grand Canyon Association, Grand Canyon, AZ, pp. 47-51.

[22] White, J.D.L., 1990. Depositional architecture of a maar-pitted playa: sedimentation in the Hopi Buttes volcanic field, northeastern Arizona, U.S.A. *Sedimentary Geology* 67:55-84.

glacial Lake Missoula are abundant in the valleys of western Montana.[23] The shorelines are etched in both hard and soft rocks the same.[24]

Figure 38.4. Havasu Canyon with Cataract Creek from near the Colorado River at the bottom of Grand Canyon.

Long Tributary Canyons Cannot Be Explained by a Dam Breach

The long tributary Kanab and Havasu Canyons also provide fatal evidence against the dam-breach hypothesis. They are erosional canyons, not fault related. The simplest explanation is the canyons formed during the same erosional event that carved Grand Canyon. Kanab Canyon enters Grand Canyon as a narrow gorge about one mile (1.6 km) deep and a quarter mile (0.4 km) wide.[11] Havasu Canyon is of similar dimensions (Figure 38.4). Both require significant erosion of hard rock. Cataract Creek runs down Havasu Canyon all year-round, but Kanab Creek is dry most of the year and presents a problem to even uniformitarian geologists: "To make the question even more difficult, Kanab Creek, like most of the side canyons, and in contrast to the perennial Colorado, is usually dry."[25] Ranney puzzled over the origin of these tributaries:

[23] Oard, M.J., 2004. *The Missoula Flood Controversy and the Genesis Flood*. Creation Research Society Monograph No. 13, Chino Valley, AZ.
[24] Alt, D., 2001. *Glacial Lake Missoula and Its Humongous Floods.* Mountain Press Publishing, Missoula, MT.
[25] Powell, Ref. 11, pp. 63–64.

> How is it that much smaller tributaries, which have no water in their channels most of the time, can carve canyons just as deep as the Colorado River has carved the Grand Canyon?[26]

Because they gradually descend to the exact depth of Grand Canyon from their upper drainage basins about 60 miles (90 km) away, they could not have formed before Grand Canyon. They had to form *simultaneously* with Grand Canyon, and so water from the dam breach would have had to be present at the *upper ends of the drainage basins* of the tributary canyons, and at the upper end of Grand Canyon at the same time—areas separated by over a hundred miles (160 km). In other words, water flowing at sufficient velocity for a sufficient time to erode a mile into indurated rock would have had to have been *spread over a hundred miles* (160 km) of the southwest Colorado Plateau and been flowing simultaneously from three widely spread sources. It is very unlikely this happened. This seems like a second fatal problem for the breach dam hypothesis.

Grand Canyon Carved by Late Flood Channelized Erosion

It is a straight forward deduction that the Grand Canyon was carved by late Flood channelized erosion.[7] The Grand Canyon is a long water gap. There are thousands of them dissecting the mountains and plateaus of the earth. It is most likely that the Grand Canyon was carved by the same process that created other water gaps: late Flood channelized runoff from currents flowing perpendicular to ridges, plateaus, or mountain ranges (see Figure 27.4 for a schematic of the origin of a water gap by Flood runoff).[27,28,29]

In the situation of Grand Canyon, 6,000 to 10,000 feet (1,830 to 3,050 m) of sediments had to have been removed from the entire region *before* the Grand Canyon was cut. This is based on the northward dipping sedimentary rocks in the Grand Staircase to the north (Figure 38.5), which extended southward over the Grand Canyon area. The erosion was done by an east to northeasterly flowing wide current of water. It eroded the strata as a sheet and left behind a lag of resistant cobbles and boulders on high points, called the Rim Gravel.[30] This is called the "Great Denudation" by secular geologists.[31]

The Grand Canyon was carved as the current reversed direction, channelized, and flowed towards the Pacific Ocean. This took place as the continent was rising and the Pacific Ocean basin was sinking.[7] A detailed hypothesis of how Grand Canyon was carved by late Flood channelized currents has been published elsewhere.[7,32]

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[26] Ranney, Ref. 10, pp. 50–51.
[27] Oard, M.J., 2010. The origin of Grand Canyon Part III: a geomorphological problem. *Creation Research Society Quarterly* 47(1):45-57.
[28] Oard, M.J., 2008. *Flood by Design: Receding Water Shapes the Earth's Surface*, Master Books, Green Forest, AR.
[29] Oard, M.J., 2014. http://michael.oards.net/GenesisFloodRunoff.htm.
[30] Oard, M. J. and Klevberg, P. 2005. Deposits remaining from the Genesis Flood: Rim Gravels in Arizona. *Creation Research Society Quarterly* 42 (1):1-17.
[31] Oard, M.J., 2010. The origin of Grand Canyon Part IV: the great denudation. *Creation Research Society Quarterly* 47(1):146-157.
[32] Oard, M.J., 2011. The origin of Grand Canyon Part V: carved by late Flood channelized erosion. *Creation Research Society Quarterly* 47(4):271-282.

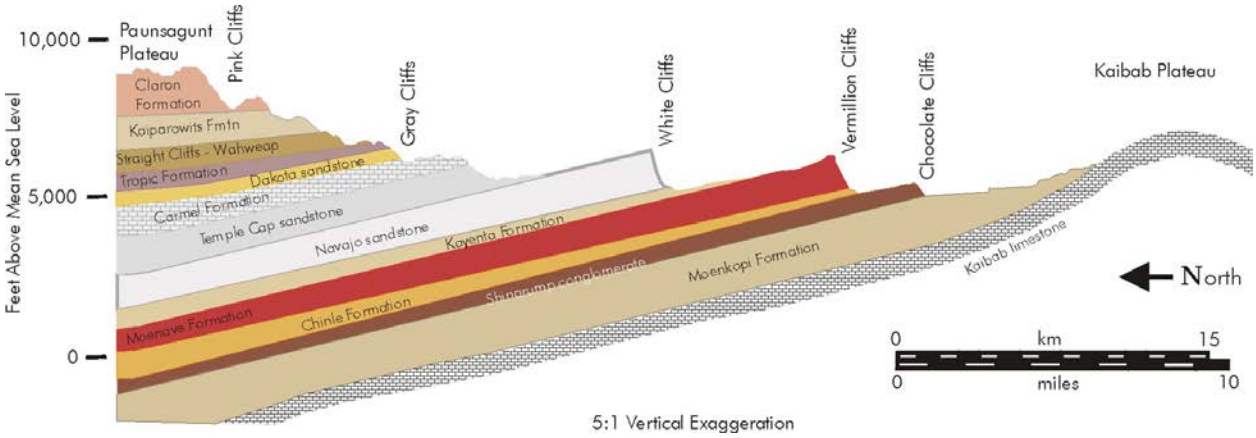

Figure 38.5. The Grand Staircase north of Grand Canyon showing the five prominent cliffs formed by erosion. The slope of the sedimentary rocks is north to north-northeast at less than 3 degrees. Vertical exaggeration is 5:1 (drawn by Peter Klevberg).

Conclusion

The dam breach hypothesis has multiple major problems, two of which seem fatal. But the canyon can be readily carved by late Flood channelized erosion, similar to thousands of other water gaps across the Earth. All this activity, including the Great Denudation, occurred during the middle and late Cenozoic as a result of Flood erosion. Therefore, Grand Canyon cannot be used as an argument that the Late Cenozoic is post-Flood. The Flood/post-Flood boundary in the Grand Canyon area would then be in the very late Cenozoic, about mid-Pleistocene.