# Imaginary Uniformitarian Thrusts

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## Abstract

The explanation for "overthrusts" and "thrusts" is one of many challenges facing creation researchers. We evaluated the stacked thrusts in the Sun River Canyon, along the Rocky Mountain Front, about 100 km west of Great Falls, Montana, USA. We have examined four possibilities for these thrusts, and have eliminated the uniformitarian option of slow uphill movement of older strata over millions of years, because there is little broken rock or deformation at the contact. We also examined a paraconformity of 130 million years but saw no evidence for deformation or erosion, suggesting that this "missing time" is imaginary. At present levels, erosion would denude the continent to sea level in a maximum of 50 million years. This places constraints on the timing of thrusting. Absence of deformation or motion at bedding planes along the northeast shore of Gibson Reservoir also suggests that four proposed minor thrust faults do not exist.

## Introduction

Although creationists have answers to many geological questions (Oard and Reed, 2009), there are many challenges for Flood geology that need investigation. One of these is the existence and origin of "overthrusts" and "thrusts." An overthrust is formally defined as "a low angle thrust fault of large scale, with displacement generally measured in kilometers" (Neuendorf et al., 2005, p. 462). A thrust fault is "a fault with a dip of 45° or less over much of its extent, on which the hanging wall [upper rock] has moved upward relative to the footwall [lower rock]" (Neuendorf et al., 2005, p. 670). Figure 1 shows a diagram of how secular researchers view the formation of a thrust fault with "older" rock pushed over "younger" rock. There are hundreds of examples of claimed overthrusts and thrusts in the world, and they are mapped in most mountain ranges.

Creationists need to derive explanations of overthrusts and thrusts. In the past, some creationists denied their existence (Read, 2000; Whitcomb and Morris, 1961). Others accept their existence but think they were formed during the Flood (Clarey, 2013; Coffin, 1983). Only field exploration can answer the question of which are real and which are not. We encourage creation researchers to go out into the field and find the answer to this and other geological challenges and not just accept the *interpretations* of secular researchers.

If thrusts and overthrusts do exist, then their origin and development needs to be explained in the paradigm of Flood geology. Implications are important: If some overthrusts and thrusts are based on paleontological or stratigraphic evidence only, rather than on structural or geophysical evidence, their potential

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nonexistence may negatively affect the geological timescale.

## Sun River Canyon Thrusts

Geologists see the Rocky Mountain Front in northwest Montana as a series of stacked or imbricate thrusts. It is probably the best exposure of this kind of thrust in North America. Secular geologists have mapped at least nine major stacked thrusts and dozens of minor ones in the region just east of the continental divide. Mudge (1972b) claimed to have found 80 thrust faults in a 28-km section perpendicular to the mountain range axis.

The famous Lewis Overthrust is located about 8 km west of the study area along the Rocky Mountain Front. It stretches over 320 km in length in a general north-south direction, from the northern Rockies of Montana into the Rockies of southern Canada. The Lewis Overthrust has been given various local names, and it is possible that it continues even farther north and south. We have observed the Lewis Overthrust at several locations, one of the best being northeast of Marias Pass in southern Glacier National Park, where fractured Precambrian dolostone lies over Cretaceous shale (Figure 2).

The Sun River Canyon, including Gibson Reservoir, lies west of Great Falls, Montana, within the Rocky Mountain Front. The canyon cuts perpendicular to the thrusts of the Rocky Mountain Front (Figure 3). Major thrusts have placed mostly Devonian and Mississippian limestones and dolostones over Cretaceous and Jurassic sandstones and shales (Mudge, 1972a, 1972b). According to the geological column, the age difference between the Devonian and the Jurassic is about 230 million years. The angle of dip of the beds and thrusts is very steep, mostly dipping west on the order of 60° to 85°. Because of these steep angles, most of the thrusts are technically not *thrust* faults, but *reverse* faults, which are high-angle faults with a dip greater than 45° that lift lower strata relative to higher strata. For simplicity, we will simply refer to all of these faults in the study area as *thrusts*.

We have been researching thrusts in the Sun River Canyon since the early 1990s. We revisited the canyon in September 2014 on a six-day field trip for a closer examination of the strata

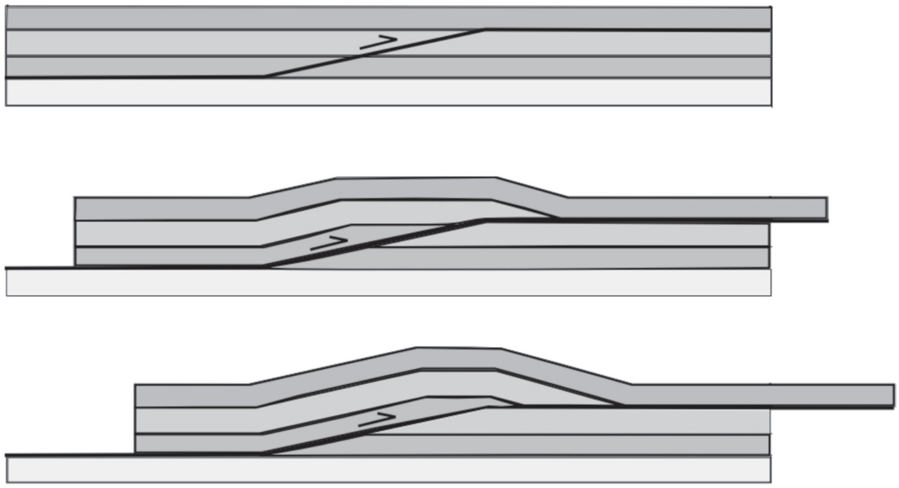

**Figure 1. Diagram of the origin of a thrust fault (Wikipedia). A lateral force pushes up older strata over younger strata.**

**Figure 2. The Lewis Overthrust at the contact with the light-colored dolostone and the darker shale, northeast of Marias Pass in Glacier National Park, Montana, USA.**

exposed there. We performed a geological reconnaissance, measuring the strike and dip of the beds at many locations in the canyon (Figure 4). Based on these field observations, we have derived four options for explaining the thrusts: (1) older layers were slowly pushed east at a steep angle over younger rocks, just as uniformitarian researchers claim; (2) there are no thrusts at all; (3) the thrusts are real, but the mechanism is different from that proposed by uniformitarians; and (4) some of the thrusts are real, and some are not. We compared these four options in the field.

The first option can be eliminated because such faulting would invariably result in meters to tens of meters of pulverized fault gouge or breccia at the plane of faulting. This is normally observed at real faults and expected when large bodies of solid rock push against each other. We observe less than 0.5 m of fault breccia at the French Thrust (Figure 5), one of the major thrust faults in the Sun River Canyon. In fact, deformation at and near the contact of major thrusts is astonishingly limited, usually less than 10 m below the contact where deformation could be observed. Based on our preliminary analysis and the absence of field evidence of motion, at least some of the alleged thrusts in the area are not real, existing only in the minds of the geologists. That leaves options 2 and 4.

**Figure 3. View north of the multiple overthrusts (ridges) along the Rocky Mountain Front (Wikipedia). The waterbody is Gibson Reservoir, west of Augusta, Montana, USA, created by a dam on the Sun River. The Lewis Overthrust is just off the figure to the left, west of the wide north-south valley of the Middle Fork of the Sun River.**

## "Mental" Thrusts

Melville Mudge (1972a, 1972b) has done the most extensive work on the geology of the Sun River Canyon and its thrust faults. He concluded that there were 80 such thrusts. He mapped four of them in Mortimer Gulch, a valley north of the eastern end of Gibson Reservoir (Figure 6). His geological map (Figure 7) showed three of the thrusts in middle Jurassic Ellis Group strata, while the fourth transported at least part of the Ellis Group over the younger Jurassic Morrison Formation at one location. A "group" is composed of two or more formations, which are bodies of rock identified by their rock type or characteristics. However, we are now skeptical that the Ellis Group or the Morrison Formation in the study area can be correlated with the rocks of the same name to the east in the High Plains. Because the uniformitarian age difference of these purported thrusts was small, the thrusts were considered minor in the sense that the purported thrust faults did not have much of a stratigraphic difference. Very few surface exposures of the thrusts are mapped on Figure 7. Data using visible outcrops is mapped as solid lines, while dashed lines indicate inferred boundaries or faults. Rocks in Mortimer Gulch are often covered by soil and trees; the dashed lines under the reservoir indicate that the thrusts are concealed, probably by sand and coarse gravel. Therefore, we would not expect major offsets, which would be visible in the nearby terrain, but there should be minor deformation or offsets in the strata that show minor thrusting.

## The Imaginary Unconformity

We were able to see and measure the strike (azimuth) and dip of the strata in exposures along the northeast shore of Gibson Reservoir. This area corresponds to the southern boundary of Mortimer Gulch (Figure 6). Most of the beds were covered by sand and coarse gravel. The strike of the layers was generally north-south. The strata where the dam is located are limestone and dolostone, dipping to the west at a very high angle of 83° (top arrow in Figure 8). These strata are dated as belonging to the late Paleozoic Mississippian Castle Reef Do-

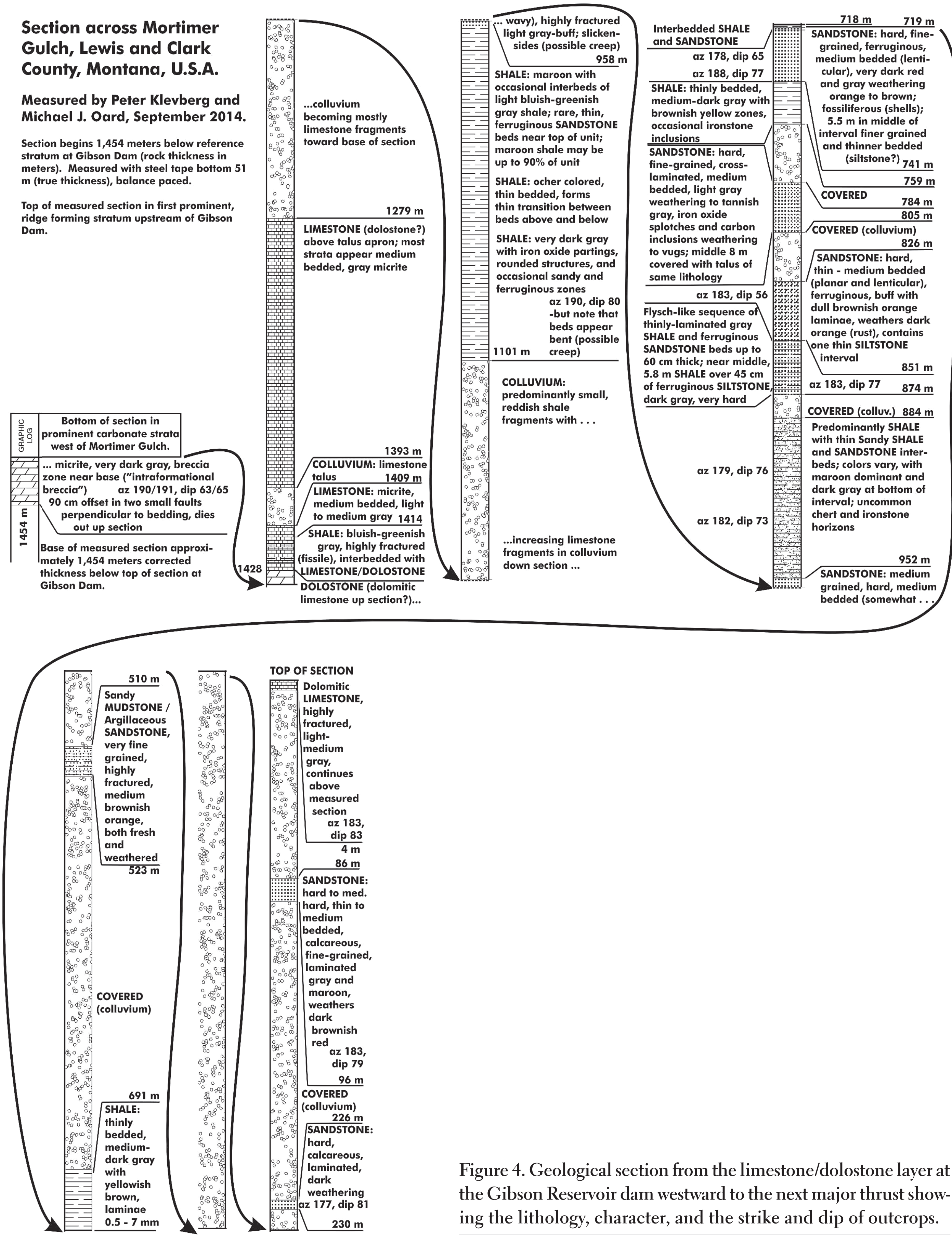


Figure 4. Geological section from the limestone/dolostone layer at the Gibson Reservoir dam westward to the next major thrust showing the lithology, character, and the strike and dip of outcrops.

lostone; 300 million years old according to the secular geological timescale. The strata just above these limestone and dolostone layers in Mortimer Gulch (to the west) are sandstone and shale assigned to the Jurassic, and dated as about 170 million years old (Figures 8 to 13).

The first layer above the limestone/dolostone was measured as dipping about 80° to the west (lower arrow on Figure 8) and was therefore conformable with the underlying Mississippian carbonates. There is no visible erosion in the field, but based on their dates, these layers are separated by 130 million years! Mudge (1972a, p. 40) stated:

> The unconformity at the base of the Jurassic rocks represents a time span of about 130 million years from Late Mississippian to Middle Jurassic.

Note that Mudge called the boundary an "unconformity" because of the relative stratigraphic position of the layers and the "missing time." However, there is no observable lithologic gap, and thus this is an example of a "paraconformity," which is a gap in time with little or no geological evidence. Since there is no field evidence, the "gap" appears as a simple bedding plane. In other words, there is no *field* basis for the time gap. Uniformitarian geologists disguise problems such as these with nomenclature; hence the "unconformity." It is a mystery to them because 130 million years is ample time for extensive erosion, which should have been preserved. A straightforward field interpretation would be that there is no significant missing time and that the stratigraphic interpretation therefore needs to be reconsidered.

**Figure 5. Contact at the French Thrust, showing ~0.5 m of fault breccia. Edge of ~3 m layer of metamorphic rock to left. Out of picture, ~10 m left, soft shale was dipping at the same high angle as the limestone of the French thrust.**


**Figure 6. View northwest from the Gibson Dam overlook of Mortimer Gulch, a north-south valley between two overthrust sheets.**

## All Continents Can be Leveled to Sea Level in 10 to 50 million years

The amount of time seen in this one paraconformity is much more serious a problem than just the stratigraphic puzzle it presents. Modern erosion rates show that erosion should be seen at almost all stratigraphic boundaries. Given today's rate of erosion, even Charles Lyell would have to admit that continents would be eroded to sea level, were there not sufficient offsetting uplift. Roth (1998) estimated that all of North America (and other continents) would have been eroded to sea level in just 10

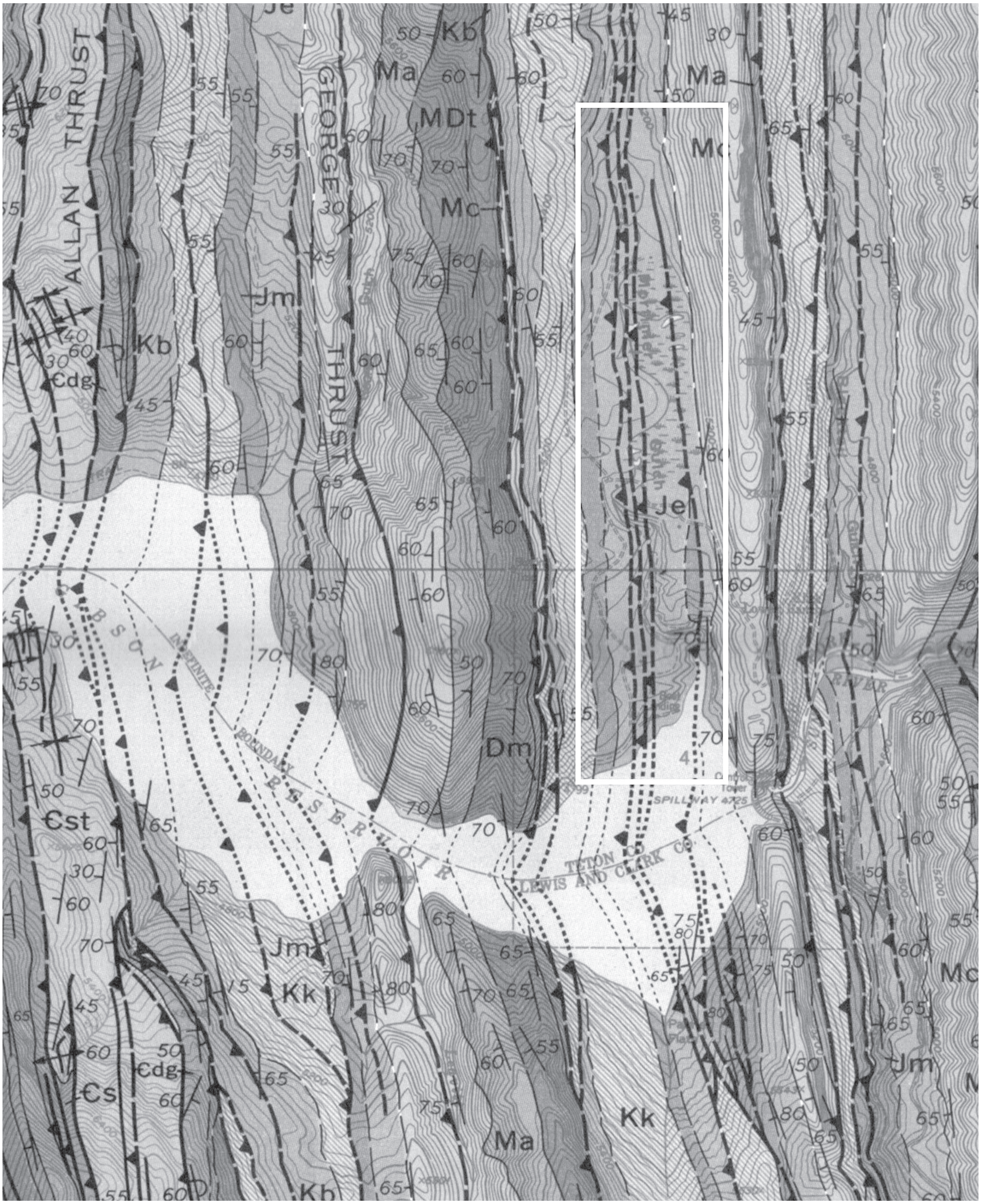


**Figure 7. Geological map through eastern Gibson Reservoir with Mortimer Gulch the first valley to the north (Mudge, 1972a, plate 1). Note the four overthrusts (triangle points to the upper block) that trend north up the gulch.**

million years at the present rate of erosion, based on the output of rivers into the oceans. But the estimate is too slow because Roth did not factor coastal erosion, which is rapid in many locations such as the Arctic coast. His estimate could be as little as 8 million years. The offsetting uplift is inferred by uniformitarian geologists because the continent obviously has not been totally denuded.

Geologists might argue that the rate would be slowed because the measurements include man's influence on the environment. But granting these arguments and doubling the rate to factor out man's contribution to the measurements of present-day erosion, the time needed to denude North America would be only 16 million years. That period of time is very small compared to the 130 million years contained in the one paraconformity at Sun River Canyon.

However, it is well known that areas of high mountains and cliffs erode faster than more subdued relief. Including the slowing down of erosion with decreasing relief would result in more time to erode the continents to sea level than 16 million years. Schumm (1963) estimated this rate at 33 million years, but that too is very small compared to 130 million. Changing the climate would have little effect because the more erratic erosion of an arid climate is still significant during heavy rains and flash floods. Warm, humid climates experience less catastrophic erosion due to vegetative protection, but there is more rain and a greater number of streams and rivers to erode the landscape. Either way, the rate to erode the continent to sea level remains insignificant compared to the time gap at the observed paraconformity in the Sun River Canyon. Summerfield (1991, p. 392) stated:

> Climate has been widely held to have a predominant influence on rates of denudation, although in the light of more recent data it is doubtful whether this view can now be sustained.

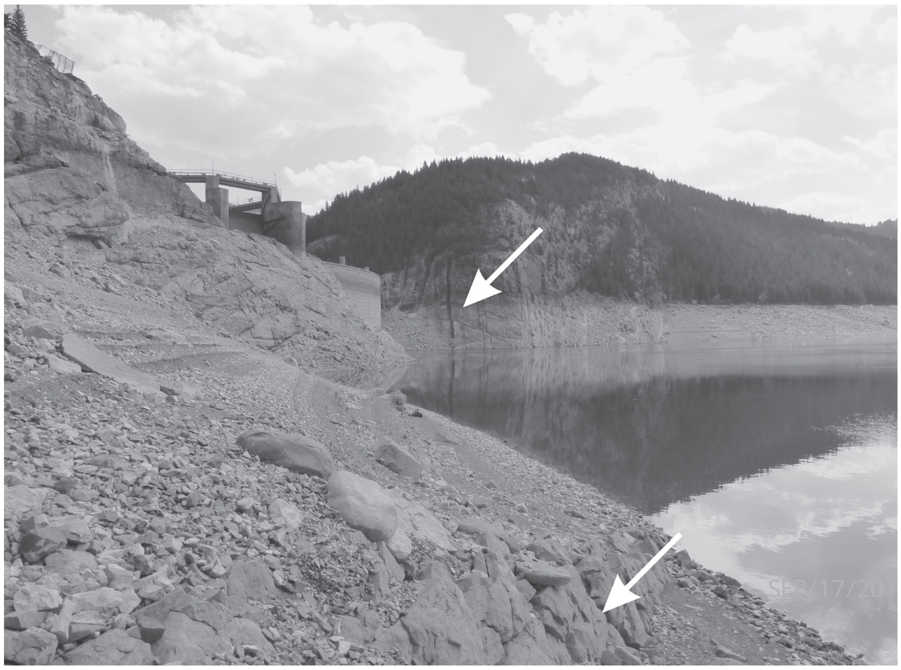

**Figure 8. Gibson Dam (left center) with limestone/dolostone dipping west (right) at 83° as seen across the Gibson Reservoir (center). Sandstone bed near the contact with the limestone/dolostone dipping west at 79°.**

**Figure 9. Shale layer farther west from limestone/dolostone layer along northeast shore of Gibson Reservoir dipping west at 81°.**

**Figure 10. Farther west of Figure 9, a sandstone layer dipping west at 77°.**

**Figure 11. Farther west of Figure 10, a wavy sandstone and shale layer dipping west about 75°.**

This general rate of continental erosion has been accepted by uniformitarian geologists (Nott, 1995; Twidale and Campbell, 1993). Young (1983) stated that the continents could be stripped to sea level in 10 to 25 million years. Twidale and Campbell (2005, p. 188, brackets added) conclude:

> However, in all cases, assuming no further major uplift or lowering of sea-level, it has been estimated that a small area like New Zealand, although mountainous, would be base-leveled [reduced to sea level] in about 11 million years. Larger land areas, like the continental United States, sub-Saharan Africa, peninsular India or Australia, would be reduced to base-level in 33 million years or so.

We will be conservative and assume total continental erosion would take a maximum of 50 million years. Even if it took 50 million years to level the continents, the amount of erosion that should be observed at Sun River Canyon in this one paraconformity is staggering. It is also absent. From a field standpoint, it appears that little to no time elapsed between deposition of these beds. Where is the erosion? Mudge (1972a, p. 41) gave the standard explanation:

> The nature of the unconformity indicates that the Mississippian rocks were exposed for a long time before middle Jurassic sedimentation.

But this is no explanation. It is a clear case of belief overriding visual evidence. It presents a glaring contradiction with the uniformitarian timescale, and for that reason the problem is essentially ignored. This is not a unique situation. Reed (2002a, 2002b, 2004) showed that it is actually quite common. Worse, for the uniformitarian point of view, the lack of erosion between layers supposedly separated by many millions of years is the rule, not the exception (Roth, 1998). On the other hand, this is what we expect in the Genesis Flood, which would lay down layers in rapid succession over wide areas.

## No Evidence of Minor Overthrusts

The strata of Mortimer Gulch on the northeast shore of Gibson Reservoir outcropped intermittently, but the strata showed little or no deformation, and exhibited a generally uniform dip of about 75 to 80° (Figures 8 to 13). There were some wavy beds, with less of a dip, but there was no significant deformation we could see. We would expect to observe some deformation of the bedding caused by the thrust faulting and sliding of one layer over another if the thrusting claimed by Mudge (1972a, 1972b) were real. Because the dip of the layers is so uniform, we conclude that the four mapped thrust faults in Mortimer Gulch are not supported by field evidence.


**Figure 12. Farther west of Figure 11, a sandstone and shale layer dipping west about 75° (Peter Klevberg for scale).**

## A Possible Cause of "Mental" Thrusts

Based on the evaluation at Mortimer Gulch, we began to suspect that most, if not all, of Mudge's (1972a, 1972b) minor thrusts are "mental" thrusts. Outcrops are few in the study area because much of the rock is covered by colluvium, soil, and vegetation. Also, some thrusts were mapped on cliffs. Having checked other locations of Mudge's proposed minor thrusts, we saw no evidence of structural deformation.

Since most strata are dated by their fossil content, we suggest that Mudge's minor thrusts resulted from out-of-order fossils. We also suspect that Mudge (1972a, 1972b) was just filling in the geological column. For instance, strata above the middle Jurassic Ellis Group would by default be identified as the Morrison Formation, since that is the formation that succeeds the Ellis Group on the geological column over the Montana high plains. The Morrison Formation supposedly stretches from southern Alberta and Saskatchewan to New Mexico. This absence of evidence of faulting in the study area and the lack of deformation on the northeast shore of Gibson Reservoir shows that the geological column is not an exact sequence of fossil changes with time; there are at least minor deviations (Oard, 2006; Reed et al., 2006).

**Figure 13. Farther west of Figure 12, wavy sandstone and shale layers with dip west about 80° (Peter Klevberg for scale).**

## Conclusions

We measured the strike and dip of exposed bedding planes through the Sun River Canyon, a series of tilted strata that are reported to contain nine major thrusts and about seventy minor ones. Some of these reported thrusts do not show field evidence of faulting. We measured the strike and dip of the limestone/dolostone ridge where Gibson Dam is located and were able to make about ten measurements of exposed strata along the northeast shore of Gibson Reservoir, stratigraphically above the limestone/dolostone. We found that the dips of all of these layers were nearly uniform; we saw no significant deformation of the strata or evidence of motion along bedding planes that would be expected if thrusting had occurred. In nearby locations where minor thrusts have been mapped, we also found no evidence of deformation. Since the strata were dated by their fossil content, we conclude that some of the minor thrusts were proposed because the fossils are out of order, suggesting more significant problems exist with the application of the geological column to the rock record.

The lead author favors the idea that the nine major thrusts are real and caused by gravity sliding (Clarey, 2013) as the Rocky Mountains uplifted during the recessive stage of the Flood. However, more research is required.

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