



# Grand Canyon Basic Interpretation

## Geology

- Earth is 4.5 Billion Years old, Grand Canyon is 1.7 – 2 Billion years old. Rim of Canyon is 250 – 273 Million years old
- 3 Types of rock – Sedimentary: (majority of rocks in GC) formed only by water; Igneous: formed by cooling molten matter (basalt, volcanic rock, obsidian, granite) Metamorphic: when igneous and metamorphic are altered through heat and pressure (Schist – Garnets)
- Main Layers mnemonic – Know The Canyon's History, Study Rocks Made By Time

**Kaibab Limestone:** (250 Million) contains marine fossils originating at bottom of sea

**Toroweap Formation:** (260 Million Years ago) both sandstone & limestone – sometimes coastal and submerged

**Coconino Sandstone:** (270-275 Million Years ago) Sand dune desert, comparable in size to the Sahara

**Hermit Shale:** (280 Million Years ago) contains many plant fossils, formed above water

**Supai Group:** (300 Million Years ago) formed in and above water/coastal environments. Named after Havasupai tribe that live within Grand Canyon

**Redwall Limestone:** (330 Million Years ago) believed to be deep underwater for a long time

**Muav Limestone:** (505 -530 Million Years ago) bottom of shallow sea

**Bright Angel Shale:** (515 Million Years ago) ocean evidence

**Tapeats Sandstone:** (deposited 525 Million Years ago) coastline



Vishnu Schist/Zoroaster Granite: 1.7-1.8 billion years old

- Most of the layers deposited in warm, shallow seas and near ancient, long-gone sea shores in western North America. Both marine and terrestrial sediments are represented, including fossilized sand dunes from an extinct desert. There are at least 14 known unconformities in the geologic record found in the Grand Canyon area.
- Why is the Canyon Here? DUDE (Deposition, Uplift, Downcarving, Erosion)
  - Plate Tectonics moved pacific plate into North American Plate to create Colorado Plateau
  - Rocky Mtns formed 60-70 Million Years ago. Uplift (17 M) causes river to cut deeper
  - River cut down through this: 2000' drop as water flows cut canyon deeper
  - Desert landscape is dry/doesn't hold moisture well. When rains/erosion happens the impact is big

#### Natural History

- GC is home to 1400 Species of flowering plants and over 24 cactus species
- The California Condor was listed on the endangered species list from 1967-1991 and was reintroduced into the wild in Grand Canyon. Their population has increased from 33 to 400+ today.

#### Some fun facts:

- 1908: Roosevelt used antiquities act declared area national monument
- 1919: Wilson declared it a National Park
- 1965: Glen Canyon Dam completed
- N. Rim 8-9k feet, over 27 inches of precipitation/year, over 200 inches snow
- S. Rim 6-7k feet, 15 inches of precipitation/year, 60 inches of snow
- Inner Gorge: 900-3k feet, 7 inches of rain/year at river level

#### Trail History

- 1901: Santa Fe RR arrives in area
- 1912: Santa Fe RR builds Hermit Trail
- 1919: National Park named
- 1920: Bright Angel Trail given to Coc. County as toll trail from Ralph Cameron. Bright Angel Trail was originally a Native American route into the canyon which



follows a natural fault line. Used most recently by the Havasupai tribe, who lived at Indian Gardens until being forcibly removed by the NPS in 1910s and 1920s.

- 1925: S. Kaibab Trail built by Park Service b/c they were tired of having park visitors pay to go on the Bright Angel trail

#### River Details

- 277 River Miles from Lee's Ferry to Lake Mead
- Headwaters: Poudre Pass in Rocky Mountain National Park. River travels 1440 miles to the Sea of Cortez/Gulf of California
- Average 10 miles across
- 1 mile down from Pt Imperial to river (tallest/longest pt)
- In Canyon river drops down over 2000 ft as it flows to Sea of Cortez

#### Human History of Grand Canyon

The known history of the Grand Canyon area stretches back 10,500 years, when the first evidence of human presence in the area is found.

Native Americans have inhabited the Grand Canyon and the area now covered by Grand Canyon National Park for at least the last 4,000 of those years. Ancestral Pueblo peoples, first as the Basketmaker culture and later as the more familiar Pueblo people, developed from the Desert Culture as they became less nomadic and more dependent on agriculture. A similar culture, the Cohonina, also lived in the canyon area. Drought in the late 13th century likely caused both groups to move on. Other people followed, including the Paiute, Cerbat, and the Navajo.

In September 1540, under direction by conquistador Francisco Vásquez de Coronado to find the fabled Seven Cities of Gold, Captain Garcia Lopez de Cardenas led a party of Spanish soldiers with Hopi guides to the Grand Canyon.

More than 200 years passed before two Spanish priests became the second party of non-Native Americans to see the canyon.

U.S. Army Major John Wesley Powell led the 1869 Powell Geographic Expedition through the canyon on the Colorado River. This and later study by geologists uncovered the geology of the Grand Canyon area and helped to advance that science.



In the late 19th century, the promise of mineral resources—mainly copper and asbestos—renewed interest in the region.

The first pioneer settlements along the rim came in the 1880s. Early residents soon realized that tourism was destined to be more profitable than mining, and by the turn of the 20th century the Grand Canyon was a well-known tourist destination.

Most visitors made the grueling trip from nearby towns to the South Rim by stagecoach. In 1901 the Grand Canyon Railway was opened from Williams, Arizona, to the South Rim, and the development of formal tourist facilities, especially at Grand Canyon Village, increased dramatically.

The Fred Harvey Company developed many facilities at the Grand Canyon, including the luxury El Tovar Hotel on the South Rim in 1905 and Phantom Ranch in the Inner Gorge in 1922. Although first afforded federal protection in 1893 as a forest reserve and later as a U.S. National Monument, the Grand Canyon did not achieve U.S. National Park status until 1919, three years after the creation of the National Park Service.

Today, Grand Canyon National Park receives about six million visitors each year, up from the annual visitation of 44,173 in 1919.