



Explore Your World

Grand Canyon Loadout Package



Grand Canyon National Park Expedition for March of 2020

By the AcadianX Outdoor Adventure Group



Overview

This is a 7-day hiking and exploring adventure loaded with rich geological history and abundant nature. This expedition is broken down into a 1-day acclimation day hike in beautiful Sedona followed by a 4-day (3-night) trek through Grand Canyon National Park via the Tonto trail. The Tonto trail takes you to a plateau that towers 1000 feet above the Colorado River and offers magnificent sweeping views of the Grand Canyon.

The Grand Canyon

The Grand Canyon, including its extensive system of tributary canyons, is valued for its combination of size, depth, and exposed layers of colorful rocks dating back to Precambrian times. The canyon itself was created by the incision of the Colorado River and its tributaries after the Colorado Plateau was uplifted, causing the Colorado River system to develop along its present path. With unique combinations of geologic color and erosional forms decorate a canyon that is 277 river miles (446km) long, up to 18 miles (29km) wide, and a mile (1.6km) deep. Grand Canyon overwhelms our senses through its immense size.

Ten Tonto Trail

In order to experience the Grand Canyon like only a few get to do we will be diving deep into the canyon and exploring the breathtaking trails of the southern rim for 4 days and 3 nights. The Tonto Trail, the trail less traveled, gently rolls in and out of seemingly innumerable drainages along its entire length from Hance Rapid to Garnet Canyon. Deep inside the canyon, the distinctive Tonto Platform towers 1200 vertical feet above the level of the river, but a series of springs makes it possible to walk the length of this trail roughly parallel to the river. Because it is so long, it is not typically done in one through hike. The trek along the Tonto Trail between the Grandview and South Kaibab Trails offers experienced backpackers an excellent introduction to the magic of the Grand Canyon, with magnificent sweeping views, quiet desert streams, and a chance for solitude in a most wild and beautiful place.

Ecosystems

The Park contains several major ecosystems. Its great biological diversity can be attributed to the presence of five of the seven life zones and three of the four desert types in North America. The five life zones represented are the Lower Sonoran, Upper Sonoran, Transition, Canadian, and Hudsonian. This is equivalent to traveling from Mexico to Canada. The Park also serves as an ecological refuge, with relatively undisturbed remnants of dwindling ecosystems (such as boreal forest and desert riparian communities). It is home to numerous rare, endemic (found only at Grand Canyon), and specially protected (threatened or endangered) plant and animal species. Grand Canyon is considered one of the finest examples of arid-land erosion in the world. Incised by the Colorado River, the canyon is immense, averaging 4,000 feet deep for its entire 277

miles. It is 6,000 feet deep at its deepest point and 18 miles at its widest. However, the significance of Grand Canyon is not limited to its geology.

Geology

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Fees & Permits

Fees need to be paid for the park entrance and to secure a backcountry itinerary. Entrance fees are paid on arrival whereas backcountry permits need to be paid and applied for through the backcountry office the day before or on the day of the start of your trip. Advanced reservations can be made by applying for permits either by fax or mail at least 4 months before your planned trip.

Regulations and Safety Considerations

The national parks are home to a variety of wildlife, including some animals and plants with the potential to harm humans. Weather poses the greatest danger to hikers. Check the forecast and heat indexes before departing. Prepare for a variety of conditions -- from chilling rains to blistering heat. With all the beauty that this treasure has to offer there are many considerations you need to be aware of. Refer to the regulations and safety section of this loadout to make yourself fully aware of what to expect and rules you need to follow in order to preserve the beauty of the park.

Routes and Topography

We have packed in to this load a trove of maps and detailed descriptions for you to educate yourself on the layout of the trail. Study and review the details so that you may know your way in case you are separated from your team.

Camping Essentials and Gear

A complete list of essential gear and clothing are included in this loadout. To further assist you we have also included a checklist so that you may keep track of your acquired gear.

Logistics

The logistics section provides spaces for you to enter the relevant logistics information when they become available. This information can include flight details, hotel information, and car rental details.

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About Grand Canyon National Park

General Information

The Canyon

The Grand Canyon is a steep-sided canyon carved by the Colorado River in Arizona, United States. The Grand Canyon is 277 miles (446 km) long, up to 18 miles (29 km) wide and attains a depth of over a mile (6,093 feet or 1,857 meters).

The canyon and adjacent rim are contained within Grand Canyon National Park, the Kaibab National Forest, Grand Canyon-Parashant National Monument, the Hualapai Indian Reservation, the Havasupai Indian Reservation and the Navajo Nation. President Theodore Roosevelt was a major proponent of preservation of the Grand Canyon area, and visited it on numerous occasions to hunt and enjoy the scenery.

Nearly two billion years of Earth's geological history have been exposed as the Colorado River and its tributaries cut their channels through layer after layer of rock while the Colorado Plateau was uplifted. While some aspects about the history of incision of the canyon are debated by geologists, several recent studies support the hypothesis that the Colorado River established its course through the area about 5 to 6 million years ago. Since that time, the Colorado River has driven the down-cutting of the tributaries and retreat of the cliffs, simultaneously deepening and widening the canyon.

For thousands of years, the area has been continuously inhabited by Native Americans, who built settlements within the canyon and its many caves. The Pueblo people considered the Grand Canyon a holy site, and made pilgrimages to it. The first European known to have viewed the Grand Canyon was García López de Cárdenas from Spain, who arrived in 1540.

The Park

The Grand Canyon National Park, located in northwestern Arizona, is the 15th site in the United States to have been named a national park. The park's central feature is the Grand Canyon, a gorge of the Colorado River, which is often considered one of the Wonders of the World. The park, which covers 1,217,262 acres (1,901.972 sq mi; 4,926.08 km²) of unincorporated area in Coconino and Mohave counties, received more than six million recreational visitors in 2017, which is the second highest count of all American national parks after Great Smoky Mountains National Park. The Grand Canyon was designated a World Heritage Site by UNESCO in 1979. The park celebrated its 100th anniversary on February 26, 2019.



Figure 1: The Colorado River flowing through the Grand Canyon.

Hiking and Camping

The busiest Grand Canyon National Park is one of the world's premier natural attractions, attracting about five million visitors per year. Overall, 83% were from the United States: California (12%), Arizona (9%), Texas (5%), Florida (3%) and New York (3%) represented the top domestic visitors. Seventeen percent of visitors were from outside the United States; the most prominently represented nations were the United Kingdom (4%), Canada (4%), Japan (2%), Germany (2%) and The Netherlands (1%). The South Rim is open all year round weather permitting. The North Rim is generally open mid-May to mid-October.

Aside from casual sightseeing from the South Rim (averaging 7,000 feet [2,100 m] above sea level), rafting, hiking, running, and helicopter tours are popular. The Grand Canyon Ultra Marathon is a 78-mile (126 km) race over 24 hours. The floor of the valley is accessible by foot, muleback, or by boat or raft from upriver. Hiking down to the river and back up to the rim in one day is discouraged by park officials because of the distance, steep and rocky trails, change in elevation, and danger of heat exhaustion from the much higher temperatures at the bottom. Rescues are required annually of unsuccessful rim-to-river-to-rim travelers. Nevertheless, hundreds of fit and experienced hikers complete the trip every year.

Camping on the North and South rims is generally restricted to established campgrounds and reservations are highly recommended, especially at the busier South Rim. There is at large camping available along many parts of the North Rim managed by Kaibab National Forest. North Rim campsites are only open seasonally due to road closures from weather and winter snowpack. All overnight camping below the rim requires a backcountry permit from the Backcountry Office (BCO). Each year Grand Canyon National Park receives approximately 30,000 requests for backcountry permits. The park issues 13,000 permits, and close to 40,000 people camp overnight. The earliest a permit application is accepted is the first of the month, four months before the proposed start month.

History

Native Americans

The Ancestral Puebloans were a Native American culture centered on the present-day Four Corners area of the United States. They were the first people known to live in the Grand Canyon area. The cultural group has often been referred to in archaeology as the Anasazi, although the term is not preferred by the modern Puebloan peoples. The word "Anasazi" is Navajo for "Ancient Ones" or "Ancient Enemy".



Figure 2: Eagle Rock (located at Eagle Point) on the West Rim, named for its shape, is considered sacred by the Hualapai Indians.

Archaeologists still debate when this distinct culture emerged. The current consensus, based on terminology defined by the Pecos Classification, suggests their emergence was around 1200 BCE during the Basketmaker II Era. Beginning with the earliest explorations and excavations, researchers have believed that the Ancestral Puebloans are ancestors of the modern Pueblo peoples.

In addition to the Ancestral Puebloans, a number of distinct cultures have inhabited the Grand Canyon area. The Cohonina lived to the west of the Grand Canyon, between 500 and 1200 CE. The Cohonina were ancestors of the Yuman, Havasupai, and Hualapai peoples who inhabit the area today.

The Sinagua were a cultural group occupying an area to the southeast of the Grand Canyon, between the Little Colorado River and the Salt River, between approximately

500 and 1425 CE. The Sinagua may have been ancestors of several Hopi clans.



Figure 3: Ancestral Puebloan granaries at Nankoweap Creek.

By the time of the arrival of Europeans in the 16th century, newer cultures had evolved. The Hualapai inhabit a 100-mile (160 km) stretch along the pine-clad southern side of the Grand Canyon. The Havasupai have been living in the area near Cataract Canyon since the beginning of the 13th century, occupying an area the size of Delaware. The Southern Paiutes live in what is now southern Utah and northern Arizona. The Navajo, or Diné, live in a wide area stretching from the San Francisco Peaks eastwards towards the Four Corners. Archaeological and linguistic evidence suggests the Navajo descended from the Athabaskan people near Great Slave Lake, Canada, who migrated after the 11th century.

European Arrival and Settlements

Spanish Explorers

In September 1540, under orders from the conquistador Francisco Vázquez de Coronado to search for the fabled Seven Cities of Cibola, Captain García López de Cárdenas, along with Hopi guides and a small group of Spanish soldiers, traveled to the south rim of the Grand Canyon between Desert View and Moran Point. Pablo de Melgrossa, Juan Galeras, and a third soldier descended some one third of the way into the canyon until they were forced to return because of lack of water. In their report, they noted that some of the rocks in the canyon were "bigger than the great tower of Seville, Giralda" It is

speculated that their Hopi guides likely knew routes to the canyon floor, but may have been reluctant to lead the Spanish to the river. No Europeans visited the canyon again for more than two hundred years.

Fathers Francisco Atanasio Domínguez and Silvestre Vélez de Escalante were two Spanish priests who, with a group of Spanish soldiers, explored southern Utah and traveled along the north rim of the canyon in Glen and Marble Canyons in search of a route from Santa Fe to California in 1776. They eventually found a crossing, formerly known as the "Crossing of the Fathers," that today lies under Lake Powell.

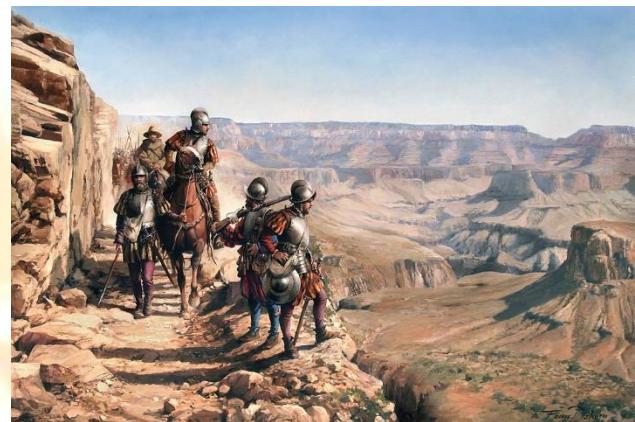


Figure 4: *La conquista del Colorado* (2017), by Augusto Ferrer-Dalmau, depicts Spanish Captain García López de Cárdenas 1540 expedition.

Also in 1776, Fray Francisco Garces, a Franciscan missionary, spent a week near Havasupai, unsuccessfully attempting to convert a band of Native Americans to Christianity. He described the canyon as "profound".

American Exploration

James Ohio Pattie, along with a group of American trappers and mountain men, may have been the next European to reach the canyon, in 1826.

Jacob Hamblin, a Mormon missionary, was sent by Brigham Young in the 1850s to locate suitable river crossing sites in the canyon. Building good relations with local Hualapai and white settlers, he found the Crossing of the Fathers, and the locations that would become Lees Ferry in 1858 and Pearce Ferry (later operated by, and

named for, Harrison Pearce) – only the latter two sites suitable for ferry operation. He also acted as an advisor to John Wesley Powell before his second expedition to the Grand Canyon, serving as a diplomat between Powell and the local native tribes to ensure the safety of his party.

In 1857, Edward Fitzgerald Beale was superintendent of an expedition to survey a wagon road along the 35th parallel from Fort Defiance, Arizona to the Colorado River. He led a small party of men in search of water on the Coconino Plateau near the canyon's south rim. On September 19, near present-day National Canyon, they came upon what May Humphreys Stacey described in his journal as "...a wonderful canyon four thousand feet deep. Everyone (in the party) admitted that he never before saw anything to match or equal this astonishing natural curiosity."

Also in 1857, the U.S. War Department asked Lieutenant Joseph Ives to lead an expedition to assess the feasibility of an up-river navigation from the Gulf of California. Also in a stern wheeler steamboat Explorer, after two months and 350 miles (560 km) of difficult navigation, his party reached Black Canyon some two months after George Johnson. The Explorer struck a rock and was abandoned. Ives led his party east into the canyon — they may have been the first Europeans to travel the Diamond Creek drainage and traveled eastwards along the south rim. In his "Colorado River of the West" report to the Senate in 1861 he states that "One or two trappers profess to have seen the canyon."

According to the San Francisco Herald, in a series of articles run in 1853, Captain Joseph R. Walker in January 1851 with his nephew James T. Walker and six men, traveled up the Colorado River to a point where it joined the Virgin River and continued east into Arizona, traveling along the Grand Canyon and making short exploratory side trips along the way. Walker is reported to have said he wanted to visit the "Moqui" Indians, as the Hopi were then called by Europeans. He had met these people briefly in previous years, thought them exceptionally interesting and wanted to become better acquainted. The Herald reporter then stated, "We believe that Captain Joe Walker

is the only white man in this country that has ever visited this strange people."

In 1858, John Strong Newberry became probably the first geologist to visit the Grand Canyon.



Figure 5: William Bell's photograph of the Grand Canyon, taken in 1872 as part of the Wheeler expedition.

In 1869, Major John Wesley Powell led the first expedition down the canyon. Powell set out to explore the Colorado River and the Grand Canyon. Powell ordered a shipwright to build four reinforced Whitewall rowboats from Chicago and had them shipped east on the newly completed Continental railroad. He hired nine men, including his brother Walter, and collected provisions for ten months. They set out from Green River, Wyoming on May 24. Passing through (or portaging around) a series of dangerous rapids, the group passed down the Green River to its confluence with the Colorado River, near present-day Moab, Utah. Most of their food spoiled after getting wet in the waves or by heavy rains. Beaten up by ferocious whitewater and nearly out of food, three men left the expedition in the Grand Canyon, electing to walk 75 miles out across a desert to a Mormon settlement. Never seen again, their disappearance remains one of the most

enduring mysteries of American western history. The remaining members completed the journey through the Grand Canyon on August 13, 1869. In 1871 Powell first used the term "Grand Canyon"; previously it had been called the "Big Canyon".



Figure 6: Noon rest in Marble Canyon, second Powell Expedition, 1872.

In 1889, Frank M. Brown wanted to build a railroad along the Colorado River to carry coal. He, his chief engineer Robert Brewster Stanton, and 14 others started to explore the Grand Canyon in poorly designed cedar wood boats, with no life preservers. Brown drowned in an accident near Marble Canyon: Stanton made new boats and proceeded to explore the Colorado all of the way to the Gulf of California.

The Grand Canyon became an official national monument in 1908 and a national park in 1919.

Federal protection: National Monument and Park

U.S. President Theodore Roosevelt visited the Grand Canyon in 1903. An avid outdoorsman and staunch conservationist, Roosevelt established the Grand Canyon Game Preserve on November 28, 1906. Livestock grazing was reduced, but predators such as mountain lions, eagles, and wolves were eradicated. Roosevelt along with other members of his conservation group, the Boone and Crockett Club helped form the National Parks Association, which in turn lobbied for the Antiquities Act of 1906 which gave Roosevelt the power to create national monuments. Once the act was passed, Roosevelt immediately added adjacent national forest lands and redesignated the preserve a U.S. National Monument on January 11, 1908. Opponents such as land and mining claim holders blocked efforts to reclassify the monument as a U.S. National Park for 11 years. Grand Canyon National Park was finally established as the 17th U.S. National Park by an Act of Congress signed into law by President Woodrow Wilson on February 26, 1919.

The federal government administrators who manage park resources face many challenges. These include issues related to the recent reintroduction into the wild of the highly endangered California condor, air tour overflight noise levels, water rights disputes with various tribal reservations that border the park, and forest fire management. Federal officials started floods in the Grand Canyon in hopes of restoring its ecosystem in 1996, 2004 and 2008. The canyon's ecosystem was permanently changed after the construction of the Glen Canyon Dam in 1963.

Between 2003 and 2011, 2,215 mining claims had been requested that are adjacent to the canyon, including claims for uranium mines. Mining has been suspended since 2009, when U.S. Interior Secretary Ken Salazar withdrew 1 million acres (4,000 km²) from the permitting process, pending assessment of the environmental impact of mining. Critics of the mines are concerned that, once mined, the uranium will leach into the water of the Colorado River and contaminate the water supply for up to 18 million people. Salazar's so-called "Northern Arizona

"Withdrawal" is a 20-year moratorium on new mines, but allows existing mines to continue. In 2012, the federal government stopped new mines in the area, which was upheld by the U.S. District Court for Arizona in 2014, but appealed by the National Mining Association, joined by

the state of Arizona under Attorney General Mark Brnovich as well as Utah, Montana and Nevada. National Mining Association v. Jewell is pending before the Ninth Circuit Court of Appeals as of September 2015.

All information in this section is cited from:

1. Wikipedia contributors. *Grand Canyon* [Internet]. Wikipedia, The Free Encyclopedia; 2019 Dec 13, 16:41 UTC [cited 2019 Dec 16]. Available from: https://en.wikipedia.org/w/index.php?title=Grand_Canyon&oldid=930603439.

Ecology

Plant Life

There are approximately 1,737 known species of vascular plants, 167 species of fungi, 64 species of moss and 195 species of lichen found in Grand Canyon National Park. This variety is largely due to the 8,000 foot (2,400 m) elevation change from the Colorado River up to the highest point on the North Rim. Grand Canyon boasts a dozen endemic plants (known only within the Park's boundaries) while only ten percent of the Park's flora is exotic. Sixty-three plants found here have been given special status by the U.S. Fish and Wildlife Service.

The Mojave Desert influences the western sections of the canyon, Sonoran Desert vegetation covers the eastern sections, and ponderosa and pinyon pine forests grow on both rims.

Natural seeps and springs percolating out of the canyon walls are home to 11% of all the plant species found in the Grand Canyon. The canyon itself can act as a connection between the east and the west by providing corridors of appropriate habitat along its length. The canyon can also be a genetic barrier to some species, like the tassel-eared squirrel.

The aspect, or direction a slope faces, also plays a major role in adding diversity to the Grand Canyon. North-facing slopes receive about one-third the normal amount of sunlight, so plants growing there are similar to plants found at higher elevations, or in more northern latitudes. The south-facing slopes receive the full amount of sunlight and are covered in vegetation typical of the Sonoran Desert.

Animal Life

Of the 90 mammal species found along the Colorado River corridor, 18 are rodents and 22 are bats.

Life Zones and Communities

The Park contains several major ecosystems. Its great biological diversity can be attributed to the presence of five of the seven life zones and three of the four desert types in North America. The five life zones represented are the Lower Sonoran, Upper Sonoran, Transition, Canadian, and Hudsonian. This is equivalent to traveling from Mexico to Canada. Differences in elevation and the resulting variations in climate are the major factors that form the various life zones and communities in and around the canyon. Grand Canyon National Park contains 129 vegetation communities, and the composition and distribution of plant species is influenced by climate, geomorphology and geology.

Lower Sonoran

The Lower Sonoran life zone spans from the Colorado River up to 3,500 feet (1,100 m). Along the Colorado River and its perennial tributaries, a riparian community exists. Coyote willow, arrowweed, seep-willow, western honey mesquite, catclaw acacia, and exotic tamarisk (saltcedar) are the predominant species. Hanging gardens, seeps and springs often contain rare plants such as the white-flowering western redbud, stream orchid, and Flaveria mcdougallii. Endangered fish in the river include the humpback chub and the razorback sucker.

The three most common amphibians in these riparian communities are the canyon tree frog, red-spotted toad, and Woodhouse's Rocky Mountain toad. Leopard frogs are very rare in the Colorado River corridor, they have undergone major declines and have not been seen in the Canyon in several years. There are 33 crustacean species found in the Colorado River and its tributaries within Grand Canyon National Park. Of these 33, 16 are considered true zooplankton organisms.



Figure 7: A bighorn ewe at the Grand Canyon, 2008.

Only 48 bird species regularly nest along the river, while others use the river as a migration corridor or as overwintering habitat. The bald eagle is one species that uses the river corridor as winter habitat.

River otters may have disappeared from the park in the late 20th century, and muskrats are extremely rare. Beavers cut willows, cottonwoods, and shrubs for food, and can significantly affect the riparian vegetation. Other rodents, such as antelope squirrels and pocket mice, are mostly omnivorous, using many different vegetation types. Grand Canyon bats typically roost in desert uplands, but forage on the abundance of insects along the river and its tributaries. In addition to bats, coyotes, ringtails, and spotted skunks are the most numerous riparian predators and prey on invertebrates, rodents, and reptiles.

Raccoons, weasels, bobcats, gray foxes, and mountain lions are also present, but are much rarer. Mule deer and desert bighorn sheep are the ungulates that frequent the river corridor. Since the removal of 500 feral burros in the early 1980s, bighorn sheep numbers have rebounded. Mule deer are generally not permanent residents along the river, but travel down from the rim when food and water resources there become scarce.

The insect species commonly found in the river corridor and tributaries are midges, caddis flies, mayflies, stoneflies, black flies, mites, beetles, butterflies, moths, and fire ants. Numerous species of spiders and several species of scorpions including the bark scorpion and the giant desert hairy scorpion inhabit the riparian zone.

Eleven aquatic and 26 terrestrial species of mollusks have been identified in and around Grand Canyon National Park. Of the aquatic species, two are bivalves (clams) and nine are gastropods (snails). Twenty-six species of terrestrial gastropods have been identified, primarily land snails and slugs.

There are approximately 41 reptile species in Grand Canyon National Park. Ten are considered common along the river corridor and include lizards and snakes. Lizard density tends to be highest along the stretch of land between the water's edge and the beginning of the upland desert community. The two largest lizards in the canyon are gila monsters and chuckwallas. Many snake species, which are not directly dependent on surface water, may be found both within the inner gorge and the Colorado River corridor. Six rattlesnake species have been recorded in the park.

Above the river corridor a desert scrub community, composed of North American desert flora, thrives. Typical warm desert species such as creosote bush, white bursage, brittlebush, catclaw acacia, ocotillo, mariola, western honey mesquite, four-wing saltbush, big sagebrush, blackbrush and rubber rabbitbrush grow in this community. The mammalian fauna in the woodland scrub community consists of 50 species, mostly rodents and bats. Three of the five Park woodrat species live in the desert scrub community.

Except for the western (desert) banded gecko, which seems to be distributed only near water along the Colorado River, all of the reptiles found near the river also appear in the uplands, but in lower densities. The desert gopher tortoise, a threatened species, inhabits the desert scrublands in the western end of the park.

Some of the common insects found at elevations above 2,000 feet (610 m) are orange paper wasps, honey bees, black flies, tarantula hawks, stink bugs, beetles, black ants, and monarch and swallowtail butterflies. Solifugids, wood spiders, garden spiders, black widow spiders and tarantulas can be found in the desert scrub and higher elevations.

Upper Sonoran and Transition



Figure 8: A California condor in flight, photographed from Navajo Bridge at Marble Canyon, 2008. Wild condors are numbered to aid wildlife researchers. As of April 2009, there were 172 wild California condors known.

The Upper Sonoran Life Zone includes most of the inner canyon and South Rim at elevations from 3,500 to 7,000 feet (1,100 to 2,100 m). This zone is generally dominated by blackbrush, sagebrush, and pinyon-juniper woodlands. Elevations of 3,500 to 4,000 feet (1,100 to 1,200 m) are in the Mojave Desert Scrub community of the Upper Sonoran. This community is dominated by the four-winged saltbush and creosote bush; other important plants include Utah agave, narrowleaf mesquite, ratany, catclaw acacia, and various cacti species. Approximately 30 bird species breed primarily in the desert uplands and cliffs of the inner canyon. Virtually all bird species present breed in other suitable habitats throughout the Sonoran and Mohave deserts. The abundance of bats, swifts, and riparian birds provides ample food for peregrines, and

suitable eyrie sites are plentiful along the steep canyon walls. Also, several critically endangered California condors that were re-introduced to the Colorado Plateau on the Arizona Strip, have made the eastern part of the Park their home.



Figure 9: Peregrine Falcon flying at the south rim of Grand Canyon.

The conifer forests provide habitat for 52 mammal species. Porcupines, shrews, red squirrels, tassel eared Kaibab and Abert's squirrels, black bear, mule deer, and elk are found at the park's higher elevations on the Kaibab Plateau.

Above the desert scrub and up to 6,200 feet (1,900 m) is a pinyon pine forest and one seed juniper woodland. Within this woodland one can find big sagebrush, snakeweed, Mormon tea, Utah agave, banana and narrowleaf Yucca, winterfat, Indian ricegrass, dropseed, and needlegrass. There are a variety of snakes and lizards here, but one species of reptile, the mountain short-horned lizard, is a particularly abundant inhabitant of the piñon-juniper and ponderosa pine forests.



Figure 10: An elk searching for water at Grand Canyon National Park in 2018.

Ponderosa pine forests grow at elevations between 6,500 and 8,200 feet (2,000 and 2,500 m), on both North and South rims in the Transition life zone. The South Rim includes species such as gray fox, mule deer, bighorn sheep, rock squirrels, pinyon pine and Utah juniper. Additional species such as Gambel oak, New Mexico locust, mountain mahogany, elderberry, creeping mahonia, and fescue have been identified in these forests. The Utah tiger salamander and the Great Basin spadefoot toad are two amphibians that are common in the rim

forests. Of the approximately 90 bird species that breed in the coniferous forests, 51 are summer residents and at least 15 of these are known to be neotropical migrants.

Canadian and Hudsonian

Elevations of 8,200 to 9,000 feet (2,500 to 2,700 m) are in the Canadian Life Zone, which includes the North Rim and the Kaibab Plateau. Spruce-fir forests characterized by Engelmann spruce, blue spruce, Douglas fir, white fir, aspen, and mountain ash, along with several species of perennial grasses, groundsel, yarrow, cinquefoil, lupines, sedges, and asters, grow in this sub-alpine climate. Mountain lions, Kaibab squirrels, and northern goshawks are found here.

Montane meadows and subalpine grassland communities of the Hudsonian life zone are rare and located only on the North Rim. Both are typified by many grass species. Some of these grasses include blue and black grama, big galleta, Indian ricegrass and three-awns. The wettest areas support sedges and forbs.



Figure 11: View from the South Rim.

All information in this section is sited from:

1. Wikipedia contributors. Grand Canyon [Internet]. Wikipedia, The Free Encyclopedia; 2019 Dec 13, 16:41 UTC [cited 2019 Dec 16]. Available from: https://en.wikipedia.org/w/index.php?title=Grand_Canyon&oldid=930603439.

Geography and Geology

Geography

The Grand Canyon is a river valley in the Colorado Plateau that exposes uplifted Proterozoic and Paleozoic strata, and is also one of the six distinct physiographic sections of the Colorado Plateau province. It is not the deepest canyon in the world (Kali Gandaki Gorge in Nepal is much deeper). However, the Grand Canyon is known for its visually overwhelming size and its intricate and colorful landscape. Geologically, it is significant because of the thick sequence of ancient rocks that are well preserved and exposed in the walls of the canyon. These rock layers record much of the early geologic history of the North American continent.



Figure 12: Location of the Grand Canyon within the state of Arizona.

Uplift associated with mountain formation later moved these sediments thousands of feet upward and created the Colorado Plateau. The higher elevation has also resulted in greater precipitation in the Colorado River drainage area, but not enough to change the Grand Canyon area from being semi-arid. The uplift of the Colorado Plateau is uneven, and the Kaibab Plateau that the Grand Canyon bisects is over one thousand feet (300 m) higher at the North Rim than at the South Rim. Almost all runoff from the North Rim (which also gets more rain and snow) flows toward the Grand Canyon, while much of the runoff on the plateau behind the South Rim flows

away from the canyon (following the general tilt). The result is deeper and longer tributary washes and canyons on the north side and shorter and steeper side canyons on the south side.

Temperatures on the North Rim are generally lower than those on the South Rim because of the greater elevation (averaging 8,000 feet or 2,400 metres above sea level). Heavy rains are common on both rims during the summer months. Access to the North Rim via the primary route leading to the canyon (State Route 67) is limited during the winter season due to road closures.



Figure 13: Image of the Grand Canyon and surrounding area taken from the International Space Station

Geology

The Grand Canyon is part of the Colorado River basin which has developed over the past 70 million years, in part based on apatite (U-Th)/He thermochronometry showing that Grand Canyon reached a depth near to the modern depth by 20 Ma. A recent study examining caves near Grand Canyon places their origins beginning about 17 million years ago. Previous estimates had placed the age of the canyon at 5–6 million years. The study, which was published in the journal *Science* in 2008, used uranium-lead dating to analyze calcite deposits found on the walls of nine caves throughout the canyon. There is a substantial amount of controversy because this research

suggests such a substantial departure from prior widely supported scientific consensus. In December 2012, a study published in the journal *Science* claimed new tests had suggested the Grand Canyon could be as old as 70 million years. However, this study has been criticized by those who support the "young canyon" age of around six million years as "an attempt to push the interpretation of their new data to their limits without consideration of the whole range of other geologic data sets."

The canyon is the result of erosion which exposes one of the most complete geologic columns on the planet.

The major geologic exposures in the Grand Canyon range in age from the 2-billion-year-old Vishnu Schist at the bottom of the Inner Gorge to the 230-million-year-old Kaibab Limestone on the Rim. There is a gap of about a billion years between the 500-million-year-old stratum and the level below it, which dates to about 1.5 billion years ago. This large unconformity indicates a long period for which no deposits are present.



Figure 14: Grand Canyon, Arizona, Nevada, Lake Powell to Lake Mead, June 27, 2017, Sentinel-2 true-color satellite image. Scale 1:450,000.

Many of the formations were deposited in warm shallow seas, near-shore environments (such as beaches), and swamps as the seashore repeatedly advanced and retreated over the edge of a proto-North America. Major exceptions include the Permian Coconino Sandstone, which contains abundant geological evidence of aeolian sand dune deposition. Several parts of the Supai Group also were deposited in non-marine environments.

The great depth of the Grand Canyon and especially the height of its strata (most of which formed below sea level)

can be attributed to 5–10 thousand feet (1,500 to 3,000 m) of uplift of the Colorado Plateau, starting about 65 million years ago (during the Laramide Orogeny). This uplift has steepened the stream gradient of the Colorado River and its tributaries, which in turn has increased their speed and thus their ability to cut through rock (see the elevation summary of the Colorado River for present conditions).

Weather conditions during the ice ages also increased the amount of water in the Colorado River drainage system. The ancestral Colorado River responded by cutting its channel faster and deeper.

The base level and course of the Colorado River (or its ancestral equivalent) changed 5.3 million years ago when the Gulf of California opened and lowered the river's base level (its lowest point). This increased the rate of erosion and cut nearly all of the Grand Canyon's current depth by 1.2 million years ago. The terraced walls of the canyon were created by differential erosion.

Between 100,000 and 3 million years ago, volcanic activity deposited ash and lava over the area which at times completely obstructed the river. These volcanic rocks are the youngest in the canyon.

Grand Canyon's Three Sets of Rocks

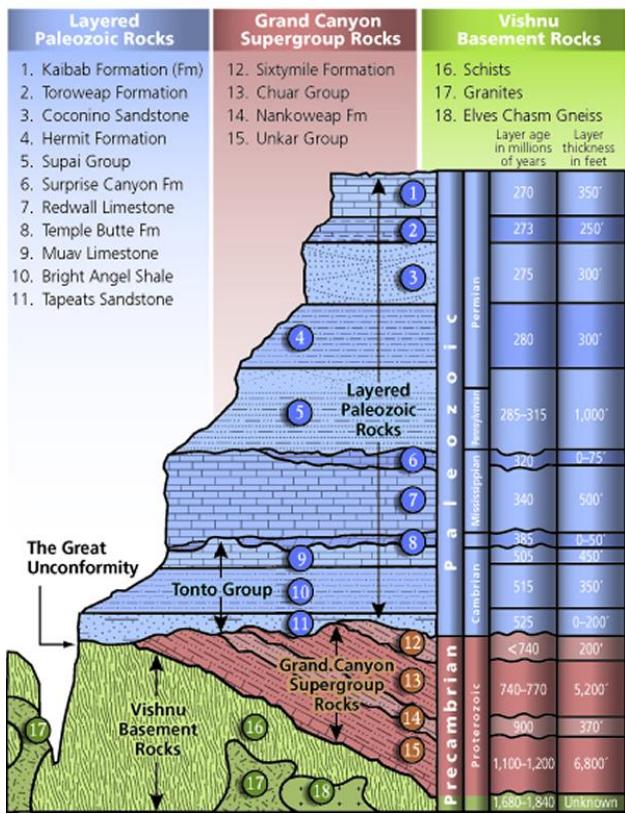


Figure 15: Diagram showing the placement, age and thickness of the rock units exposed in the Grand Canyon.

All information in this section is sited from:

- Wikipedia contributors. Grand Canyon [Internet]. Wikipedia, The Free Encyclopedia; 2019 Dec 13, 16:41 UTC [cited 2019 Dec 16]. Available from: https://en.wikipedia.org/w/index.php?title=Grand_Canyon&oldid=930603439.

Weather

Weather in the Grand Canyon varies according to elevation. The forested rims are high enough to receive winter snowfall, but along the Colorado River in the Inner Gorge, temperatures are similar to those found in Tucson and other low elevation desert locations in Arizona. Conditions in the Grand Canyon region are generally dry, but substantial precipitation occurs twice annually, during seasonal pattern shifts in winter (when Pacific storms usually deliver widespread, moderate rain and high-elevation snow to the region from the west) and in late summer (due to the North American Monsoon, which delivers waves of moisture from the southeast, causing dramatic, localized thunderstorms fueled by the heat of the day). Average annual precipitation on the South Rim is less than 16 inches (41 cm), with 60 inches (150 cm) of snow; the higher North Rim usually receives 27 inches (69 cm) of moisture, with a typical snowfall of 144 inches (370 cm); and Phantom Ranch, far below the canyon's rims along the Colorado River at 2,500 feet (762 m) gets just 8 inches (20 cm) of rain, and snow is a rarity.

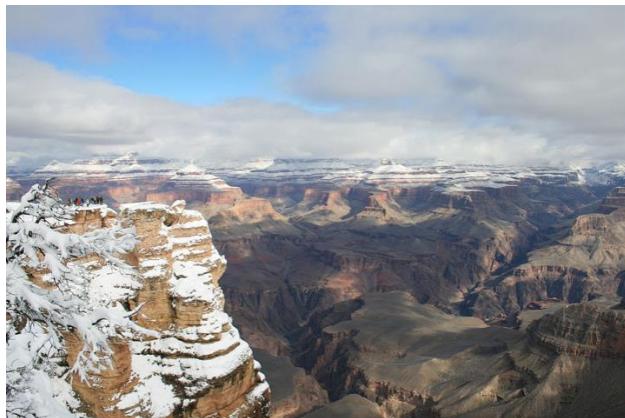


Figure 16: Grand Canyon covered in snow.

Temperatures vary wildly throughout the year, with summer highs within the Inner Gorge commonly exceeding 100 °F (37.8 °C) and winter minimum temperatures sometimes falling below zero degrees Fahrenheit (-17.8 °C) along the canyon's rims. Visitors are

often surprised by these potentially extreme conditions, and this, along with the high altitude of the canyon's rims, can lead to unpleasant side effects such as dehydration, sunburn, and hypothermia.

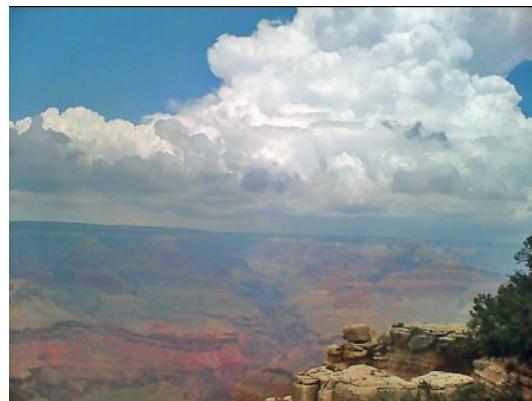


Figure 17: A storm over the Grand Canyon.

Weather conditions can greatly affect hiking and canyon exploration, and visitors should obtain accurate forecasts because of hazards posed by exposure to extreme temperatures, winter storms and late summer monsoons. While the park service posts weather information at gates and visitor centers, this is a rough approximation only, and should not be relied upon for trip planning. For accurate weather in the canyon, hikers should consult the National Weather Service's NOAA weather radio or the official National Weather Service website.

The National Weather Service has had a cooperative station on the South Rim since 1903. The record high temperature on the South Rim was 105 °F (41 °C) on June 26, 1974, and the record low temperature was -20 °F (-29 °C) on January 1, 1919, February 1, 1985, and December 23, 1990.

Air Quality

The Grand Canyon area has some of the cleanest air in the United States. However, at times the air quality can be considerably affected by events such as forest fires and dust storms in the Southwest.

What effect there is on air quality and visibility in the canyon has been mainly from sulfates, soils, and organics. The sulfates largely result from urban emissions in southern California, borne on the prevailing westerly winds throughout much of the year, and emissions from Arizona's copper smelter region, borne on southerly or southeasterly winds during the monsoon. Airborne soils originate with windy conditions and road dust. Organic particles result from vehicle emissions, long-range transport from urban areas, and forest fires, as well as from VOCs emitted by vegetation in the surrounding forests. Nitrates, carried in from urban areas, stationary sources, and vehicle emissions; as well as black carbon from forest fires and vehicle emissions, also contribute to a lesser extent.

A number of actions have been taken to preserve and further improve air quality and visibility at the canyon. In 1990, amendments to the Clean Air Act established the Grand Canyon Visibility Transport Commission (GCVTC) to advise the US EPA on strategies for protecting visual air quality on the Colorado Plateau. The GCVTC released its final report in 1996 and initiated the Western Regional Air Partnership (WRAP), a partnership of state, tribal and federal agencies to help coordinate implementation of the Commission's recommendations.



Figure 18: Smoke from prescribed fires on the South Rim, as seen from Yavapai Point, April 2007.

In 1999, the Regional Haze Rule established a goal of restoring visibility in national parks and wilderness areas (Class 1 areas), such as the Grand Canyon, to natural background levels by 2064. Subsequent revisions to the rule provide specific requirements for making reasonable progress toward that goal.



Figure 19: Natural fog sometimes fills the canyon, during temperature inversions.

In the early 1990s, studies indicated that emissions of SO₂, a sulfate precursor, from the Navajo Generating Station affected visibility in the canyon mainly in the winter, and which if controlled would improve wintertime visibility by 2 to 7%. As a result, scrubbers were added to the plant's three units in 1997 through 1999, reducing SO₂ emissions by more than 90%. The plant also installed low-NOx SOFA burners in 2009 -2011, reducing emissions of NO_x, a nitrate precursor, by 40%. Emissions from the Mohave Generating Station to the west were similarly found to affect visibility in the canyon. The plant was required to have installed SO₂ scrubbers, but was instead shut down in 2005, completely eliminating its emissions.

Prescribed fires are typically conducted in the spring and fall in the forests adjacent to the canyon to reduce the potential for severe forest fires and resulting smoke conditions. Although prescribed fires also affect air quality, the controlled conditions allow the use of management techniques to minimize their impact.

Average Climate

According to the Köppen climate classification system, Grand Canyon National Park has five climate zones; Cold Semi-Arid (BSk), Humid Continental Dry Cool Summer (Dsb), Humid Continental Dry Warm Summer (Dsa), Warm Summer Mediterranean (Csb), and Hot Summer Mediterranean (Csa). The plant hardiness zone at Grand Canyon Visitor Center is 7a with an average annual extreme minimum temperature of 3.3 °F (-15.9 °C)

Climate data for Grand Canyon Visitor Center, Grand Canyon Village, Grand Canyon National Park, Coconino County, AZ (1981 – 2010 averages).													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °F (°C)	46.6 (8.1)	50.0 (10.0)	57.2 (14.0)	65.9 (18.8)	76.2 (24.6)	86.9 (30.5)	90.7 (32.6)	87.1 (30.6)	81.2 (27.3)	69.2 (20.7)	55.2 (12.9)	46.3 (7.9)	67.8 (19.9)
Daily mean °F (°C)	35.6 (2.0)	38.4 (3.6)	44.2 (6.8)	51.1 (10.6)	60.8 (16.0)	70.1 (21.2)	75.4 (24.1)	72.5 (22.5)	66.2 (19.0)	54.9 (12.7)	43.1 (6.2)	35.1 (1.7)	54.0 (12.2)
Average low °F (°C)	24.5 (-4.2)	26.9 (-2.8)	31.1 (-0.5)	36.3 (2.4)	45.3 (7.4)	53.3 (11.8)	60.1 (15.6)	57.9 (14.4)	51.1 (10.6)	40.7 (4.8)	30.9 (-0.6)	24.0 (-4.4)	40.2 (4.6)
Average precipitation inches (mm)	1.42 (36)	1.41 (36)	1.63 (41)	0.94 (24)	0.53 (13)	0.32 (8.1)	1.20 (30)	1.94 (49)	1.18 (30)	1.01 (26)	0.90 (23)	1.17 (30)	13.65 (347)
Average relative humidity (%)	47.1	44.8	38.7	30.4	24.0	19.2	26.2	36.0	31.9	33.2	39.8	46.4	34.8

Source: PRISM Climate Group [\[20\]](#)

All information in this section is sited from:

1. Wikipedia contributors. Grand Canyon [Internet]. Wikipedia, The Free Encyclopedia; 2019 Dec 13, 16:41 UTC [cited 2019 Dec 16]. Available from: https://en.wikipedia.org/w/index.php?title=Grand_Canyon&oldid=930603439.
2. Wikipedia contributors. Grand Canyon National Park [Internet]. Wikipedia, The Free Encyclopedia; 2019 Dec 12, 05:40 UTC [cited 2019 Dec 16]. Available from: https://en.wikipedia.org/w/index.php?title=Grand_Canyon_National_Park&oldid=930398169.



Fees & Passes

Park Entrance Fees

Entrance Fee by vehicle - 7 day permit

\$35.00

This is an entrance fee for all persons traveling in a single, private, non-commercial vehicle (car/truck/van). The permit is non-transferable. Visitors can enter the park at any time, and the permit is valid for seven days and includes both the North Rim and South Rim.

All park visitors are required to pay an entrance fee. Money collected must be used in ways that directly improve visitor experiences and assist with the cost of providing safe, meaningful experiences to park visitors. Entrance passes may be purchased at the NPS North Rim Entrance Station, the NPS South Entrance Station and the NPS Desert View Entrance Station. Passes may also be purchased online then printed out for display before entering the park or displayed on a smart phone. Passes are non-transferable. Credit cards are preferred at all fee collection areas.

Buy Your Digital Pass on [Recreation.gov](#)

Whether you're planning a single visit or coming back multiple times a year, enjoy the convenience of purchasing a Grand Canyon National Park site-specific digital pass on Recreation.gov before you arrive. You have immediate access to your digital pass and can easily download it on your phone or tablet. Your pass will also be emailed as a PDF and can be printed out for display when you arrive.

Backcountry Permits

Standard Permit Fee

\$10.00 – per permit

+

\$8.00 – per person/night (below the rim)

or

\$8.00 – per group/night (above the rim)

A permit is required for camping in these remote areas of the park.

- Overnight camping outside of Mather Campground, Desert View Campground, and North Rim Campground
- Overnight camping in all sites at Tuweep Campground
- Overnight camping anywhere on the North Rim of Grand Canyon National Park between Nov 1 - May 14 (includes ski-camping)
- Off-river camping by river trip participants
- Overnight camping with private stock outside of Mather Campground or outside of North Rim Campground (May 15 – Oct 31)
- Packrafting, other than that which occurs under a river permit

Permit Cost

\$10 per permit plus \$8 per person or stock animal per night camped below the rim and \$8 per group per night camped above the rim. Denied requests will not incur a charge. Permits cancelled at least four days in advance will receive hiker credit (minus a \$10 cancellation charge) valid for one year. Backcountry Information Center charges are NON-REFUNDABLE!

When sending in a permit request, the required method of payment is with a credit card. Indicate the maximum amount you authorize the Backcountry Information

Center to charge so that your longest trip alternative can be considered. Do not send cash in the mail.

Permit holders will be responsible for paying park entrance fees upon arrival.

South Bass Trail and Pasture Wash Trail visitors may be charged an additional fee by the tribe for crossing the Havasupai Indian Reservation.

How to Apply

Obtain and fill out the Backcountry Permit Request Form:

- [Backcountry Permit Request Form](#) (PDF file)
- [Backcountry Hiking Brochure](#) (PDF file)
- [Corridor Availability Report](#) (PDF file)

Do not forget to include the following with your permit request:

1. Trip leader's name, address, and telephone number.
2. Credit card number, expiration date, signature, date signed, and largest amount you authorize the National Park Service to charge.
3. Number of people and/or stock in the group (see Private Stock).
4. License plate numbers of any cars to be left at the trailhead.
5. Proposed night-by-night itinerary showing use area codes and dates for each night
6. Organization name if applicable (see Group Size and Commercial Use below).
7. Alternative proposed itineraries.

Submit the permit request form in one of the following ways:

1. Fax request to the Backcountry Information Center, 928-638-2125. NOTE: You can send a fax 24 hours a day, 7 days a week, 365 days a year - HOWEVER the first day of every month we receive many faxes and the number may be busy.

2. Mail request to Grand Canyon National Park, Permits Office, 1824 S. Thompson St., Suite 201, Flagstaff AZ, 86001
3. Bring request to the Backcountry Information Center, located inside the park on both the South Rim and the North Rim. The South Rim Backcountry Information Center is open daily, year round, for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time. The North Rim Backcountry Information Center (located in the administrative building) is open daily mid-May to mid-October for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time.

Permit requests are not accepted by telephone or by email.

When to Apply

APPLY DURING EARLIEST CONSIDERATION TIME FRAME!
Popular use areas / campsites fill up right away! Permit requests are welcome later, but your chance of success will be greatly reduced.

Earliest Consideration Requests: For requests received during the Earliest Consideration time period, the day received does not matter; all Earliest Consideration requests received during this span of dates are treated exactly the same. Requests are combined together into one pile, duplicates are removed, and then processing begins using a computer generated random order. It may take Rangers up to three weeks to process all Earliest Consideration requests.

Subsequent Requests: Once all Earliest Consideration requests have been processed, Rangers will begin processing written requests received on subsequent dates. These Subsequent Requests are kept and considered in the order received. Requests are accepted as late as two weeks prior to a hike start date.

START DATE	EARLIEST CONSIDERATION for hikes starting in:	IN-PERSON VERBAL REQUESTS not eligible for consideration until:
Jan	Aug 20 and Sep 1 (by 5pm MST)	Oct 1
Feb	Sep 20 and Oct 1 (by 5pm MST)	Nov 1
Mar	Oct 20 and Nov 1 (by 5pm MST)	Dec 1
Apr	Nov 20 and Dec 1 (by 5pm MST)	Jan 1
May	Dec 20 and Jan 1 (by 5pm MST)	Feb 1
Jun	Jan 20 and Feb 1 (by 5pm MST)	Mar 1
Jul	Feb 20 and Mar 1 (by 5pm MST)	Apr 1
Aug	Mar 20 and Apr 1 (by 5pm MST)	May 1
Sep	Apr 20 and May 1 (by 5pm MST)	Jun 1
Oct	May 20 and Jun 1 (by 5pm MST)	Jul 1
Nov	Jun 20 and Jul 1 (by 5pm MST)	Aug 1
Dec	Jul 20 and Aug 1 (by 5pm MST)	Sep 1

Permit Responses

Permit requests are responded to via U.S. Mail or email. Due to the volume of requests received, the park cannot confirm receipt of requests until they have been fully processed. **Please allow at least three weeks for processing.**

When space is available and all fee requirements are met, a permit will be issued to the trip leader. The permit is valid only for the trip leader named on the permit. Overnight hikers are not permitted to enter the canyon without a valid permit in the trip leader's possession.

If you have been denied a permit, you may want to consider day hikes or attempt to obtain a last minute, walk-in permit.

Last Minute Permit for Corridor Campgrounds

A limited number of last minute walk-up permits are available at the South Rim and/or North Rim Backcountry Information Center for Corridor Campgrounds (Indian Garden, Bright Angel, and Cottonwood Campgrounds). These permits are issued in person only, are for one or two consecutive nights, and cannot be purchased more than one day prior to the start of a hike.

Last minute permits are issued by the Backcountry Information Center, located inside the park on both the South Rim and the North Rim. The South Rim Backcountry Information Center is open daily, year round, for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time. The North Rim Backcountry Information Center (located in the administrative building) is open daily mid-May to mid-October for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time.

Waitlist

You can stop by the Backcountry Information Center at any time during open hours and request a waitlist number. This number is valid for the following morning and will be used to determine priority of service. At 8:00 a.m. Backcountry Information Center staff will call waitlist numbers. When your turn comes you can request a permit, exchange your number for a new waitlist number good for the following day, or simply ask questions. You may participate in the waitlist for as many consecutive days as is convenient.

Waitlist numbers are issued by the Backcountry Information Center, located inside the park on both the South Rim and the North Rim. The South Rim Backcountry Information Center is open daily, year round, for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time. The North Rim Backcountry Information Center (located in the administrative building) is open daily mid-May to mid-October for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time.

Following is an example showing how the waitlist can be used to secure a lower number for the next day and increase your chances of obtaining your desired permit. This is an example of how the process works in the busy season. It's rare to wait longer than this scenario, and it can be faster than this. Backcountry Information Center staff can give you a much clearer picture of how long the potential wait time will be once you arrive. During the busy season it is rare to get a last minute permit the same day.

Last minute permit and waitlist example:

- Day 1, Tuesday: You come to the Backcountry Information Center at 11 a.m. and request a permit for Bright Angel on Wednesday night and Indian Garden on Thursday night. No permits are available. You join the waitlist for the next day and are assigned #10.
- Day 2, Wednesday: You return at 7:59 a.m. Unfortunately by the time Backcountry Information Center staff reaches your waitlist number, all Corridor Campground permits have been assigned. You exchange today's waitlist number for tomorrow's waitlist number; you are #2.
- Day 3, Thursday: You return at 7:59 a.m. You obtain a permit for Bright Angel on Friday night and Indian Garden on Saturday night, hiking out Sunday morning.

Use Areas

The backcountry is divided into "use areas". Each use area has an overnight capacity based upon the size of the area, the number of suitable and available campsites, its ecological sensitivity, its management zoning, and its use history. Use areas range in size from several hundred acres to several thousand acres.

Length of Stay

Camping in designated campsites or campgrounds is limited to two nights (consecutive or non-consecutive) per campsite or campground per hike. Designated campsites include the Corridor (Indian Garden, Bright Angel, Cottonwood), Hermit, Hermit Rapids, Monument, Granite Rapids, Cedar Spring, Salt, Horn, Horseshoe Mesa, South Bass Trailhead areas (SE1, SE2, SE3), Cape Final, Point Sublime, Swamp Point, Fire Point, Tapeats, and Deer Creek Use Areas. One exception is made to this rule, during the off-season (November 15 through February 28), and within the Corridor Use Area only, overnight stays up to a total of four nights per campground per trip are allowed.

Outside the use areas named above, "at-large" camping is permitted, meaning that camps are not limited to designated sites.

Trips are limited to a maximum of seven nights per use area; however, overall trip lengths are not limited.

Group Size

More permits are available for small groups (1-6 people) than for large groups (7-11 people). Because there are only a few large group sites, limiting the size of your group will increase your chances of obtaining a permit.

Larger groups tend to cause a disproportionately higher amount of damage to the canyon, largely due to the effects of "social" trailing. For this reason, the park's Backcountry Management Plan does not allow groups larger than eleven people to camp in the same campground or use area.

Regulations stipulate that all permits are void when a group obtains multiple permits for the same campground or use area for the same night. The alternative for these larger groups is to obtain permits for smaller groups and ensure the itineraries for these permits never bring more than one of the permits into the same campground or use area on the same night. No more than four large groups or eight small groups that are affiliated with each

other may camp within the backcountry on the same night.

North Rim Winter Use

Winter use guidelines come into effect after the North Rim receives adequate snowfall to close Highway 67 or on Dec 1st, whichever comes first. Once in effect, winter use guidelines apply until mid-May, when the North Rim reopens for the season.

During the winter season a backcountry permit is required for overnight use of the North Rim from the park's northern boundary to Bright Angel Point on the canyon rim. Winter access is by hiking, snowshoeing, or cross-country skiing only. A permit can be obtained in advance at the Backcountry Information Center.

Permittees are allowed to camp at-large between the park's north boundary and the North Kaibab trailhead but not at the trailhead itself. Between the North Kaibab trailhead and the Bright Angel Point area, camping is permitted only at the North Rim Campground group campsite.

Human waste may not be buried in the snow in areas that will be in view of summer users.

Remote Sites

With a valid credit card, last minute permits may sometimes be obtained from the rangers on duty at the Lees Ferry ranger station for a limited number of use areas in their vicinity. However, these rangers have other patrol responsibilities and may not be available to provide assistance. It is recommended that all trips be planned well in advance through the Backcountry Information Center.

Backcountry Information Center

The **South Rim** Backcountry Information Center is open daily for walk-in visitors from 8 am to noon and 1-5 pm Mountain Standard Time. The **North Rim** Backcountry Information Center is open daily mid-May to October 31 for walk-in visitors from 8 am to noon and 1-5 pm (Mountain Standard Time).

Backcountry Information Center staff answer information telephone inquiries at 928-638-7875 between 8 am and 5 pm Monday through Friday, except on federal holidays. **This telephone number is for information only.**

[Email](#) the Backcountry Information Center.

FAX number for permits is 928-638-2125
you can send a fax 24 hours a day, 7 days a week, 365 days a year - HOWEVER the first day of every month we receive many faxes and the number may be busy.

Mailing address is:
Grand Canyon National Park
Permits Office
1824 S. Thompson St., Suite 201
Flagstaff AZ, 86001

[Backcountry Permit Request Form](#) (PDF file)

[Trip Planner](#) (2mb PDF file): The information in this newspaper can assist you in obtaining a backcountry use permit.

Video: [Hiking Grand Canyon, Prepare for Backpacking](#). This video is designed to help you plan for and enjoy your hike into the canyon's harsh, yet fragile, environment.

Video: [Leave No Trace](#). All Grand Canyon backcountry users are asked to follow Leave No Trace principles. The goal is to have minimum human impact on the canyon as a result of your trip

Planning, Regulations, and Safety

Trip Planning

Your descent marks your entry into a world in which planning and preparation, self-reliance, and good choices are crucial. Don't hike alone. Know what your destination will be and how to get there. Know where water is available. Get the weather forecast. Don't overestimate your capabilities. Hike intelligently. You are responsible for your own safety as well as that of everyone in your party. Stay on the trail and never shortcut switchbacks.

Seasons

With an elevation spanning from around 2000 feet to over 8000 feet (760-2440m), the Grand Canyon area experiences a variety of weather conditions. This weather variety includes cold winters and mild pleasant summers, moderate humidity, and considerable diurnal temperature changes at the higher elevations, with hot and drier summers at the bottom of the Grand Canyon along with cool damp winters. Summer thunderstorms and winter snowfall adds to the weather variety in this region.

SUMMER

Plan for hot, mostly dry weather in May and September; extremely hot, dry weather in June; and hot with monsoon thunderstorms in July and August.

Average temperatures at the top: 48°F to 83°F (9°C to 28°C) Average temperatures at the river: 74°F to 104°F (23°C to 40°C); **temperatures can feel like 140°F (60°C) in the sun and reach 115°F (46°C) in the shade.**

Hiking Tips

- Start hiking before dawn, in the evening, or at night to avoid dangerous heat. Do not hike between 10 am and 4 pm.
- Wear light-colored, loose-fitting cotton clothing. Soak your shirt, bandana, and hat to stay cool.

- Beware of lightning, falling rocks, and flash floods during storms. Stay away from edges, promontories, and individual trees.
- Know the signs of heat illness: headaches, dizziness, nausea and vomiting, cramping, and decreased urine output. Rest in the shade, get wet, hydrate, and eat high energy foods.
- Know the signs of hyponatremia, caused by over-hydration: nausea and vomiting, headache, difficulty walking, confusion, and seizures. Balance hydration with salty snacks, eat well-rounded meals, and rest frequently.

WINTER

Plan for short days and long, cold nights with potential snow and ice at the top and rain in the canyon. The upper portion of all trails can be icy and dangerous. The South Kaibab Trail receives more sun than the Bright Angel Trail.

Average temperatures at the top: 19°F to 45°F (-7°C to 7°C) Average temperatures at the river: 38°F to 59°F (3°C to 15°C)

Hiking Tips

- Carry over-the-shoe traction devices and use them on icy trails.
- Wear a warm hat, gloves, wool socks, and synthetic or wool-blend layers. Pack waterproof layers, dry clothes, and socks.
- Eat warm foods often, such as soup, tea, cocoa, and oatmeal.
- Know the signs of hypothermia: uncontrolled shivering, confusion, and exhaustion. Put on dry clothing, drink warm liquids, and protect yourself from wind, rain, snow, and cold.

SPRING AND AUTUMN

Plan for short days with highly variable weather. While the climate is typically cool, it can snow or be intensely hot. High winds are common.

Average temperatures at the top: 32°F to 63°F (0°C to 17°C) Average temperatures at the river: 56°F to 82°F (13°C to 28°C)

Hiking Tips

- If the weather is hot, follow summer hiking tips at left.
- Prepare for lingering ice in spring and early snow in autumn. Bring over-the-shoe traction devices.
- Check water availability along the Bright Angel and North Kaibab trails. Seasonal water is usually available May through September.
- Wear windproof layers on windy days.
- Stay aware—hypothermia can occur in 50°F (10°C) weather and heat illness in 80°F (27°C) weather.

Trails

Corridor Trails Distances

South Kaibab Trail: The trail begins on the South Rim near Yaki Point, and descends to the Colorado River. Elevation change from rim to river is 4860 ft (1480 m), along a 6.3 mile (10.1 km) trail. Because of the unavailability of water and steepness of the South Kaibab Trail, rangers recommend hiking down this trail only - and recommend using the Bright Angel Trail for the hike out.

River Trail: The trail has little elevation variation and follows the Colorado River for 1.7 miles (2.7 km) between the Bright Angel and South Kaibab trails. Two foot bridges permit access to the north side of the Colorado River.

Bright Angel Trail: The trail begins on the South Rim just west of Kolb Studio, and descends to the Colorado River. Elevation change from rim to river is 4460 ft (1360 m), along a 7.8 mile (12.6 km) trail. This trail passes through Indian Garden.

North Kaibab Trail: The trail begins on the North Rim at the head of Roaring Springs Canyon and descends to the Colorado River. Elevation from rim to river is 5850 ft (1780 m), along a 14.2 mi (22.9 km) trail.

Corridor Availability Report (PDF file)

<https://www.nps.gov/grca/planyourvisit/upload/CorAvail.pdf>

DW = drinking water; TF = Toilet Facilities; EP = Emergency Phone; RS = Ranger Station

Distance Via:	Distance from Rim (mi/km)	Elevation (ft/m)	DW	TF	EP	RS	Other
Bright Angel Trailhead to:		6860/2093					
Mile-and-a-Half Resthouse	1.6/2.6	5729/1748	Y	Y	Y		water available mid-May to mid-Oct only
Three-Mile Resthouse	3.1/5	4748/1449	Y	Y	Y		water available mid-May to mid-Oct only
Indian Garden Campground	4.8/7.7	3800/1160	Y	Y	Y	Y	picnic tables, food storage cans, pack poles
River Resthouse	8/12.9	2480/756	Y	Y			
Bright Angel Campground	9.5/15.3	2480/756	Y	Y	Y		picnic tables, food storage cans, pack poles
Phantom Ranch	9.9/15.9	2546/776	Y	Y	Y	Y	reservation required for food and lodging
South Kaibab Trailhead to:		7260/2213					
Cedar Ridge	1.5/2.4	6120/1865	Y				
Skeleton Point	3/4.8	5220/1591					
Tip Off	4.4/7.1	4000/1219		Y	Y		junction with Tonto Trail (distance to Indian Garden via Tonto Trail - 4.6 mi/6.6 km)
Bright Angel Campground	7/11.3	2480/756	Y	Y	Y		picnic tables, food storage cans, pack poles
Phantom Ranch	7.4/11.9	2546/776	Y	Y	Y	Y	reservation required for food and lodging
North Kaibab Trailhead to:		8241/2512					
Supai Tunnel	1.7/2.5	6800/2073	Y	Y			water available mid-May to mid-Oct only
Roaring Springs	4.7/7.3	5220/1591	Y	Y			20 minute detour off main trail; water available mid-May to mid-Oct only
Manzanita Rest Area	5.4/8.4	4600/1402	Y	Y	Y		
Cottonwood Campground	6.8/10.9	4080/1244	Y	Y	Y		water available mid-May to mid-Oct only; picnic tables, food storage cans, pack poles
Ribbon Falls	8.4/13.3	3720/1134					20 minute detour off main trail; waterfalls; day use only; stay on designated trails
Phantom Ranch	13.6/21.8	2546/776	Y	Y	Y		reservation required for food and lodging
Bright Angel Campground	14/22.5	2480/756	Y	Y	Y	Y	picnic tables, food storage cans, pack poles

Backcountry Use Areas

Corridor Use Areas

There are three campgrounds located along the Corridor Trails: Indian Garden Campground (CIG), Bright Angel Campground (CBG), and Cottonwood Campground (CCG). You may spend up to two nights (consecutive or non-consecutive) per campground per hike. One exception is made to this rule: from November 15 - February 28, up to four nights per campground per hike is allowed. To camp in one of these campgrounds you must obtain a backcountry permit.

Every campsite at Indian Garden, Bright Angel, and Cottonwood Campgrounds has a picnic table, pack pole, and metal food storage can. All food, toiletries, and plastics must be placed inside the food storage can.

Indian Garden Campground (CIG), located along the Bright Angel Trail, is a beautiful riparian area filled with cottonwood trees. A small creek passes through on its way to the Colorado River. Indian Garden is 4.8 miles below the South Rim. Indian Garden has a ranger station, emergency phone, year-round potable water, and toilets. Mule trains stop to rest on their way to Phantom Ranch. Day hike destinations include Plateau Point (with panoramic views of the Colorado River).

Bright Angel Campground (CBG) is at the bottom of the Grand Canyon, 9.9 miles from the South Rim and 14 miles from the North Rim. The campground is 1/2 mile north of the Colorado River, and sits along Bright Angel Creek. The campground is less than 1/2 mile from Phantom Ranch. The area is characterized by the river delta where Bright Angel Creek meets the Colorado River. There is a ranger station, emergency phone, year-round potable water, and toilets. To reach this campground you can travel the South Kaibab Trail (and cross the black bridge) or the Bright Angel Trail (and cross the silver bridge) from the South Rim, or travel the North Kaibab Trail from the North Rim. Cottonwood trees shade Bright Angel Campground and the creek is a wonderful place to cool off. Deer, ringtail cats, gray foxes, and squirrels are often seen. Popular activities include relaxing, wading in Bright Angel Creek, stargazing, fishing (license required), and day hiking. Day hike destinations include the River Trail and Phantom Overlook. Seasonal ranger programs are offered. Snack items and meals are available for purchase at Phantom Ranch Lodge (meals must be reserved in advance 303-297-2757).

Cottonwood Campground (CCG) is a small campground 6.8 miles below the North Rim of the Grand Canyon on the North Kaibab Trail. Bright Angel Creek nearby offers a cool and refreshing place to get wet. Seasonally (mid-May to mid-Oct) potable drinking water is available at the campground. During other times of the year you should be prepared to filter/treat water obtained from the creek. There are deer, ringtail cats, and squirrels in the area. Cottonwood has an emergency phone and toilets. Day hike destinations include Roaring Springs, Ribbon Falls, and Manzanita Canyon.

Use Areas

The Grand Canyon backcountry is divided into use areas. Each use area has an overnight capacity based upon the size of the area, the number of suitable and available campsites, its ecological sensitivity, its management zoning, and its use history. Use areas range in size from several hundred acres to several thousand acres. To camp in a backcountry use area you must obtain a backcountry permit. The table below lists the more popular use areas only. For additional areas not listed, contact the Backcountry Information Center.

Code	Use Area Name	Mgmt. Zone	Camping Type
AH9	Vishnu	Wild	At Large Camping
AJ9	Cheyava	Wild	At Large Camping
AK9	Clear Creek	Threshold	At Large Camping
AL9	Greenland Springs	Wild	At Large Camping
AP9	Phantom Creek	Wild	At Large Camping
AQ9	Trinity Creek	Wild	At Large Camping
AR9	Scorpion Ridge	Wild	At Large Camping
BE9	Hance Creek	Primitive	At Large Camping
BF5	Horseshoe Mesa	Threshold	Designated Sites
BG9	Cottonwood Creek	Primitive	At Large Camping
BH9	Grapevine	Primitive	At Large Camping
BJ9	Cremation	Primitive	At Large Camping
BL4	Horn Creek	Threshold	Designated Sites
BL5	Salt Creek	Threshold	Designated Sites
BL6	Cedar Spring	Threshold	Designated Sites
BL7	Monument Creek	Threshold	Designated Sites
BL8	Granite Rapids	Threshold	Designated Sites
BM7	Hermit Creek	Threshold	Designated Sites
BM8	Hermit Rapids	Threshold	Designated Sites
BN9	Boucher	Primitive	At Large Camping
CBG	Bright Angel	Corridor	Campground
CCG	Cottonwood	Corridor	Campground
CIG	Indian Garden	Corridor	Campground
NA0	Walhalla Plateau	Primitive	At Large Camping
NB9	Thompson Canyon	Wild	At Large Camping
NC9	Ken Patrick Primitive	At Large	Camping
ND9	Robbers Roost	Primitive	At Large Camping
NF9	Widforss	Threshold	At Large Camping
NG9	Outlet	Primitive	At Large Camping
NH1	Point Sublime	Threshold	Designated Sites
NJ0	Swamp Ridge	Primitive	At Large Camping
SC9	Eremita Mesa	Threshold	At Large Camping

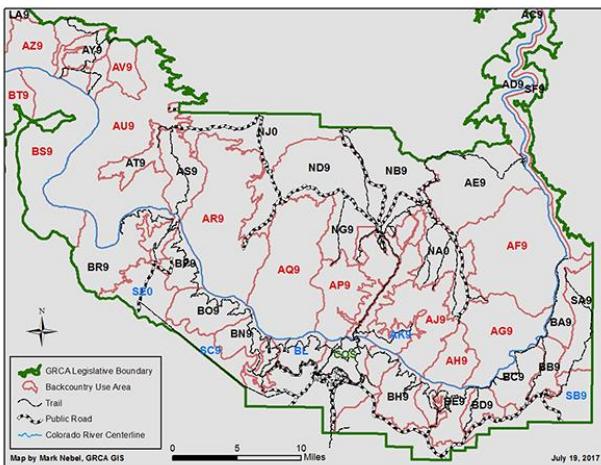
Corridor Zone Recommended for hikers without previous experience at Grand Canyon. Maintained trails. Purified water stations. Paved roads to trailheads. Toilets, signs, emergency phones, and ranger stations. Use of private livestock (horses and mules only) allowed only when specified on permit.

Threshold Zone Recommended for experienced Grand Canyon hikers. Non-maintained trails. Scarce water sources. Dirt roads to trailheads. Pit toilets. Use of private livestock (horses and mules only) allowed with permit only on Whitmore Trail and on designated roads and trails on the rim.

Primitive Zone** Recommended for highly experienced Grand Canyon hikers with proven route-finding ability. Non-maintained trails and routes. 4-wheel-drive roads to trailheads. Occasional signs. No other developments. Use of private livestock (horses and mules only) allowed with permit only on the Ken Patrick Trail to Uncle Jim Trail to Uncle Jim Point and on designated roads on the rim.

Wild Zone** Recommended for highly experienced Grand Canyon hikers with extensive route finding ability. Indistinct to non-existent routes require advanced route finding ability. Water sources scarce to non-existent. No other development. Use of private livestock is not allowed.

**** Primitive and Wild Zones are not recommended for use during summer months due to extreme high temperatures and the lack of reliable water sources.**



Check for Updates

Check the [Backcountry Updates and Closures page](https://www.nps.gov/grca/planyourvisit/trail-closures.htm) for current information on trail conditions and situations affecting the backcountry.

<https://www.nps.gov/grca/planyourvisit/trail-closures.htm>

Also check the weather and road conditions for any relevant conditions that may affect your trip:

<https://www.nps.gov/grca/planyourvisit/weather-condition.htm>

Be Realistic

- Choose the appropriate trail for your abilities or consider walking the Rim Trail for an easier hike.
- Check the weather and adjust plans; avoid summer heat. Remember the weather can change suddenly.
- Leave your itinerary with someone who will notice if you are overdue and report it to 911.
- Hydrate, but don't force fluids. Eat a good meal, and get a good night's sleep. If you do not feel well, do not hike.
- Prepare yourself for a faster hike down with high impact on your joints and a slow, strenuous hike out that may take twice as long or longer.

10 Essentials for Your Day Pack

1. Water: bring a sufficient amount and extra in case of emergency; always bring a water treatment method
2. Salty snacks and high-calorie meal(s)
3. First aid kit, prescriptions, blister care, duct tape, and pocket knife
4. Map or trail guide
5. Flashlight or headlamp with spare batteries
6. Sunscreen, wide-brimmed hat, and sunglasses
7. Whistle, signal mirror, and cell phone
8. Lightweight tarp or emergency shelter

9. Broken-in hiking shoes with good soles and hiking poles
10. Layers of clothing

Overnight Camping

"At-large" camping is allowed between Cottonwood drainage and Cremation drainage. Campsites are located where the Tonto Trail crosses the drainages (often better shade and access to seasonal water) and also 1 to 2 miles on either side of the drainages, out on the Tonto Platform (more sun- so nice winter camps).

In spring of 2014, the western boundary of the Cremation Use Area (BJ9) was adjusted in order to protect sensitive resources. Camping is no longer allowed west of the west arm of Cremation drainage. The area closed to camping is shaded grey on the map.

Prepare: Plan Ahead

- Backpackers planning to camp overnight must obtain a backcountry permit before starting their hike. Attach the permit visibly to your backpack. Camp only in campgrounds, not along the trail. No campfires allowed.
- In addition to the 10 essentials listed above, bring a stove, fuel, and matches; blanket or sleeping bag with ground pad; and ground cloth, tarp, or tent.
- Pack weight should not be more than 15–20% of your body weight. In summer, pack light—replace your sleeping bag with a liner or sheet; bring ready-to-eat foods and leave the stove behind.

While at Camp

- Choose your campsite. Sites are firstcome, first-served with the required permit. Large group sites are reserved for parties of 7–11 hikers.
- Immediately place all food, toiletries, and plastic bags in the food storage cans at each campsite. Keep the lids closed and fastened shut at all times. Hang your backpack with the zippers open

to prevent animals from chewing through your pack.

- Place your backcountry permit in the box provided. Leave your permit at your site during your entire stay.
- Use headlamps with red lights to preserve your night vision, minimize light pollution, and avoid disturbing other campers.

When Leaving Camp

- If you start early, remember to maintain a quiet camp and let fellow campers sleep.
- Do not leave any trash, gear, or extra food behind. Check your site for micro-trash —look for bandages, twist ties, fruit peels, etc.
- Remove everything from the food storage cans.
- Attach your permit to your backpack for your hike out.
- Check the campground bulletin boards for weather, trail, and water updates.

Water Sources

The Tonto Trail is notorious for its dearth of reliable water sources, and this section is no exception.

Cottonwood (BG9): Cool weather: Southern spring is usually reliable. Northern Spring and O'Neill Spring are unreliable at best. Hot weather: May be dry.

Grapevine (BH9): Cool weather: Water in the east arm at the Tonto Trail crossing and from the spring on the east side of the drainage. Hot weather: Water normally available in the east arm above or below Tonto Platform level (but sometimes dry at the Tonto Trail) and usually a small trickle from the spring on the east side of the drainage. Further downcanyon water flows perennially.

Boulder (BH9): Cool weather: Dry at the Tonto Trail crossing. Small amounts are occasionally found above Tonto Platform level. Water may also be found downstream about 20 minutes. Water is often reported as salty and unpalatable. Hot weather: Dry.

Lone Tree (BJ9): Cool weather: Small amounts at or below Tonto Trail crossing (the most reliable water source is a half hour walk downstream of the Tonto crossing near a lone cottonwood tree). Hot weather: Dry.

Cremation (BJ9): Dry all year. Occasional potholes in the Tapeats (down the west arm of the drainage).

Emergency Water Sources: Page Spring and Hance Creek (east of Horseshoe Mesa), Burro Spring and Pipe Creek (west of the Tip-off) and the Colorado River at the bottom of the Kaibab Trail. **River access in each of the side canyon's is not realistic with some like Cremation plunging 100 or more feet prior to reaching the Colorado River.**

Backcountry Regulations

It is the responsibility of a backcountry permit trip leader to insure that all participants know and obey the following regulations. The trip leader and/or participants can be cited for violating these regulations.

1. A backcountry permit is required for all overnight backcountry use and MUST be in the trip leader's possession while in the backcountry. Permittees must abide by all trail closures and activity or use restrictions.
2. A backcountry permit is valid only for the trip leader, campsites, dates, and number of people specified on the permit.
3. Carry out your trash. Burning, burying, or leaving trash or toilet paper is prohibited.
4. A backcountry permit is void if on any night another group affiliated to yours (i.e. same club, organization, group of friends, etc.) is using the same campground or use area. More than one group from the same organization or affiliation camping in the same designated campground or use area per night is prohibited.
5. Commercial Use Authorization is required for commercial use of the backcountry.

6. Wood or charcoal fires of any type are prohibited. Sterno or fossil fuel backpack stoves are permitted.
7. Use of biodegradable or any other type of soap in creeks is prohibited, and hikers in at-large areas are encouraged where possible to leave room for wildlife and protect water quality by camping at least 100 feet away from natural water sources other than the Colorado River.
8. Feeding, touching, teasing, or intentionally disturbing wildlife is prohibited.
9. Throwing or rolling rocks or other items down hillsides or mountainsides, into valleys or canyons, or inside caves is prohibited.
10. Leaving a trail or walkway to shortcut between portions of the same trail or walkway, or to shortcut to an adjacent trail is strictly prohibited.
11. Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state any plants, rocks, animals, mineral, cultural or archeological resources natural features, or signs is prohibited. Walking on, entering, traversing, or climbing an archeological resource is prohibited.
12. The use of motorized vehicles or wheeled devices, such as bicycles, motorcycles, baby buggies, and similar vehicles, on trails below the rim is prohibited.
13. Overnight private stock use requires a backcountry permit. Use is restricted to trails and campsites designated for stock. Other domestic animals or pets are prohibited below the rim.
14. Traps and nets are prohibited. A valid fishing license is required for all fishing.
15. Because of their sensitive and sometimes dangerous nature, entry and/or exploration of any caves or mines must be approved in advance through Grand Canyon National Park.

Backcountry Safety

Plan Ahead

THE DIFFERENCE BETWEEN A GREAT HIKE OR A TRIP TO THE HOSPITAL IS UP TO YOU!

Your descent marks your entry into a world in which planning and preparation, self-reliance, and good choices are crucial. Don't hike alone. Know what your destination will be and how to get there. Know where water is available. Get the weather forecast. Don't overestimate your capabilities. Hike intelligently. You are responsible for your own safety as well as that of everyone in your party. Stay on the trail and never shortcut switchbacks.

Average Temperatures in the Inner Canyon

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
High (F)	56	62	71	82	92	101	106	103	97	84	68	57
Low (F)	36	42	48	56	63	72	78	75	69	58	46	37
High (C)	13	17	22	28	33	38	41	39	36	29	20	14
Low (C)	2	6	9	13	17	22	26	24	21	14	8	2

Average temperatures, weather information, and road conditions can be found in the [Climate](#) section.

WARNING! Summer thunderstorms bring lightning.

Be Kind to Yourself

KNOW YOUR ABILITIES; CHOOSE AN APPROPRIATE HIKE.

You will be hiking at high elevation in hot, dry desert conditions with a steep climb out at the end of the day. Everyone who hikes in the canyon for the first time reports that it was more difficult than they expected. Be conservative in planning your hike!

If you have asthma, diabetes, a heart condition, knee or back problems, or any other health or medical issue, limit both your exertion and your exposure to the heat. The altitude, strenuous climbing, dehydration, and intense inner canyon heat will combine to make any medical problem worse. Stay within your training, physical limitations, and abilities.

Be a Lightweight

THE LESS YOU CARRY, THE MORE ENJOYABLE THE HIKE.

Travel as light as possible. The heaviest items in your pack should be food and water. Use hiking sticks to take stress off your legs. Wear well-fitting and broken-in hiking boots. Bring a small lightweight flashlight and a change of batteries and bulb. Wear sunscreen, sunglasses, and a hat. Bring a map, compass, signal mirror or whistle, first aid kit, and water purification tablets. Keep in mind that all trash (including biodegradable) needs to be carried out of the canyon.

Avoid Huffing and Puffing

IF YOU CAN TALK WHILE YOU ARE WALKING, YOU ARE WALKING THE PERFECT SPEED.

When you huff and puff your body is not getting enough oxygen. Walking at a pace that allows you to be able to walk and talk means that your legs and your body are getting the oxygen needed to function efficiently.

When your body generates fewer metabolic waste products, you enjoy your hike more and you feel better at the end. At times it may seem like you are walking too slow, but at an aerobic pace (sometimes even baby-sized steps when the trail is steep) your energy reserves will last longer. You will also feel much better that night and the next day.

Take a Break

TAKE A TEN MINUTE BREAK AT LEAST ONCE EVERY HOUR.

A break of ten minutes helps remove the metabolic waste products that build up in your legs while hiking. Take a break at least every hour. Sit down and prop your legs up. Eat some food, drink some fluids, and take this time to enjoy and appreciate the view. These efficient breaks can recharge your batteries. In the long run, breaks will not slow you down.

No Food, No Fuel, No Fun

EAT OFTEN AND DON'T FORCE FLUIDS.

Eat more than you normally do, ensuring you eat before, during, and after your hike. No matter what the temperature, you need water and energy to keep going. Every hour hiking in the canyon can be likened to the

physiological equivalent of shoveling wet sand. Plan accordingly when determining how much food and water you should consume during your hike.

Keeping yourself cool while hiking in the canyon takes a large amount of energy (food). Food is your body's primary source of fuel while hiking in the canyon. You need to eat about twice as much as you normally would to meet your energy needs while hiking in the Grand Canyon. Salty snacks and water or sports drink should be consumed on any hike lasting longer than 30 minutes.

Your best defense against illness and exhaustion is to eat a healthy breakfast, and eat regularly throughout your hike.

Watch Your Time

COMING BACK UP IS HARD!

Plan on taking twice as long to hike up as it took to hike down. Allow 1/3 of your time to descend and 2/3 of your time to ascend. As a courtesy, give uphill hikers the right of way. Bring a small, lightweight flashlight in case you end up hiking in the dark.

Mules and Hikers

MULES HAVE THE RIGHT OF WAY.

To ensure safety for yourself, other trail users, and mule riders, when encountering mules on the trails:

- Step off the trail on the uphill side away from the edge.
- Follow the direction of the wrangler. Remain completely quiet and stand perfectly still.
- Do not return to the trail until the last mule is 50 feet (15 meters) past your position.

Summer Hiking

The National Park Service urges SPECIAL CAUTION for all hikers during the summer months.

Every year, scores of unprepared hikers, lured by initially easy downhill hiking, experience severe illness, injury, or death from hiking in the canyon.

Be aware that efforts to assist you may be delayed during the summer months due to limited staff, the number of rescue calls, employee safety requirements, and limited helicopter flying capability during periods of extreme heat or inclement weather.

Do not rely on physical strength alone, hiking smart will take you much farther. Rangers respond to heat exhausted hikers every day during the summer — don't let yourself become one of them! Use the information below to hike smart.

10 Summer Hiking Essentials

1. **Water** - plain and some with electrolyte replacement.
2. **Food** - especially salty foods. Eat twice as much as normal.
3. **First Aid Kit** - bandaids, ace wrap, antiseptic, moleskin, etc.
4. **Map** - while many trails are well-marked, maps are helpful tools.
5. **Pack** - to carry the essentials.
6. **Flashlight/Spare Batteries** - allows you to hike out during the cool of the evening.
7. **Spray Bottle** - fill with water for your own personal air conditioning system.
8. **Hat/Sunscreen** - to keep the sun off you and protect your skin.
9. **Whistle and/or Signal Mirror** - for emergency use.
10. **Waterproof Clothing** - poncho or jacket; especially useful during monsoon season (mid-July to early September).

Don't Force Fluids. Drink When You Are Thirsty. Rest and Eat Often.

Ambient temperature, elevation, and exercise intensity and duration increase the physiological strain, calorie and water demands on our bodies. This makes canyon hiking more difficult than traveling the same distance on level ground or in cooler temperatures.

Fluid/electrolyte loss can exceed 2 quarts per hour if you hike uphill in direct sunlight and during the hottest time of

the day. Because inner canyon air is so dry and hot, sweat evaporates instantly, making its loss almost imperceptible. Keep an eye out for salt rings on your clothes.

Even a mild level of dehydration can make hiking a lot less fun. The more dehydrated you become, the less efficient your body is at self-cooling. This puts you at greater risk for heat related illness. Over-hydration and lack of salty foods can be equally as dangerous, as this may lead to a life-threatening electrolyte disorder called hyponatremia.

The sensations of thirst and hunger are influenced by many factors, and should not be used as the only guide to replenishment. Eat and drink enough throughout your hike to replace the calories and fluid your body is using. Make sure that you balance your food and fluid intake, to avoid the risk of becoming exhausted, debilitated, or severely ill.

Wait for the Shade

AVOID HIKING BETWEEN 10AM AND 4PM!

Even if you are eating and drinking correctly you still need to avoid hiking in direct sunlight during the hottest part of the day. Sun temperatures are 15F to 20F (9C-11C) degrees hotter than posted shade temperatures. And keep in mind, the farther into the canyon you go the hotter it gets!

Plan your day so you are not hiking between the hours of 10am and 4pm. Take a break near shade and water to avoid the worst heat of day. Enjoy a predawn start and a late afternoon finish. Experienced desert hikers know that the timing of their hike is the most important factor in avoiding hazards. Most of the people who need emergency medical help in the canyon due to heat illness are hiking between 10am and 4pm.

Always bring a lightweight flashlight to give yourself the option of hiking out after dark in the event that illness, injury, or enjoyment should slow you down.

Stay Wet and Stay Cool

KEEP YOURSELF SOAKING WET TO STAY COOL.

This is one of the best things that you can do for yourself, it will help decrease your core body temperature. Whenever you are near water, make sure that you wet (actually soak) yourself down. If you hike while soaking wet you will stay reasonably cool. This will make a wonderful difference in how well you feel, especially at the end of the day!

The Hazardous H's

WATCH OUT FOR THESE HEALTH HAZARDS!

HEAT EXHAUSTION

- The result of dehydration due to intense sweating. Hikers can lose one or two quarts (liters) of water per hour. Rangers at Phantom Ranch and Indian Garden treat many cases of heat exhaustion each day in summer.
- *Symptoms:* pale face, nausea, vomiting, cool and moist skin, headache, cramps.
- *Treatment:* drink water with electrolytes, eat high-energy foods (with fats and sugars), rest in the shade for 30-45 minutes, and cool the body by getting wet.

HEATSTROKE

- A life-threatening emergency where the body's heat regulating mechanisms become overwhelmed by a combination of internal heat production and environmental demands. Your body loses its ability to cool itself. Grand Canyon has two to three cases of heatstroke a year. Untreated heat exhaustion can lead to heatstroke.
- *Symptoms:* flushed face, dry skin, weak and rapid pulse, high core body temperature, confusion, poor judgment or inability to cope, unconsciousness, seizures.
- *Treatment:* the heatstroke victim must be cooled immediately! Continuously pour water on the victim's head and torso, fan to create an evaporative cooling effect. Immerse the victim in cold water if possible. Move the victim to shade and remove excess clothing. The victim needs evacuation to a hospital. Someone should go for help while attempts to cool the victim continue.

HYPONATREMIA (water intoxication)

- An illness that mimics the early symptoms of heat exhaustion. It is the result of low sodium in the blood caused by drinking too much water and losing too much salt through sweating.
- *Symptoms:* nausea, vomiting, altered mental states, confusion, and frequent urination. The victim may appear intoxicated. In extreme cases seizures may occur.
- *Treatment:* have the victim eat salty foods, slowly drink sports drinks with electrolytes, and rest in the shade. If mental alertness decreases, seek immediate help!

HYPOTHERMIA

- A life-threatening emergency where the body cannot keep itself warm, due to exhaustion and exposure to cold, wet, windy weather.
- *Symptoms:* uncontrolled shivering, poor muscle control, careless attitude. Look for signs of the "umbles" - stumbling, mumbling, fumbling, grumbling.
- *Treatment:* remove wet clothing and put on dry clothing, drink warm sugary liquids, warm victim by body contact with another person, protect from wind, rain, and cold.
- Avoid hypothermia by checking at Canyon View Information Plaza or the Backcountry Information Center for the latest weather and trail conditions, taking layered clothing for protection against cold and wet weather, eating frequently, replacing fluids and electrolytes by drinking before feeling thirsty, and avoiding exposure to wet weather.

Winter Hiking

Every year, scores of unprepared hikers, lured by initially easy downhill hiking, experience severe illness, injury, or death from hiking in the canyon. Travel in Grand Canyon National Park's backcountry has inherent risks and involves unavoidable hazards. Your safety depends upon your judgment, your experience, and a realistic assessment of your abilities.

A successful and safe winter hike depends on weather and routes, but realize that any hike can be affected by unforeseen natural occurrences. Routes and trails are susceptible to deterioration from rockslides. Weather, at any time of the year, can compromise an individual's ability to cope with the psychological challenges of backcountry travel. Always be sure you have adequate food, water, and equipment to deal with the unexpected.

If you have doubts as to your ability to hike safely in the Grand Canyon, do not attempt to do so! All visitors should be aware that efforts to assist them may be delayed and limited due to weather, rescuer safety, and incident urgency.

Do not rely on physical strength alone, hiking smart will take you much farther. Use this information to hike smart.

10 Winter Hiking Essentials

1. **Food** – especially salty foods. Eat twice as much as normal.
2. **First Aid Kit** – bandaids, ace wrap, antiseptic, moleskin, etc.
3. **Map** – while many trails are well-marked, maps are helpful tools.
4. **Water** – plain and some with electrolyte replacement.
5. **Pack** – to carry the essentials.
6. **Flashlight/Spare Batteries** – allows you to hike out at night.
7. **Appropriate Footwear** - waterproof boots, gaiters to keep snow and mud out of your boots.
8. **Over-the-shoe traction devices** - it will only take a short and unexpected stretch of ice to make you glad you have extra traction.
9. **Hiking Poles** – to help with footing on icy trails.
10. **Whistle and/or Signal Mirror** – for emergency use, know how to use your equipment.
11. **Waterproof/Warm Clothing** – parka, hat, gloves for the snow and rain, plus an extra set of dry clothing – in case you get wet.

The Hazardous H

WATCH OUT FOR THIS HEALTH HAZARD!

HYPOTHERMIA

- A life-threatening emergency where the body cannot keep itself warm, due to exhaustion and exposure to cold, wet, windy weather.
- *Symptoms:* uncontrolled shivering, poor muscle control, careless attitude, confusion, exhaustion (even after rest). Look for signs of the "umbles" - stumbling, mumbling, fumbling, grumbling.
- *Treatment:* remove wet clothing and put on dry clothing, drink warm sugary liquids, warm victim by body contact with another person, protect from wind, rain, and cold. If re-warming is unsuccessful - seek help.
- Avoid hypothermia by checking at the Visitor Center or the Backcountry Information Center for the latest weather and trail conditions, taking layered clothing for protection against cold and wet weather, eating frequently, replacing fluids and electrolytes by drinking before feeling thirsty, and avoiding exposure to wet weather.

Trail Conditions

KNOW TRAIL CONDITIONS BEFORE YOU START!

Some trails are more difficult than others to navigate in the winter. Stop by the Backcountry Information Center prior to your hike for a trail update. Pay close attention to the weather forecast. Winter travelers are reminded that precipitation patterns in Northern Arizona are quite variable. Just because it is the winter season doesn't mean it looks or feels like winter on the ground. The following descriptions assume that winter has set in and that a snowpack exists on the North Kaibab Plateau. This is most likely to be the case January through March.

The following narrative is meant as an introduction ONLY to winter trail conditions on the South Rim (west to east). Further research, including talking with the Backcountry Information Center, is highly recommended prior to your first winter hike in the canyon.

The **South Bass Trail** can be difficult to access in winter due to the necessity to travel on 30 miles of remote roads. During wet years snow is the main hindrance with mud being the biggest concern in late winter and early spring.

The primary access road is FR 328 which is administered by the U.S. Forest Service. The **Boucher Trail** as it parallels the west side of Hermit Canyon is known for developing a serious stretch of ice after big storms and during the spring melt. This is due to the trail's west-facing exposure which allows for significant daytime heating. When this daytime thaw combines with the cold nighttime temperatures of the upper canyon you have a perfect recipe for trail-ice. The **Hermit Trail** has less snow and ice than any other trail on the South Rim. This is due in part to the trailhead being at less than 7000ft. In addition, at about 0.5 miles the trail turns from north-facing to southwest-facing as it descends through the Coconino Sandstone. So expect some snow and ice at first, but with quickly improving conditions as you descend. The **Bright Angel Trail** is a fault line trail that is primarily north-facing. Packed snow and ice tends to be consistently encountered for the initial three miles. The **South Kaibab Trail** is a ridgeline trail that receives considerable daytime heating. The initial 1/4 mile, known as the Chimney, is north-facing and holds ice all winter long. Below the Chimney, ice is intermittent. The **Grandview Trail** is north-facing and at a higher elevation and thus receives considerable snow at the trailhead. This trail, more than any other, tends to turn around unprepared hikers due to the combination of narrow sections of trail, exposure, and ice. The **New Hance Trail** and the **South Bass Trail** are the least used South Rim trails in the winter. First time winter hikers often report route finding problems on the New Hance Trail. The Backcountry Information Center recommends hikers consider not ending a backpack trip on this trail in winter, especially when a big storm is forecasted. The **Tanner Trail** has a long and prolonged north-facing section. The upper two miles tend to remain snow covered throughout the winter.

Foot travel across the **Kaibab Plateau (North Rim)** in winter shares many of the pleasures, and dangers, of a journey through a high mountain environment. Deep snow brings peace and a unique kind of beauty to the Kaibab forest, but quiet may be harder to come by when the winds of winter hum across the meadows and howl through the trees. With the exception of avalanche and crevasse, the Kaibab Plateau in winter offers all the potential pitfalls of lofty peaks: high elevation, extreme

cold, violent storms bringing remarkable snow fall, and great distances, all encountered in one of the most isolated locations in the lower 48. It's possible to cover the entire 45 miles between Jacob Lake and the North Rim and not see another soul so self-sufficiency becomes the primary requirement imposed by the landscape. Tested and reliable winter tents and sleeping bags, insulation that will work when wet, shell layers that provide effective protection from wind and the wetness of the snow, spare parts for stoves, tents, ski bindings or snowshoes, an efficient snow shovel, plenty of high calorie food, fuel for melting snow, and, most importantly, the personal expertise required to use it all effectively and safely are key components in a successful passage. The tranquility of a quiet evening with a winter sunset flaring overhead represents one face of the Kaibab Plateau, but it is well to remember the sunset obscuring other face, wind-dominated and arctic, which can quickly turn hands to ice and paralyze one's ability to make a rational decision.

The equipment and gear necessary for a North Rim winter trip are not standard lightweight items. Your destination is at 8,000 feet and winter can be severe at this elevation. Come prepared for severe trail ice and deep snow. Cotton clothing and jeans are not appropriate because they hold moisture against your skin hastening hypothermia.

- Backpack (if hiking in canyon) or sled (if skiing from Jacob Lake), sleeping bag, sleeping pad.
- Base layer and socks (merino wool blend or synthetic), polar fleece or down jacket, exterior waterproof layer, gloves, hat and hiking boots rated to 0 degree or lower.
- Sunglasses, sunscreen, sunscreen lip block, map and knife.
- Personal medications, toilet paper, headlamp, cook stove and fuel.
- Matches or a lighter (fire starting kit), first aid kit.

Weather Dangers

Lightning

- Go to low-lying areas away from cliff edges, lone trees, poles, or metal objects. Make sure the area is not subject to flash floods. Do not seek shelter in caves or alcoves.
- Become a smaller target by squatting low on the ground. Place hands on knees or back of neck with head between knees. Do not lie down or touch the ground with your hands. Minimize contact with the ground and nearby rocks to minimize ground current effects caused by a nearby strike.
- Lightning can strike 10 miles across the canyon, so being below the rim does not make you at a low spot.

Rock Falls

- Watch and listen for rock falls and slides, especially during and after downpours.
- Do not stand at places where rocks have obviously fallen before.

Flash Floods

- Take the possibility of rainfall and flash flooding seriously when hiking the canyons of Northern Arizona. It is a good idea before you hike to study maps to identify possible escape routes.
- Be especially careful hiking the Grand Canyon, Marble Canyon, and Glen Canyon regions. The slot canyons in these areas are beautiful, but can be extremely dangerous when it rains. Hikers have been killed in flash floods generated by thunderstorms as far as 25 miles away.
- Flash floods can occur at any time of the year. Be alert for the possibility of flash flooding anytime that rainfall is forecast. Be especially cautious from July to mid-September when severe thunderstorms can develop rapidly.
- Never camp in a dry wash. If you must camp near a wash, camp as high as possible and check for indications of past high water, such as stains on rock walls and debris lines.
- Be cautious and/or avoid areas subject to flooding - stream beads, narrow canyons, and

washes. Be especially cautious in areas posted with flash flood warning signs.

- Do not cross-flowing water or flooded trails where water is above your knees.
- Always face upstream when near or in any creek or drainage. Be alert! It does not have to be raining where you are to cause a sudden flash flood in your area.
- Move to higher ground immediately if you see or hear a flood coming. Do not try to outrun a flood.
- Warn other people downstream when a flash flood occurs.

Flash floods, which have been described as "more water than you want in less time than you have," are common in Northern Arizona. This is because the arid, sparsely vegetated environments found in this area have little capacity to absorb rainfall. The resulting runoff moves rapidly through the narrow canyons and steep terrain found throughout Northern Arizona. In many areas, even small storms can turn normally dry streambeds into raging torrents of water in a matter of minutes.

A flash flood can travel miles beyond the rainfall that generated it, catching unwary hikers and motorists by surprise. In Lower Antelope Canyon on August 12, 1997, twelve hikers were caught in a flash flood that filled the narrow canyon with water up to 50 feet deep. The hikers did not recognize the flood danger until it was too late, probably because the storm that caused the flood occurred miles away. Only one hiker survived!

Leave No Trace Principles



Developed by the National Outdoor Leadership School, the principles of Leave No Trace are an extension of the National Park Service mission to preserve a vast system of resources

"unimpaired for the enjoyment of future generations" that challenge individuals to become active stewards in its preservation. The Program builds awareness,

appreciation, and respect for the land, and provides a foundation for applying minimum-impact techniques.

Plan Ahead and Prepare

- Know the regulations and restrictions for the area you visit.
- Prepare for extreme weather, hazards, and emergencies.
- Select terrain and mileage based on what your group can handle.
- Schedule your trip to avoid times of high use.
- As you look through the campsite list in this planner, please note the party size limit that pertains to each campsite. If your group size exceeds these limits, you will need to camp and cook as smaller groups in separate campsites with separate permits.
- Repackage food to minimize waste.

Travel and Camp on Durable Surfaces

- To prevent erosion, avoid shortcuts and switchbacks.
- Walk single file in the middle of the trail, even when wet or muddy.
- Camp in designated campsites.
- Protect riparian areas by camping at least 100 feet from lakes and streams.
- Keep campsites small. Focus activity in areas where vegetation is absent. Avoid leveling the tent site.

Dispose of Waste Properly

- Pack it in, pack it out. Inspect your campsite and rest areas for trash or spilled foods. Never bury it or dump it in pit toilets. Pack out all trash, leftover food, and litter.
- To wash yourself or your dishes, carry water 100 feet away from streams or lakes and use small amounts of biodegradable soap. Scatter strained dishwater.
- Deposit solid human waste in catholes dug 6 to 8 inches deep at least 100 feet from water, camp, and trails. Cover and disguise the cathole when finished.
- Pack out toilet paper and hygiene products.

Respect Wildlife

- Do not approach wildlife. All wild animals are potentially dangerous. Observe Wildlife from a distance. If your presence causes an animal to move away, you are too close.

- Never feed or harass animals. Feeding wildlife damages their health, alters natural behaviors, and exposes them to predators and other dangers.
- Protect wildlife and your food by storing rations and trash securely.
- Avoid wildlife during sensitive times: mating, nesting, raising young, or winter.

Minimize Campfire Impacts

- Campfires can cause lasting impacts to the backcountry. Use a lightweight stove for cooking and enjoy a candle lantern for light.
- Where fires are permitted, use established fire rings, fire pans, or mound fires. Campfires are only permitted in specified campsites in designated fire rings.
- Keep fires small. Burn only small diameter dead and down wood. Do not break, cut or saw branches from any standing tree (dead or alive).
- Burn all wood and coals to ash, put out campfires completely. Fires must be completely extinguished before you leave the site.

Leave What You Find

- Avoid introducing or transporting non-native species.
- Do not build structures, furniture, or dig trenches.
- Federal law prohibits: collecting antlers; removing any plant, animal, or mineral substance; and disturbing or removing archeological or historical items. Leave natural objects as you find them.

Be Considerate of Other Visitors

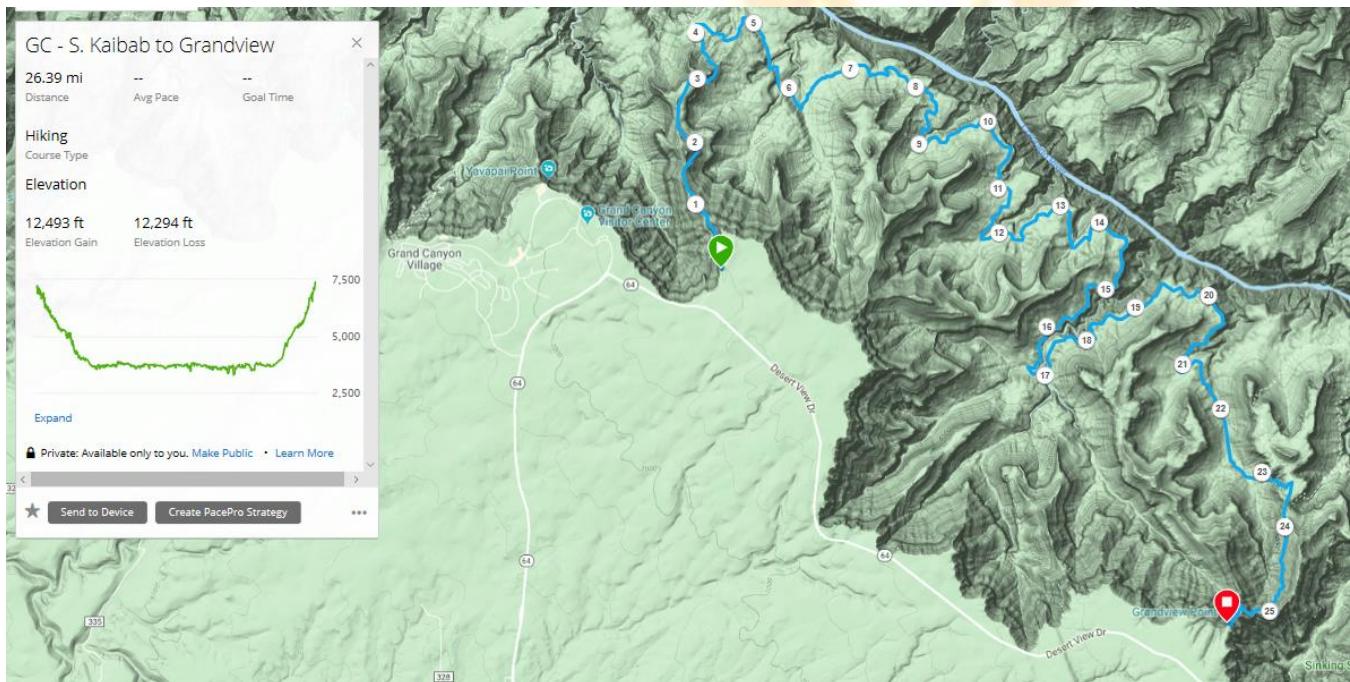
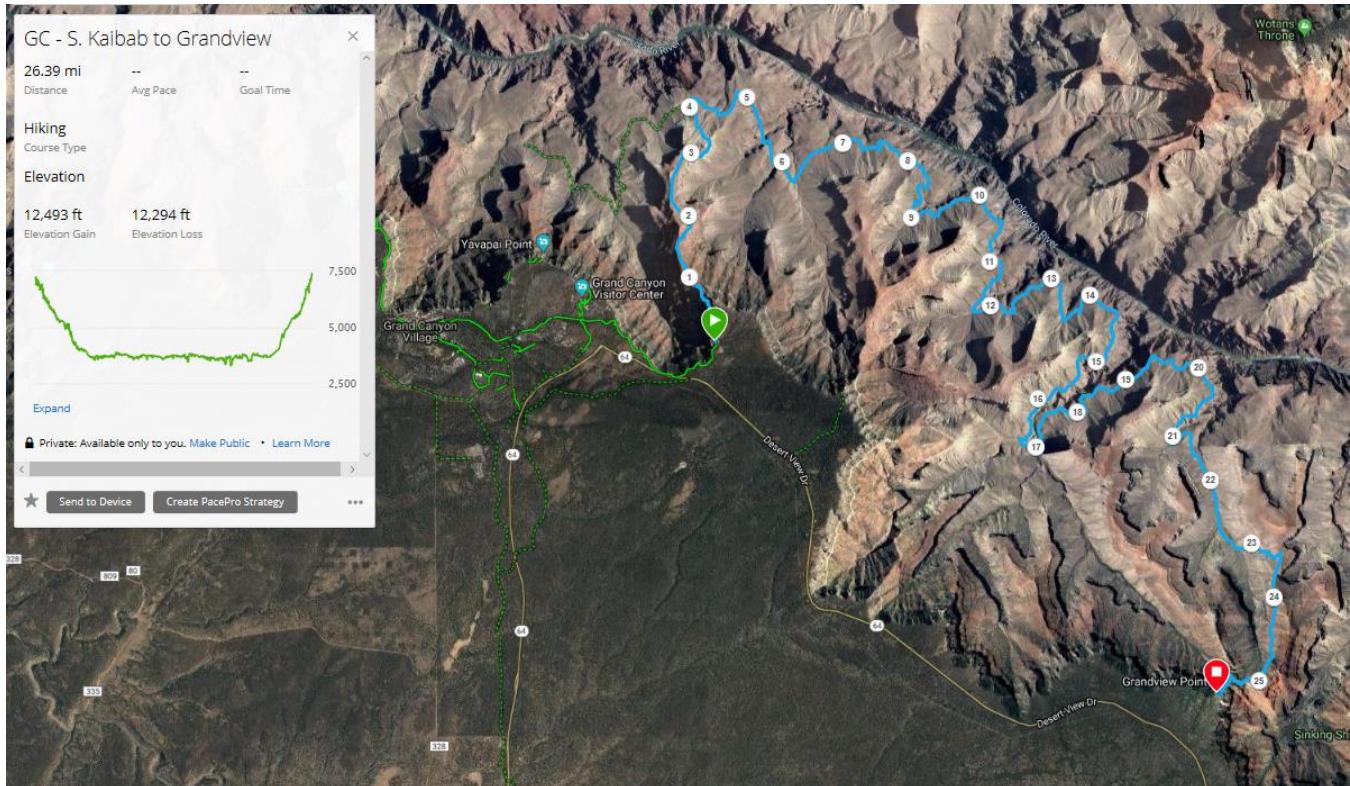
- Respect other visitors and protect the quality of their experience.
- Be courteous. Yield to other users on the trail.
- Step to the downhill side of the trail when encountering pack stock.
- Take breaks and camp away from trails and other visitors.
- Let nature's sounds prevail. Avoid loud voices and noises.

The Expedition

The Tonto Trail gently rolls in and out of seemingly innumerable drainages along its 95 mile length from Hance Rapid to Garnet Canyon. Deep inside the canyon, the distinctive Tonto Platform towers 1200 vertical feet above the level of the river, but a series of springs makes it possible to walk the length of this trail roughly parallel to the river. Because it is so long, it is not typically done in one through hike. The trek along the Tonto Trail between the Grandview and South Kaibab Trails offers experienced backpackers an excellent introduction to the magic of the Grand Canyon, with magnificent sweeping views, quiet desert streams, and a chance for solitude in a most wild and beautiful place. (This hike is very exposed to the sun, and definitely not recommended from May to September).

Itinerary

GRAND CANYON ITENERARY for MARCH of 2020							
Date	Day/Activity	Night/Camp	Distance	Positive Gain	Negative Gain	Overall Gain	Travel Times
3/25/2020	Fly in to Phoenix, pick up vehicle, supply run to Walmart and REI, drive to Sedona						
3/26/2020	Acclimation day hike in Sedona, drive to Grand Canyon, pick up BC permit, tour South Rim	Hotel near Sedona					
3/27/2020	South Kaibab Trailhead, hike to Tonto trail, hike into area BJ9	Open camping - area BJ9	8.34 mi.	2447 ft.	5817 ft.	-3370 ft.	7.17 hrs.
3/28/2020	Continue hiking Tonto trail to area BH9	Open camping - area BH9	9.59 mi.	2943 ft.	3215 ft.	-272 ft.	8.38 hrs.
3/29/2020	Continue hiking Tonto trail to Horseshoe Mesa	Camp at Horseshoe Mesa	6.84 mi.	3424 ft.	2098 ft.	1326 ft.	7.41 hrs.
3/30/2020	Hike out to Grapevine Trailhead, tour park, drive to hotel	Hotel near Grand Canyon	2.73 mi.	3302 ft.	858 ft.	2444 ft.	5.06 hrs.
3/31/2020	Explore South Rim and surrounding area, drive to Phoenix	Hotel in Phoenix					
1/4/2020	Fly home						
Totals			27.5 mi.	12116 ft.	11988 ft.	128 ft.	28.02 hrs.

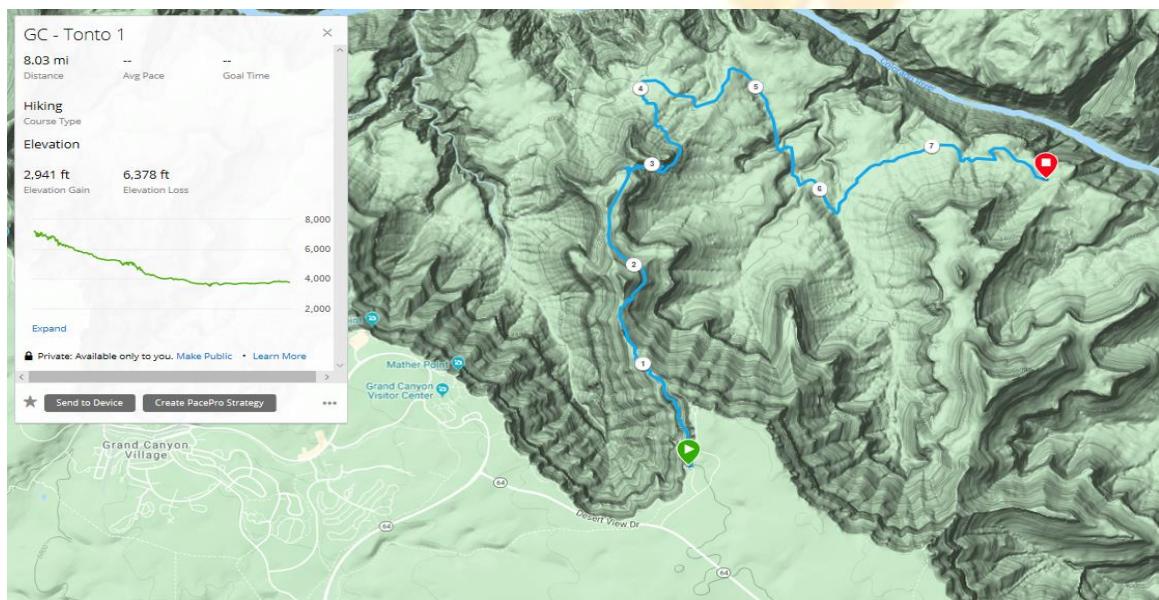
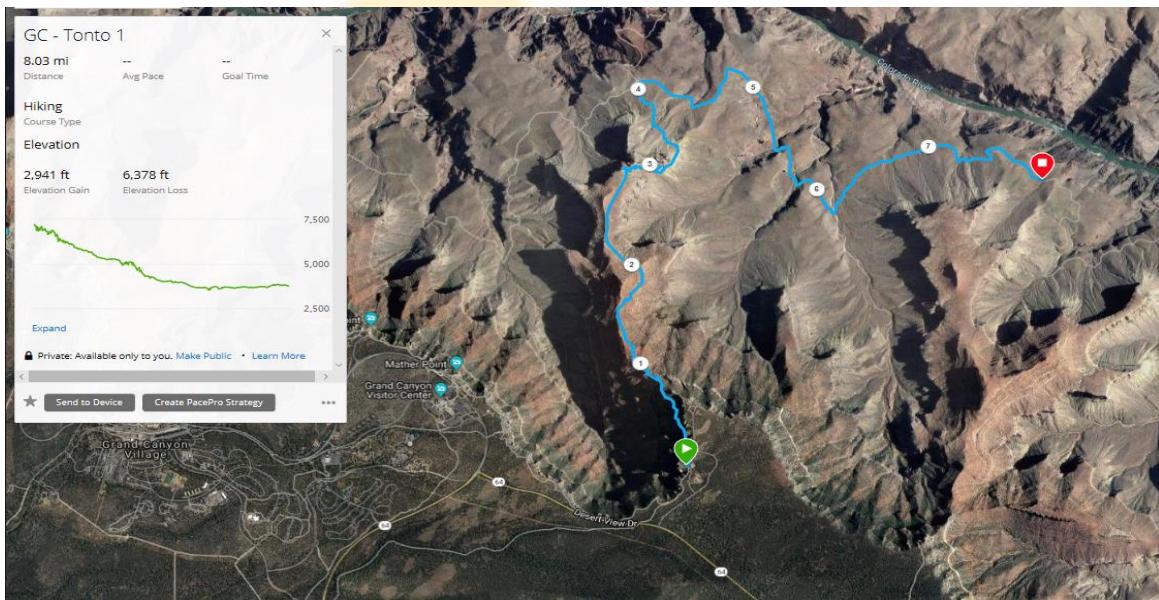
Satellite & Topographical Map of the Tonto Trail

Hiking Routes

Day 1

Hiking from the South Kaibab Trailhead to the Cremation Creek area BJ9 (8.03 miles).

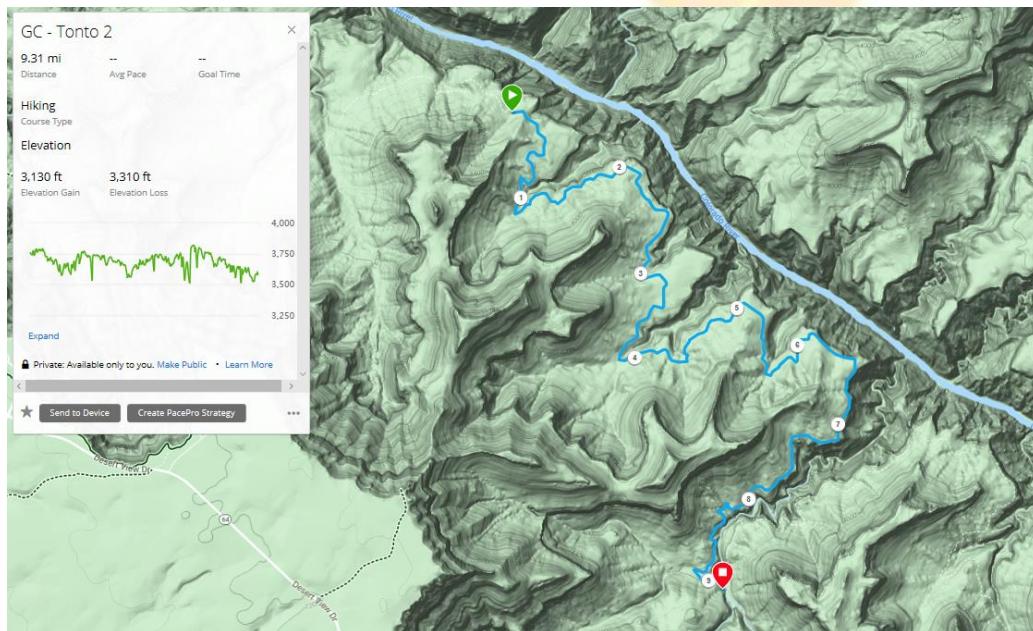
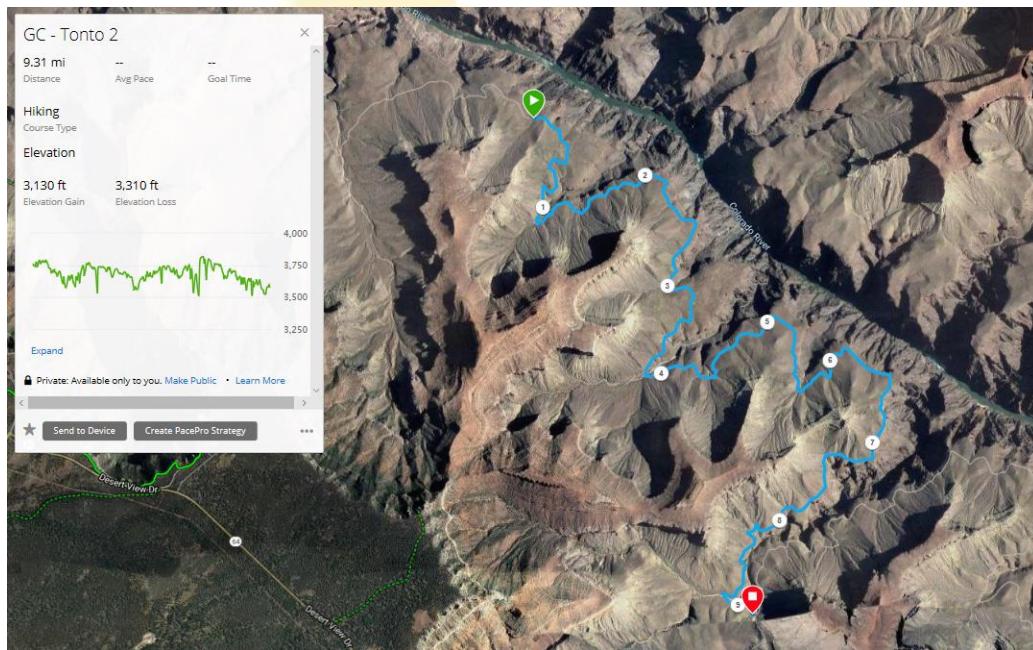
Starting from the South Kaibab Trailhead we descend rapidly until we reach the Tonto trail junction near the 4 mile mark bringing us to the Cremation Creek area. Cremation is deceptive because it traverses the Grandview/Cremation monocline. This faulting creates significantly more elevation change than previously encountered along the route, which can be especially tough because of the total lack of water. There is also no river access at Cremation Canyon.



Day 2

Hiking from the Cremation Creek area BJ9 to the Grapevine Creek area BH9 (9.31 miles)

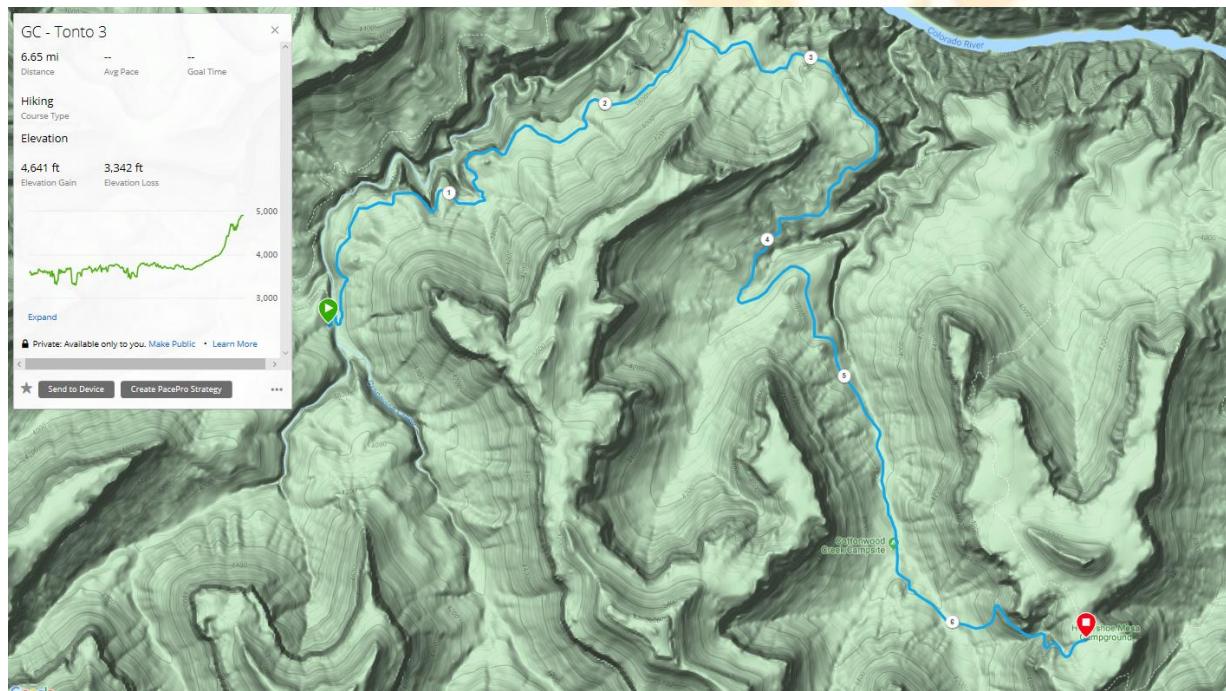
The Tonto Trail leaves the bed of Cottonwood near the top of the Tapeats Formation, contours around the west arm, and heads west toward Grapevine. Entering Grapevine from the east involves a short section of narrow, eroding trail with significant exposure. The views down into the lower reaches of Grapevine are wonderful, but watch your step. Grapevine is, by far, the largest and most complex side canyon between the Grandview and the South Kaibab Trails. Looking across the mouth of the drainage from the Tonto Trail the distance seems short, but plan on at least 2-3 hours of steady hiking to cross.



Day 3

Hiking from the Grapevine Creek area BH9 to the Horseshoe Mesa Campground (6.65 miles)

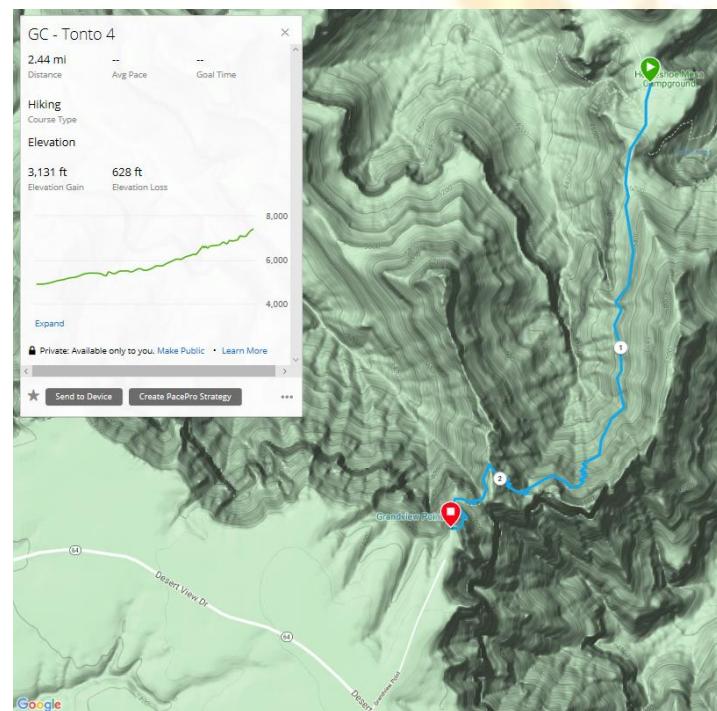
The small unnamed drainages between Grapevine and Boulder and Boulder and Lone Tree will slow progress, and a little confusion on the west side of Lone Tree is normal, but generally speaking the route between Grapevine and Cremation is straightforward



Day 4

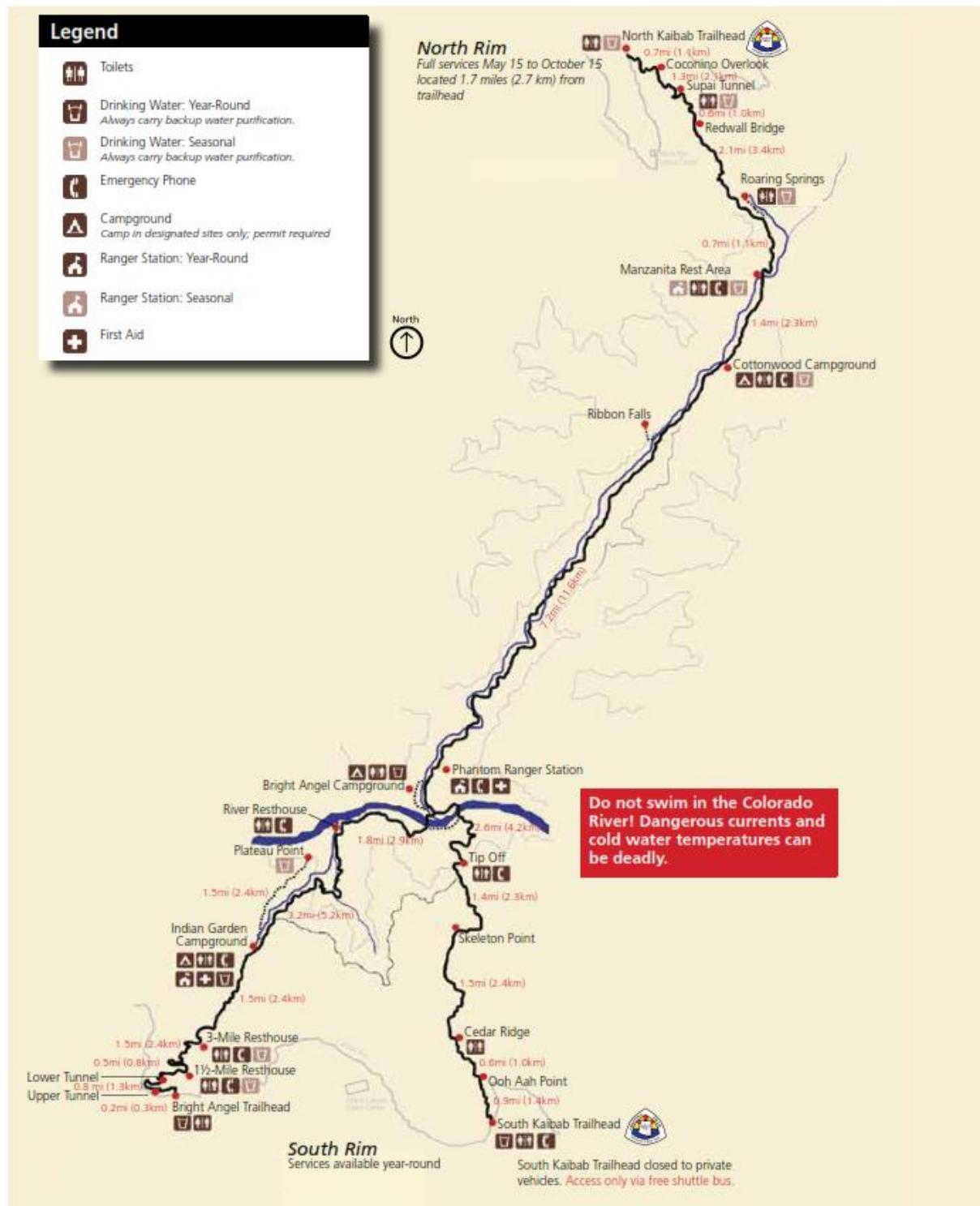
Hiking from the Horseshoe Mesa Campground to the Grandview Trailhead (2.44 miles)

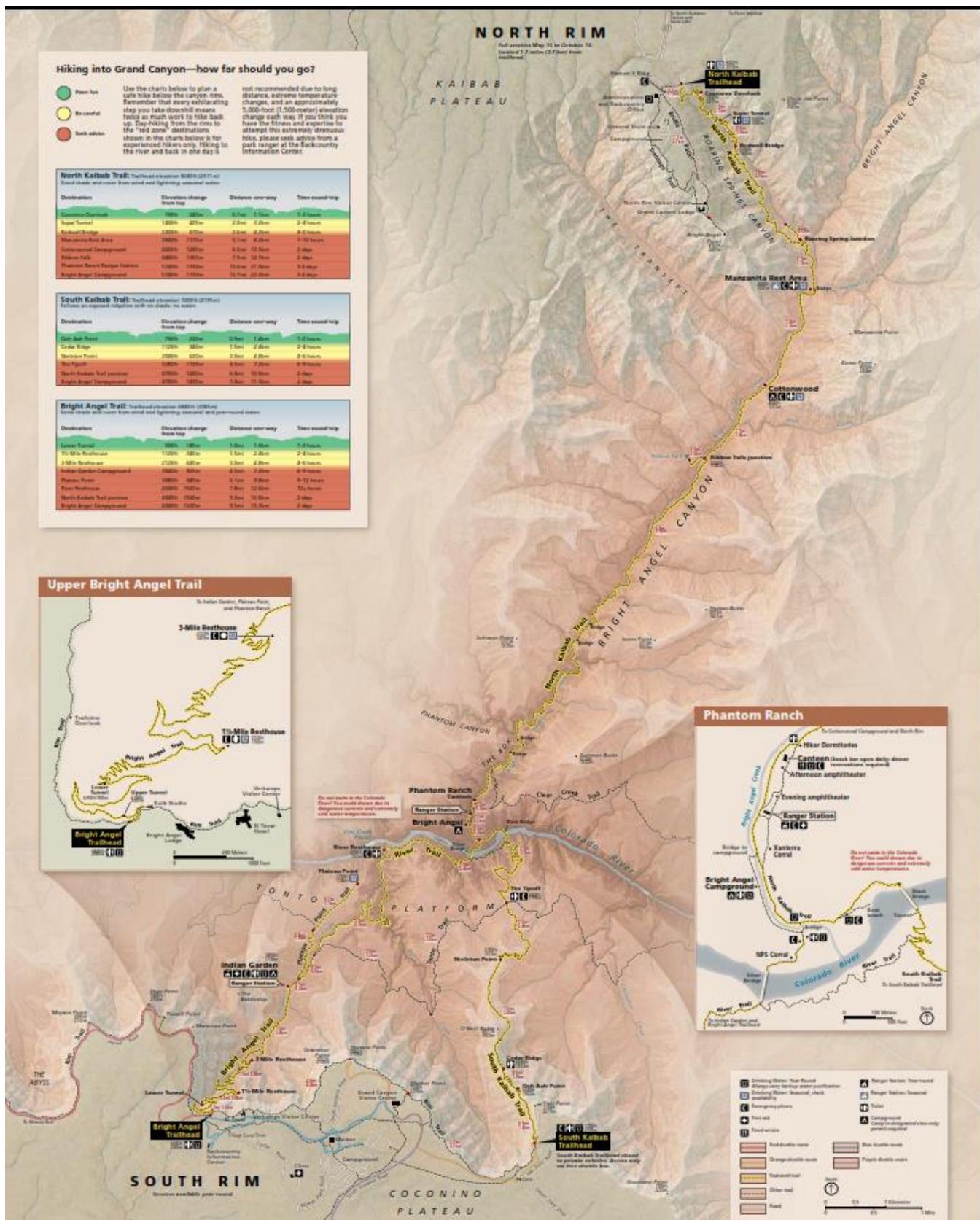
On the final day, we head south and ascend quickly to the Grandview trailhead. This marks our last hike and it is now time to high five and celebrate with revels.



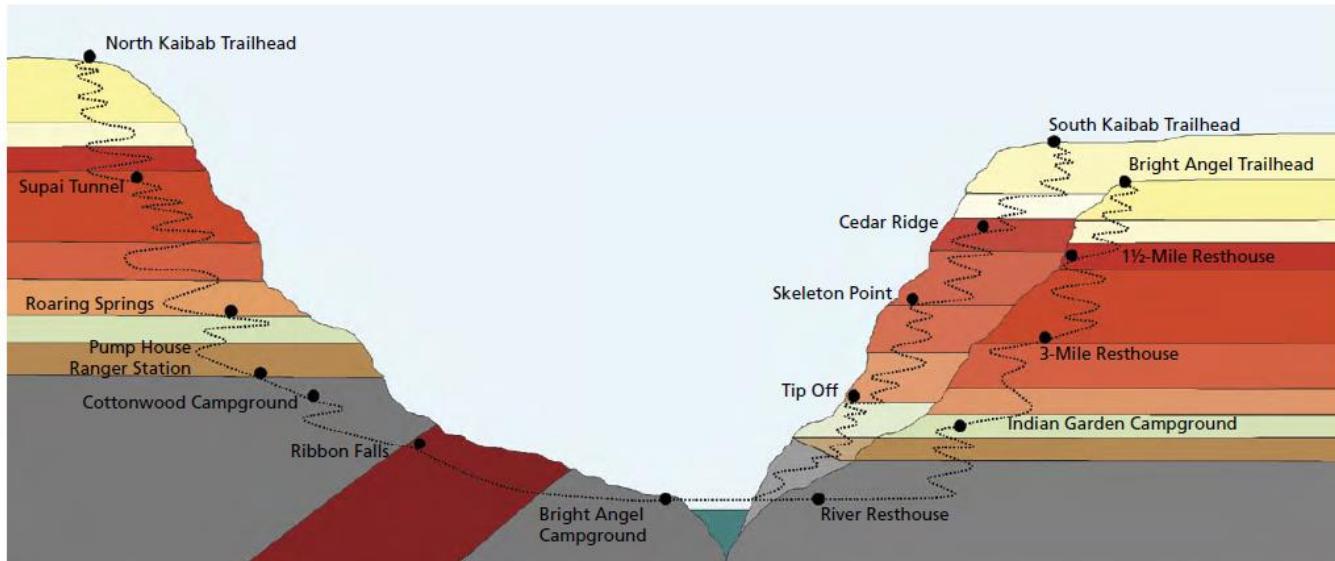
Topography & Maps

Hiking Corridor Map

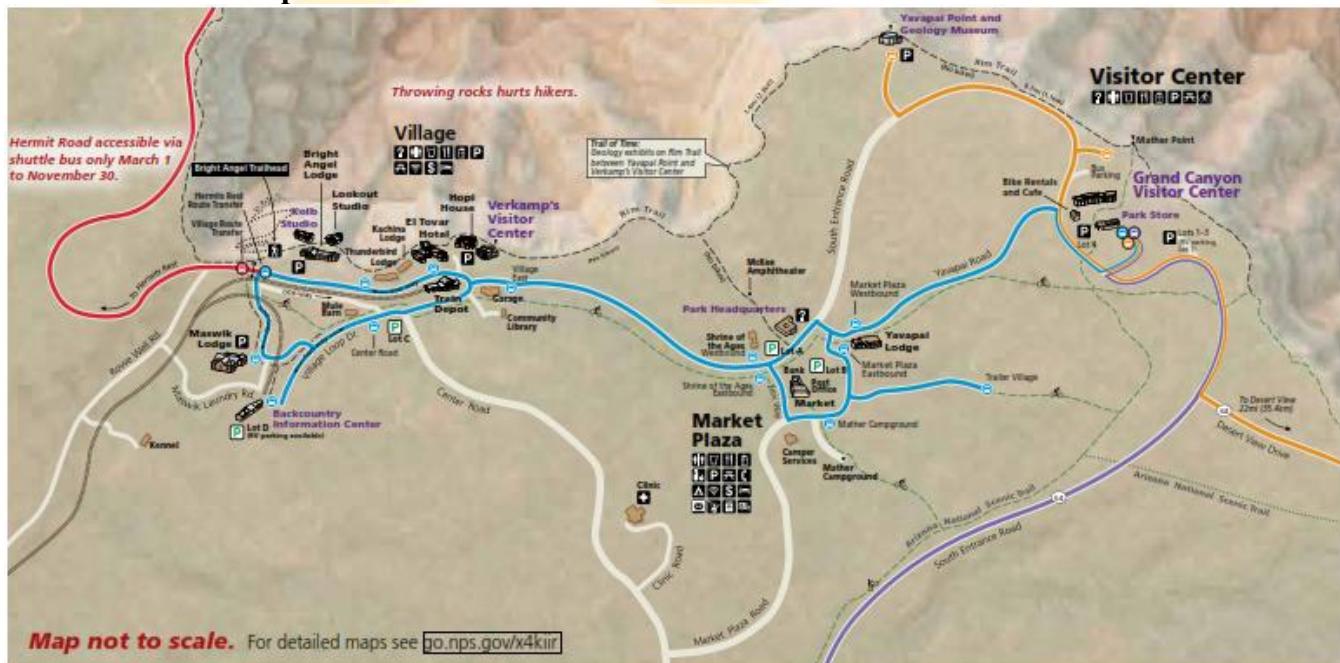




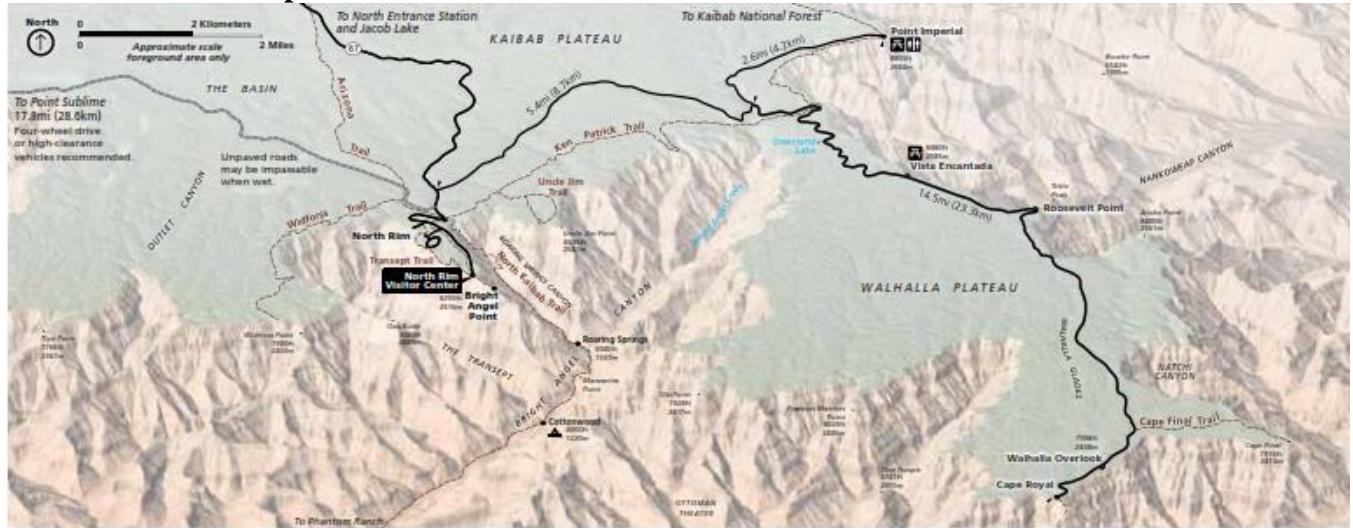
Canyon Cross Section



South Rim Area Map



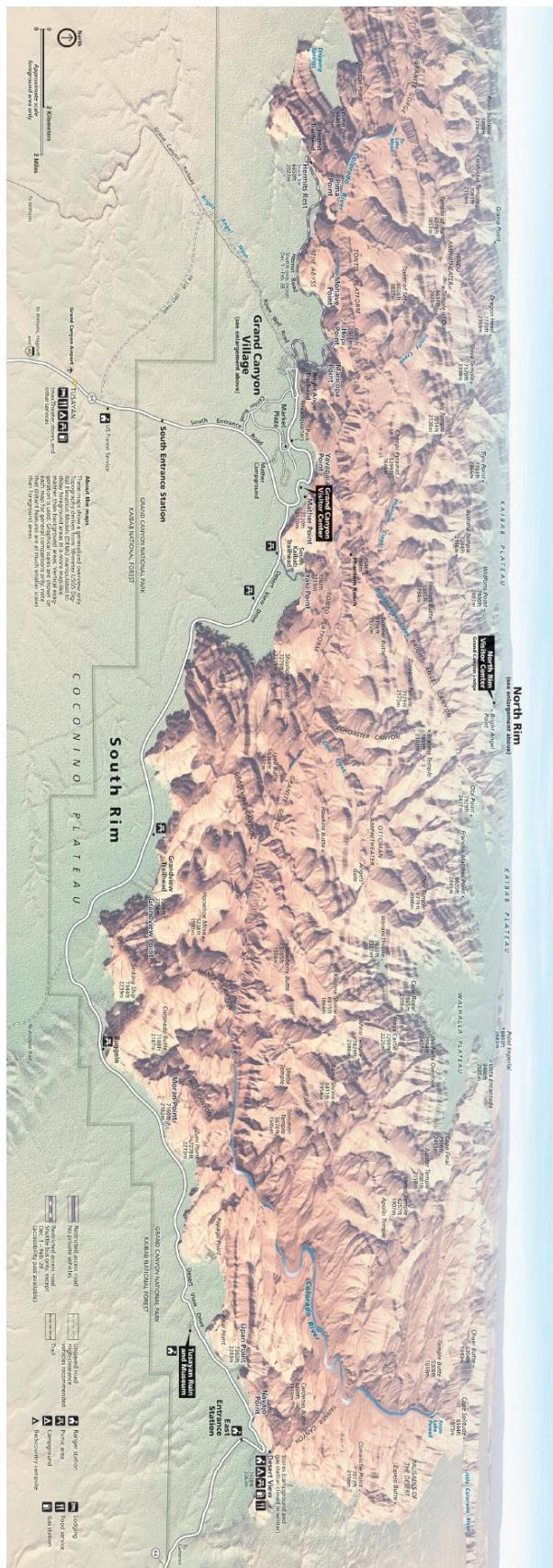
North Rim Area Map



Grand Canyon Area Map

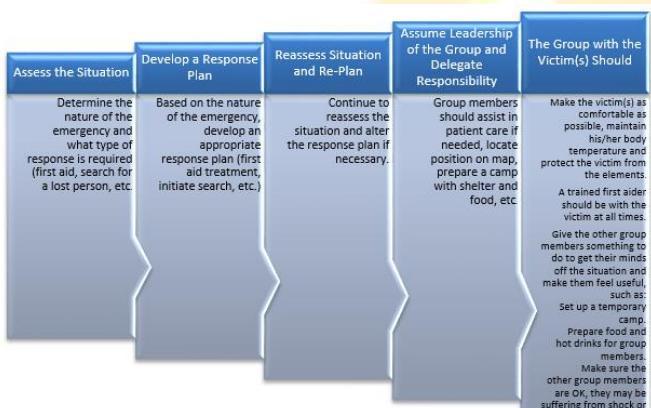


Coconino Plateau Panoramic View

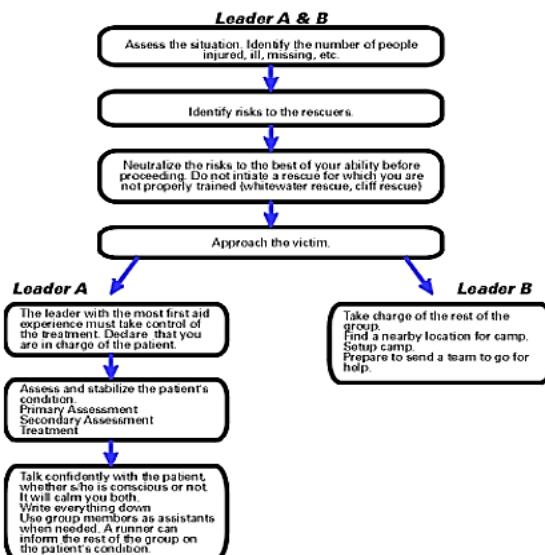


Emergency Action Plan (EAP)

Since each situation is unique, trip leaders must remain flexible in their response. The key to properly responding to an emergency is to remain calm, assess things carefully before acting, and continue to reassess your strategy throughout. There are two basic things to be done, care for the victim and care for the rest of the group. The more severe the situation, the more both populations will need your care and support. A basic approach to handling emergency situations is shown in flowchart form in the figure below.



Emergency Response Flow Chart



Evacuation Procedures

When to Evacuate

Evacuation is used as a general term for transporting someone from a trip. In most cases we think of this as caused by a medical problem. It can also be the result of psychological problems, a family emergency, or the assessment of the trip leaders that the person's behavior poses a threat to themselves or others in the group. Specific evacuation protocols for first aid situations will be determined by the group leaders.

If someone needs to be evacuated due to injury or illness, the primary concern is for the safety and health of the patient. When assessing the need for an evacuation, think both about the patient's condition and how rapidly medical attention is needed. For example, it may take 2 hours for the patient to walk out on their own. Whereas to send two people out for help (2 hours), get a rescue squad to the trailhead (1 hour), hike back in (2 hours - unless driving in is possible), and hike back out (2 hours+) will mean over 7 hours before the patient is evacuated. Their injury may need treatment sooner than that. You also consider your resources, do you have the necessary equipment, manpower, and experience to safely evacuate the person given the current trail and weather conditions. If you do evacuate the person, take the time to plan out the best route keeping in mind patient condition, distance, terrain, etc. Depending on the situation, you might chose the shortest route, the quickest route, or a longer route that poses less threat to the patient's condition. Use the evacuation flow chart to determine how to deal with an evacuation situation.

Possible Evacuation Scenarios

Person Can Walk Out On Own Power	Person Can Walk Out with Assistance	Person Cannot Walk Out
<ul style="list-style-type: none"> The person's medical condition would not be compromised by walking out. This may necessitate taking all the person's equipment. Ex. Stomach ailment, mild allergic reaction, minor laceration. 	<ul style="list-style-type: none"> If the distance is not too great, the person may be able to hike out if carrying no weight and with assistance. This is to be attempted only as long as it does not aggravate the individual's condition. The person must be constantly monitored. 	<ul style="list-style-type: none"> The injury/illness would be aggravated by walking out or movement is contraindicated. Do not attempt a litter evacuation unless you have the necessary equipment, experience, and manpower, otherwise you risk additional injury to your patient as well as placing other members of the group at risk (see Dynamics of Accidents Model page 00). In this case a litter evacuation by skilled rescue personnel (rangers, first aid squad, etc.) is required. Send for help

Choosing to Evacuate

If you have determined that it is medically appropriate to evacuate your patient, you need to determine whether or not you have the skills, the time and the manpower to perform the evacuation safely. Ask yourself these questions.

_____ How much daylight do you have?

_____ What is the weather? Is it changing? For the worse?

_____ Can you continue to provide the necessary first aid treatment and monitoring during the evacuation?

Emergency Call – Ins/Rescue

In the event of an emergency one of the most important components is how you handle the incoming call. You need to gather sufficient information to determine the nature of the problem and to select the most appropriate responses.

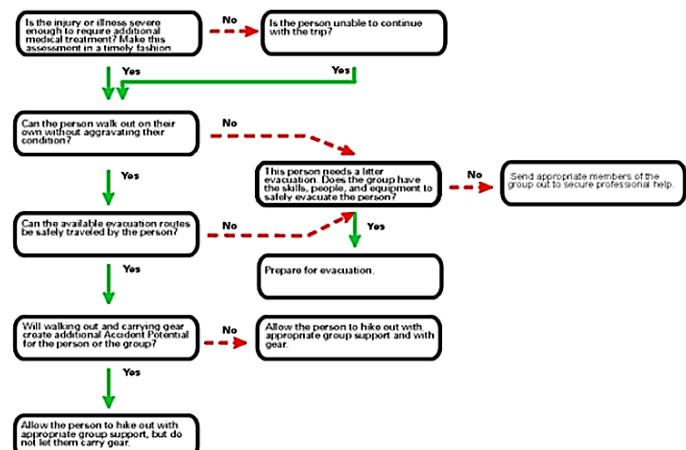
In order to categorize the nature of the response we use an adaptation of the International Scale of River Difficulty which is used to rate whitewater rivers on a scale from Class I to Class V. As you will see below, we use this scale to establish responses levels for Evacuation, Medical Response, and Notification.

_____ What if your patient's condition deteriorates? Would it be more difficult to treat him/her once you start hiking out?

_____ How many people do you have to do the evacuation? For a litter evacuation you should plan to have a minimum of 3 teams of 6-8 people rotating through the litter carry.

Evacuation Flow Chart

Evacuation Plan Flow Chart



Identify caller

Identify exact location and phone number. Can you call back? If not determine a time or plan for the caller to contact you again.

Interview caller to determine problem

Leaders may underestimate the nature of the problem so a conservative medical response is the best course of action.

Triage problem

Class I - minor medical problem. Person can remain on the trip.

Class II - minor medical problem. Person must be treated or evaluated at medical facility. Discharge and return to trip likely. Anything

above Class II requires a call to McCosh Health Center.

Class III - moderate medical problem. Person must be treated or evaluated at medical facility. Discharge and return to trip uncertain.

Class IV - serious medical problem. Person must be treated or evaluated at medical facility. Discharge and return to trip unlikely.

Determine appropriate evacuation response

Class I - hikes out on own power

- How long will this take?
- What if it takes longer?
- What if patient's condition deteriorates?

Class II - hikes out with assistance

- How long will this take?
- What if it takes longer?
- What if patient's condition deteriorates?

Class III - needs to be picked up by vehicle

- How long will this take?
- What if it takes longer?
- What if patient's condition deteriorates?

Class IV - needs litter evacuation

- How long will this take?
- What if it takes longer?
- What if patient's condition deteriorates?

Class V - needs helicopter airlift

- How long will this take?
- What if it takes longer?
- What if patient's condition deteriorates?

Determine appropriate professional medical response

Class I - person seen on return to campus

Class II - leaders or support drives person to hospital

Class III - EMS meets groups at trailhead

Class IV - EMS sent in to group

Class V - Advanced Rescue Team or helicopter required

Notifications (each higher level is cumulative of the levels beneath)
Family members

Follow-up

How is the group doing? Do they need to be evacuated for emotional support?

Will the group need follow-up support and/or counseling upon return to campus?

Will the leaders need follow-up support and/or counseling upon return to campus?

Triage

The purpose of Triage is to determine the nature and extent of injury or illness. In the case of multiple victims, it is used to prioritize treatment. As you take an emergency phone call, you need to gather information to do your own triage of the situation.

1. Get full SOAP Note from Leader
 - History
 - Vitals
 - Problem list
 - Anticipated Problem list
2. Determine exact location of the group.
 - Where was the group when the messengers left?
 - How far are they from the trailhead?
 - What other options are there for reaching the patient? What is the group doing (staying put or hiking out?)
 - How will the time lengths of different evacuation modes affect the medical condition/treatment?
3. Contact outside experts as needed to develop emergency response plan
 - Based on problem as defined in #1 and #2 determine the "need for speed."
 - Implement the appropriate professional medical response as indicated above.

Gear Loadout

Communications and Navigation

Recommended Communication Equipment

Motorola T600 H2O 2-Way Radio		Garmin inReach Mini
 <p>Group will be equipped with two way radios for communications and emergency procedures. Range of up to 35 miles (may vary depending on terrain and conditions); compatible with any radio regardless of brand.</p> <p>Motorola T600 H2O 2-way radios will keep you in contact with your adventure partners on land or water, thanks to a 35-mile range and a floating, waterproof design and LEDs that light up in water. An emergency alert button transmits an alert siren followed by spoken or incidental sounds to warn others of your peril, and has a built-in LED flashlight for emergencies.</p> <p>Push-To-Talk (PTT) power boost allows you to extend the transmission range by increasing the transmitter power output.</p> <p>Hands-free communication is provided by iVOX/VOX, which acts like a speakerphone to keep your hands free as you hike</p>		 <p>inReach Mini is your go-to connection for maintaining off-the-grid contact. It's our palm-sized satellite communicator for adventures where size and weight matter. inReach Mini lets you send and receive text messages, track and share your journey and, if necessary, trigger an SOS alert to contact the GEOS 24/7 emergency response team. With inReach connectivity, your family and friends will know they can stay in touch globally.</p> <ul style="list-style-type: none">Small, rugged, lightweight satellite communicator enables two-way text messaging using the 100% global Iridium network (satellite subscription required)Trigger an interactive SOS to the 24/7 search and rescue monitoring center (satellite subscription required)Access downloadable maps, U.S. NOAA charts, color aerial imagery and more by using the free Garmin Earthmate app and compatible devicesOptional inReach weather forecast service provides detailed updates directly to your inReach Mini or paired device; basic and premium weather packages availableSend and receive inReach messages through compatible Garmin devices, including connected wearables and handhelds
Emergency Frequency:		Garmin Link for Tracking:
Ranger Frequency:		

Recommended Tracking & Emergency Signal Devices

Garmin Rino 755t	
	We will have one Rino device for navigation, gps tracking and emergency communications. High-sensitivity GPS with GLONASS satellite reception tracks satellites in more challenging environments than GPS alone. Powerful, 5 watt FRS/GMRS 2-way radio lets you communicate by voice call or unit-to-unit text messaging. 3 in. color touch-screen with dual orientation and sunlight-readable display. Bluetooth® connectivity supports a wireless headset (not included) for improved voice communication. 3-axis compass with accelerometer and barometric altimeter sensors. NOAA weather radio, Active Weather forecasts and animated weather tracking help you stay one step ahead of changing conditions. Geocaching Live connects with Geocaching.com to download the caches you want while you're on the go. Position Reporting shows you the location of other Rino users on the same channel and lets you alert them if you need help.

Note: AcadianX Guides are equipped with all mentioned gear.

Recommended Navigation Tools

Topographic Trail Map

National Geographic Trails Illustrated Topo Map

Learning how to navigate with a paper map is an essential skill. A topographic map is designed to show the physical features and terrain of an area, which is what makes them ideal for backpackers. They're different from other maps because they show the three-dimensional landscape: its contours, elevations, topographic features, bodies of water, and vegetation. Simplified trail maps—like the JPEG images you might find on a national park's website—don't include all the information you need in order to navigate. No elevation data, no magnetic declination, and much fewer symbols. If you get lost, these trail maps won't help you find your way out. A topographic map offers a wealth of orienteering information—not just elevation and distance, but changes in vegetation and even human-made structures. It's enough to plan an entire trip in advance or to find your way in a pinch.

Handheld Navigation Device

Garmin Rino 755t

Whether you're hunting, hiking, climbing or paddling, the rugged Rino 700 navigator is your go-to for any adventure. Offering an affordable entry point to our navigator/communicator lineup, it retains the core functionality of our more feature-rich Rino 750 and 755t handhelds. And its powerful two-way radio is fully compatible with them as well. So, it's easy to stay in touch with other Rino-carrying members of your group.

- 5 W GMRS two-way radio offers extended range, up to 20 miles; communicate by voice or unit-to-unit text messaging
- High-sensitivity GPS and GLONASS satellite reception; tracks in more challenging environments than GPS alone
- Rechargeable internal lithium-ion battery can provide up to 13 hours of battery life
- Position reporting feature shows locations of other Rino users on the same channel
- Worldwide basemap shows position and supports basic navigation

Navigation Enabled Watch

Garmin Fenix

- Ultimate multisport GPS watch with full-color TOPO U.S. mapping, routable cycling maps and other outdoor navigation features
- Fit for adventure with rugged design that features stainless steel bezel, buttons and rear case: Physical size 5.1 x 5.1 x 1.8 cm; Weight - silicone band: 98 g ; metal band: 196 g
- Built-in navigation sensors include GPS and GLONASS capability to track in more challenging environments than GPS alone as well as 3-axis compass, gyroscope and barometric altimeter
- Preloaded run profiles: running, treadmill running, trail running. Put key stats at your fingertips with the performance widget that shows your training status, training load and more
- Provides built-in mapping and navigation features to help keep you oriented and on course. Full-color TOPO mapping comes preloaded with map data optimized for at-a-glance navigation and location tracking.
- Features multinection (GPS, GLONASS and Galileo) satellite reception to track in more challenging environments than GPS alone. In addition to map-based guidance, each watch also provides a set of ABC (altimeter, barometer and compass) sensors for outdoor navigation. The built-in altimeter provides elevation data to accurately monitor ascent and descent for activities such as hiking, while the tilt-compensated three-axis electronic compass keeps your bearing — whether you're moving or not.

Note: AcadianX Guides are equipped with all mentioned gear.

Clothing Essentials

Layering Basics

When you step outdoors, the ancient art of layering becomes your smart-technology thermostat. This tried-and-true strategy lets you regulate comfort by slipping layers on and off as your activity level or the weather changes.

How to layer: To understand layering your clothing for outdoor activities, you need to know the function of each layer:

1. **Base layer** (underwear layer): wicks sweat off your skin
2. **Middle layer** (insulating layer): retains body heat to protect you from the cold
3. **Outer layer** (shell layer): shields you from wind and rain

Even if you don't wear all three layers at the outset, it's a good idea to take all layers on every outing: You can peel off layers if things heat up, but you can't put on layers that you didn't bring along.

Cold, Rainy and Hot Layering Examples

We're often asked about how to layer for certain weather. Any suggestions based solely on weather, though, overlook key considerations, like exertion level and personal metabolism. The examples below are for a hypothetical person who doesn't run particularly hot or cold, who is going on an intermediate-level half-day hike:

Cold-weather layers:

Midweight polyester long underwear top and bottom; a jacket with synthetic insulation; midweight fleece pants; waterproof/breathable rain jacket and pants.



Rainy-weather layers (cool temps):

Lightweight polyester long underwear top and bottom; lightweight fleece jacket; synthetic hiking pants; lightweight waterproof/breathable rain jacket and pants (with plenty of vents).



Hot-weather layers:

Polyester briefs and a short-sleeve synthetic Tee; convertible nylon hiking pants; lightweight wind jacket.

You have literally dozens of alternatives and options for each of these layers. The trick is to go with options that make the most sense for where you're headed, what you're doing and what you're able to spend.

It's also key that you take the time to adjust layers as conditions change. If the rain and wind let up, remove your shell. If hiking alone isn't warming you up, add a middle layer. And many people add a middle layer (on top) and/or outer layer at every rest stop, just to avoid getting chilled.



Base Layer: Moisture Management

As the next-to-skin layer, a base layer's job is moving perspiration away from your skin, aka "wicking." In cool or cold conditions, wicking long-underwear-style base layers are needed to keep your skin dry. That's essential because it helps to keep you from becoming chilled or worse—hypothermic.



Base layer materials: You have a wide range of fabric options, including synthetics like polyester and nylon, or natural fibers like merino wool and silk. Though there are subtle differences in wicking and drying for each material, and in odor retention and durability, a lot people simply go with their personal fabric preference.

Base layer weights: Your options are straightforward—lightweight, midweight and heavyweight—though you might also see terms like “ultralightweight” on one end of the spectrum or “expedition weight” at the other. Generally, heavier (thicker) fabrics keep you warmer, though that's not really the primary purpose of a base layer (wicking is).

Warm-weather base layers: Long underwear might not be appealing when temperatures soar, but having dry skin generally makes you more comfortable in all conditions. (No one likes having clammy, drippy skin.) Here are some other warm-weather base-layer considerations:

- Any summer shirt is really a base layer, so look for ones that offer wicking.
- Some shirts designed for warm weather spread the moisture out through the fabric, where evaporation helps with cooling. They won't really be marketed as a base layer, but as your next-to-skin layer they can increase your comfort in hot conditions.
- Underwear like briefs, boxers and bras should also wick (the same is true when you wear it under your long underwear in winter).
- UPF-rated base layers give you added sun protection.
- Cotton, considered a no-no in winter because it sponges up water and can chill you, can be okay if you're outside on a super-dry, scorching summer day.

- Emerging fabric technologies, like wool infused with ceramic particles, will offer base layers that literally cool your skin for greater comfort.

Middle Layer: Insulation

The insulating layer helps you retain the heat that's radiated by your body. The more efficiently this layer traps that heat, the warmer you'll be.



Middle layer materials: Just as with base layers, you have a broad range of options, both synthetic and natural. In general, thicker (or puffier) equals warmer, though the efficiency of the insulating material is also important. Below are some common middle layer materials, though other options, like wool and wool-blend tops, are also available.

Here are some of your primary choices for middle layers:

Polyester fleece: Available in lightweight, mid-weight and heavyweight fabrics (sometimes marketed as 100, 200 and 300 weight), fleece stays warm even if gets damp, and it dries fast. Fleece also breathes well, so you're less likely to overheat in it.

The flipside of breathability, though, is that wind blows right through, which can steal warmth. That's why you need to have a shell layer with you if you're

going with a fleece middle layer. (Another option is to wear wind fleece, which includes an inner wind-blocking membrane.)

Down insulated jackets: Highly compressible for easy packing, down offers more warmth for its weight than any other insulating material. The efficiency of down is measured in fill power—from 450 to 900. Because down is always inside a shell material, down jackets also offer some water and wind resistance. The drawback to down is that it loses insulating efficiency when damp.

Synthetic insulated jackets: Synthetic insulations have long tried to mimic down's efficiency, coming closer to that standard every year. And, while synthetics don't compress as well as down, they're a popular option for rainy conditions because they retain insulating ability when they get damp. And, like down, synthetic insulation is always inside a shell material that offers added water- and wind resistance.

Outer Layer: Rain and Wind Protection (Shell)

The outer layer (or shell layer) protects you from wind, rain and snow. Shells range from pricey mountaineering jackets to simple wind-resistant jackets. Most allow at least some perspiration to escape; virtually all are treated with a durable water repellent (DWR) finish to make water bead up and roll off the fabric.

Your outer shell is an important piece in stormy weather, because if wind and water are allowed to penetrate to inner layers, you can get seriously chilled.



Shells can be lumped into the following categories:

Waterproof/breathable shells: Your most functional (and expensive) choice, this type of shell is your best option for full-on squall conditions. Generally, pricier equals drier, though higher priced shells are often more durable as well.

Water-resistant/breathable shells: These are more suited to drizzly, breezy conditions and high

activity levels. More affordable than waterproof/breathable shells, they're typically made of tightly woven nylon or polyester fabrics that block light wind and light rain.

Soft shells: These emphasize breathability. Most feature stretch fabric or fabric panels for added comfort during aerobic activities. Many combine light rain and wind protection with light insulation, so they in effect combine two layers into a single jacket.

Waterproof/nonbreathable shells: These bare-bones shells are okay for rainy days with light to no activity (e.g., fishing, spectating). They are typically made of a coated nylon, which is water- and windproof. If you exert yourself while wearing one, you'll probably end up saturating your underneath layers with perspiration.

Recommended Clothing Brands and Considerations

Clothing Type	Style	Brands	Notes
Hiking Shoe/Boot		Salomon Merrel Obre	Some people like to wear a pair of light trail running shoes instead of boots. Most prefer boots in order to keep ankle stable. Feet will get wet so Gor-tex lined are recommended.
Base Layers	Torso	Tesla Under Armor	Must wick away moisture.
	Legs	Tesla Under Armor	Must wick away moisture.
Middle Layer	Torso	Mountain Hardware REI	Insulation layer for thermal protection.
	Legs	Under Armor	Insulation layer for thermal protection.
Outer Layer	Torso	Kuhl Outdoor Research Mountain Hardware	Should be durable, moisture resistant, quick drying and light weight.
	Legs	Kuhl Outdoor Research	Should be durable, moisture resistant, quick drying and light weight.
Briefs/Boxers		Exoficcio Saxx	Needs to be synthetic, anti-microbial, breathable, and moisture wicking. At least 3 pairs.
Socks		Smart Wool Darn Tough	Good hiking socks are a must. We recommend either "Darn Tough" or "Smart Wool". You will need at least 3 pairs.
Head Gear	Beanie	Smartwool Outdoor Research	Should be snug on your head and keep you warm.
	Neck Gaiter/ Cravat	Buff	Most versatile piece of clothing you will have. A must on the trail.
Gloves	Hiking		Gloves - a good pair of biking gloves will help prevent blisters when using trekking poles.
	Thermal	Outdoor Research Black Diamond Manzella Sealskinz	Waterproof is preferable. Need to keep you warm even when wet outside.
Rain Shell		REI Co-Op Arc'teryx Outdoor Research	The rain shell needs to breathe properly allowing heat to escape. If not you will become overheated when hiking.

Recommended Clothing Retailers and Websites

Below is a list of suggested retailers where you can find your gear and websites to help you research and choose your best option:

1.  REI Co-Op <https://www.rei.com/>
2.  Backcountry.com <https://www.backcountry.com/>
3.  Amazon <https://www.amazon.com/>
4.  Outdoor Gearlab <https://www.outdoorgearlab.com/>

Recommended Local Clothing Retailers – Lafayette, Louisiana

1.  Pack & Paddle <https://packpaddle.com/>
2.  The Backpacker <https://backpackeroutdoors.com/>
3.  Field & Stream <https://www.fieldandstreamshop.com/>

Gear Essentials

Gear Basics

Camping is like staying in a primitive cabin, minus the cabin itself. So, in addition to your tent, pack as though you're going to stay someplace where there's little or no furniture, no electricity, no stove or refrigerator, and the cupboards are bare. In a developed campground you will have running water and a community bathroom a few hundred yards away. A typical campsite has a table (if not, you'll want to bring one), a place to park a car and a place to pitch a tent.

You can keep your initial investment low if you borrow or rent the priciest items—the tent and your sleeping bags and pads. That's a better strategy than paying bottom dollar for something that might not even last for a single camping trip. That said, if you are ready to invest in your very own camping gear, here are a few tips to help you decide exactly what to buy.

- **The tent:** If your budget can go a little bigger, then go bigger with your tent: A 3-person tent gives a cozy couple a little extra breathing room, and a family of four can more easily achieve harmony in a 6-person tent. You can also check the tent's peak height if you want a tent that you can stand up in (that can make getting dressed and moving around easier to do). Vestibules outside the doors are nice for stowing muddy shoes and having two doors can help you avoid climbing over sleeping tent-mates for late-night bathroom breaks.

Tip: Practice setting up your tent at home first. And don't forget a properly sized footprint—if you have a ground sheet that's too small, it won't fully protect your tent floor, and if you have one that's too big, it can catch rainwater and pool it underneath your tent.

- **The sleeping bag:** When selecting your bag, temperature rating is a good place to start. If you're planning on only going fair-weather camping, a summer bag is probably all you'll

need, but a 3-season bag will give you more leeway for unpredictable shoulder-season weather. If you're always cold (or always hot), adjust accordingly. And no need to go with a super-snug mummy bag like backpackers use, when a rectangular camping bag will give your body more room to roam.

- **The sleeping pad:** A good sleeping pad is like the mattress on a bed, but it also has high-tech insulation to prevent you from losing body heat on the cold ground. Big air mattresses, like what your guests sleep on at home, might look temptingly plush, but their lack of insulation will likely leave you feeling cold. Take a look at specs when comparing sleeping pads—if one is thicker, longer or wider and has a higher insulation value (known as the R-value) — it will be more comfortable and warmer.

Tip: Set your tent, bag and pad up early, so you don't have to do it in the dark.

- **Lighting:** Campsites don't have illumination, so you have to bring your own. A flashlight is OK, but a headlamp frees up your hands for camp tasks. A lantern is nice for ambient light. (You can also build a campfire, but watch for fire restrictions.)
- **Stove:** A classic two-burner propane camp stove should do the trick. You won't spend a fortune and you can cook breakfast and prepare your morning brew at the same time. Bring at least a couple of fuel canisters and a lighter, and fire it up once at home to be sure you know how it works.
- **Pots, plates, cups and sporks:** You gotta bring everything necessary for food prep and consumption. You can raid your home kitchen, just don't bring the fine china. And, unless you plan to take dirty dishes home, you'll need a scrubber, biodegradable soap, a towel and a

small washtub or two (one for dirty, one for clean).

Tip: Pack all your kitchen gear in a large clear plastic bin with a lid. It's easy to store away at home and everything will be ready next time you want to camp.

- **Camp Chairs:** These are optional if you can sit at the camp picnic table, but downtime will be a little more enjoyable when you have a comfy place to perch. (And a hammock is even better, especially for afternoon naps.)

Tip: Mesh camp chairs let water drain easily and they dry quickly if left out in the rain or morning dew.



Recommended Gear Brands

Category	Gear	Brands	Notes
Packing	<i>Backpack</i>	Osprey	Pack size is dependent on trip length. For a 3 to 6 day hike a 60 L or larger pack is preferred. Look for good suspension with a breathable back. Should support hydration system.
	<i>Daypack</i>	Osprey	Hydration system is key.
	<i>Compression/Stuff Sacks</i>	Sea to Summit	These will protect your gear within your pack and help to keep it organized. Waterproof.
	<i>Pack Cover</i>	Osprey	Make sure the cover fits completely around your pack when fully loaded.
Shelter	<i>Tent</i>	REI Co-Op Big Agnes Nemo Kelty	1 man tent is recommended but a 2 man is nice if you prefer the extra room. Pay attention to the total weight.
Sleep System	<i>Sleeping Bag</i>	Big Agnes Marmot REI Co-Op Nemo	20 degree rating is preferred. Major differences are between down or synthetic. Each has its benefits.
	<i>Sleeping Pad</i>	Therm-a-Rest Klymit Nemo	Pay attention to thermal rating.
	<i>Camp Pillow</i>	Sea to Summit Klymit	
Kitchen	<i>Stove</i>	Jetboil	
	<i>Utensils</i>		Need to be lightweight with a small footprint.
Health, Hygiene & Safety	<i>First Aid Kit</i>		
	<i>Wipes</i>	Dude Wipes	Must be biodegradable.
	<i>Water Filter</i>	Sawyer Lifestraw Platypus	
Personal Gear	<i>Gaiters</i>	Outdoor Research	
	<i>Trekking Poles</i>	Black Diamond	
	<i>Camp Chair</i>	Helinox REI-Co Op	The lighter the better.
	<i>Head Lamp</i>	Black Diamond	
Navigation/Electronics	<i>Radio</i>	Motorola	Used for communicating with other members of your team. Need to be weather proof and at least splash resistant.
	<i>Battery Pack Charger</i>	Anker	
	<i>Solar Power</i>	Goal Zero	
	<i>GPS</i>	Garmin	
	<i>PLB & Satellite Messaging</i>	Garmin	

Recommended Gear Retailers and Websites

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1.		REI Co-Op	https://www.rei.com/
2.		Backcountry.com	https://www.backcountry.com/
3.		Amazon	https://www.amazon.com/
4.		Outdoor Gearlab	https://www.outdoorgearlab.com/

Recommended Local Gear Retailers – Lafayette, Louisiana

4.		Pack & Paddle	https://packpaddle.com/
5.		The Backpacker	https://backpackeroutdoors.com/
6.		Field & Stream	https://www.fieldandstreamshop.com/

Gear Checklist

*Optional depending on temperature and weather conditions.

Packing Gear:

- Backpack _____ lbs.
- Daypack _____ lbs.
- Compression/Stuff Sack _____ lbs.
- Pack/Rain Cover _____ lbs.

- PLB & Sat. Messaging _____ lbs.
- Waterproof VHF Radio _____ lbs.
- Battery Charger _____ lbs.
- Phone _____ lbs.

Shelter:

- Tent _____ lbs.
- Tent Pad _____ lbs.

Health, Hygiene, and Safety:

- First Aid Kit _____ lbs.
- Water Filter _____ lbs.
- Personal Wipes _____ lbs.
- Sunscreen _____ lbs.
- Lip Balm _____ lbs.
- Insect Repellant _____ lbs.
- Personal Medication _____ lbs.
- Sunglasses _____ lbs.
- Camp Towel _____ lbs.

Sleep System:

- Sleeping Bag _____ lbs.
- Sleeping Pad _____ lbs.
- Camp Pillow _____ lbs.

Kitchen:

- Stove/Burner _____ lbs.
- Fuel _____ lbs.
- Pot/Cup _____ lbs.
- Utensil _____ lbs.

- Base Layer – Torso
- Base Layer – Legs
- Mid Layer – Torso*
- Mid Layer – Legs*
- Light weight/quick drying Outer Layer – Torso
- Light weight/quick drying Outer Layer – Legs
- Briefs x 3
- Socks x 3 pair
- Hiking Boots
- Belt
- Hat

Personal Gear:

- Trekking Poles _____ lbs.
- Gaiters _____ lbs.
- Camp Chair _____ lbs.
- Water proof Flashlight/lamp _____ lbs.
- Water proof Headlamp _____ lbs.
- Knife _____ lbs.
- Multi-tool _____ lbs.
- Parachute Cord 50 ft. _____ lbs.
- Extra Batteries _____ lbs.
- Camp Shoes _____ lbs.

- Beanie*
- Neck Gaiter*
- Hiking Gloves
- Thermal Gloves*
- Rain Shell
- Sleep Clothes

Navigation and Electronics

- Map/Nautical Map _____ lbs.
- Compass _____ lbs.
- GPS _____ lbs.

Logistics

Travel

You can travel to the Everglades by either plane or vehicle. The nearest airport to the park is either the Southwest Florida International Airport in Ft. Myers, FL or the Miami International Airport in Miami, FL.

Departure Flight

Route: Lafayette (LFT) to Phoenix

Date: _____

Depart Time: _____

Arrival Time: _____

Flight Number: _____

Return Flight

Route: Phoenix to Lafayette (LFT)

Date: _____

Depart Time: _____

Arrival Time: _____

Flight Number: _____

Lodging

There is plenty of available lodging in the Everglades National Park area. Lodging information here:

Hotel 1 Name: _____

Check-In Date: _____

Hotel 2 Name: _____

Check-In Date: _____

Hotel 3 Name: _____

Check-In Date: _____

Transportation

Vehicle needs to fit all members of the expedition with enough room to also haul all your gear and supplies.

Rental Service: _____

Pickup Location: _____

Type of Vehicle: _____

Shuttle Plan

Shuttle Service: _____

Pickup Date/Time: _____

Gear Rental

Outfitter Service: _____

Pickup Date/Time: _____

Type of Gear: _____

Preparation & Training

Study the map

Provided in this loadout are maps of the route which you can use to familiarize with the journey. Study the layout of the land and all the significant land features. Use mapping tools such as Google Earth to help visualize your journey.

Submit Permit requests

You need to know when permits are being accepted and to be sure to submit them as soon as you can in order to secure the desired sites. Refer to the [Fees and Passes](#) section of this loadout for more details.

Book Travel and Lodging Arrangements

Travel and lodging arrangements should be made 3 months prior to departure. Ensure your vehicle has the capability to hold all your gear and get you where you're going. You can input your travel details in the [Logistics](#) section of this loadout once you have them.

Trip Insurance

For your protection, we strongly recommend the purchase of trip insurance. It will protect you against financial loss in the event of trip cancellation or interruption, medical expenses, travel delay, emergency evacuation or other circumstances. Follow the following link to find out more:

<https://www.imglobal.com/travel-insurance>

Gear up

Begin purchasing needed gear. Refer to the [Gear Loadout](#) section of this loadout to determine your gear needs. Use the gear checklist to determine the total weight of your gear. For a multi-day trip your gear should be within the 30 to 35 lb. range without food and water. Assume 20 lbs. for water.

Learn your gear

Know how to setup and use your gear. Pull all your gear out, ensure it all works, and calculate the total weight (you can use the [Gear Checklist](#) to record weights). Become familiar with your pack. Find an efficient way to pack it that works for you.

Physical Self-Assessment

Request the AcadianX "MOUNTAINEERING PHYSICAL ASSESSMENT & BACKCOUNTRY READINESS QUESTIONNAIRE" to assess yourself.

Training

You need to prepare your body for carrying a heavy load for long periods of time. The "3 Way Training" program is a good basic program to help you meet that goal. This consists of training for three days a week doing 3 different exercises for a span of 3 months.

Day 1: Leg Training & Trail Run

Begin with leg training. This can consist of calisthenics, plyometrics, and strength training. Then follow up with a 2 – 3 mile trail run. Work on improving your time.

Day 2: Tower Day

This day consists of using a weighted pack or vest that is equivalent to the amount of weight you will be carrying and to climb a local parking tower. You can alternate between the ramps and the stairs or for more of a challenge you can use the stairs exclusively.

Day 3: Hiking Day

On this day grab your weighted vest or pack and head to the trail. Again you should have enough weight to match the weight you will carry on your trip. Refrain from using trekking poles because you don't want to train your body to become dependent on them. Again go for 2 to 3 miles or more at a time and pay attention to pace. Maintaining between a 2 – 3 mile and hour pace is ideal.

For more in-depth advice on training and ways to physically prepare yourself for the mountains follow the link below:

[Physical Training Fundamentals for Mountaineering](#)

Assessment Hike

When training to go on a long distance trek or a summit attempt it is good practice to go on an overnight hiking trip in full gear at least one month before your scheduled adventure. This is a great way for you to assess your performance and break-in or test out your gear. Try to at least simulate the distances you will cover in a single day. For example when training for the Zion Traverse Trek, I took our group on an overnight hiking trip to Chicot State Park. This hike featured a 20 mile loop that was close to home (we are Cajuns from South Louisiana) with a hilly topography that was ideal for assessing our performance. Because our average daily distance planned for Zion was 9 miles, the Chicot loop gave us an ideal proving ground by offering similar hiking distances. When the hike was over, based on the group's performance, I was confident this team was ready to tackle highlands and canyons of Zion National Park.