

DESERTS AND CANYONS



Leave No Trace
SKILLS & ETHICS



The Leave No Trace educational program promotes skills and ethics to support the sustainable use of wildlands and natural areas. The concept originated in the U.S. as a way to help recreationists minimize their impacts while enjoying the outdoors. In 1991, the U.S. Forest Service teamed with the National Outdoor Leadership School (NOLS) and the Bureau of Land Management as partners in the Leave No Trace educational program. NOLS, a recognized leader in minimum-impact camping practices, became involved as the provider of Leave No Trace materials and training.

Today, the non-profit organization The Leave No Trace Center for Outdoor Ethics, established in 1994, manages the national program. The Center unites four federal land management agencies—the U.S. Forest Service, National Park Service, Bureau of Land Management, and U.S. Fish and Wildlife Service—with manufacturers, outdoor retailers, user groups, educators, and individuals who share a commitment to maintain and protect our wildlands and natural areas for future enjoyment.



LEAVE NO TRACE

Outdoor Skills & Ethics



*"A thing is right when it tends to preserve the
integrity, stability, and beauty of the biotic
community. It is wrong when it tends otherwise"*

—Aldo Leopold, *A Sand County Almanac*

DESERTS AND CANYONS

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"The notion that [outdoor] recreation has no environmental impacts is no longer tenable."

—Curtis H. Flather and H. Ken Cordell, Wildlife and Recreationists

People enjoy the outdoors in myriad ways. We explore on foot, kayak, horseback, mountain bicycles, skis, snowshoes, and crampons. There are more of us pushing our sports to greater extremes and into more remote parts of the natural world everyday. Our experiences are personally satisfying, but they can be costly to the places we visit and the animals we observe.

America's wildlands are diverse and beautiful. They can also be fragile. Polluted waters, displaced wildlife, eroded soils, and trampled vegetation are just some of the impacts linked directly to recreational activities. Even our mere presence has an influence. Considerable damage could be prevented if recreationists were better informed, especially about Leave No Trace techniques.

This booklet is part of a national

educational program called Leave No Trace which aims to be part of the solution. At the heart of Leave No Trace are seven principles for reducing the damage caused by outdoor activities, particularly non-motorized recreation. Leave No Trace concepts can be applied anywhere—in remote wilderness, city parks, even in our own backyards—and in any recreational endeavor.

Leave No Trace principles and practices extend common courtesy and hospitality to other wildland visitors and to the natural world of which we are all a part. They are based on an abiding respect for nature. This respect, coupled with good judgment and awareness, will allow you to apply the principles to your own unique circumstances.

We can act on behalf of the places and wildlife that inspire us—in deserts and canyons and beyond. First, let's educate ourselves and adopt the skills and ethics that enable us to *Leave No Trace*.

At the heart of LNT are seven principles for reducing the damage caused by outdoor activities, particularly non-motorized recreation.



LNT Outdoor Skills and Ethics

Principles of LEAVE NO TRACE

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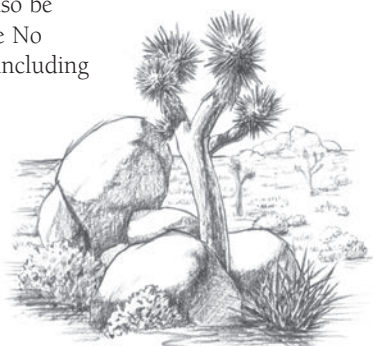
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LNT Outdoor Skills and Ethics LIBRARY

Visitors to deserts and canyons might also be interested in other booklets in the Leave No Trace Outdoor Skills and Ethics series, including Mountain Biking, Rock Climbing, or Western River Corridors editions.

To obtain these and other Leave No Trace curriculum materials, or for information on courses and trainings, call Leave No Trace, Inc. (800-332-4100) or visit the Leave No Trace website: www.LNT.org.



America's DESERTS AND CANYONS

The southwestern region of the continental United States is a magical land of canyons, sand dunes, mountains, deeply carved arroyos, pre-historic ruins, pictographs, petroglyphs, saguaros, creosote bushes, cryptobiotic soil crusts, and Joshua trees. Home of the Mojave, the Sonoran, the Great Basin and the Chihuahuan deserts, these varied and diverse lands are united by extremes—extreme temperatures and extreme aridity. It is these extremes that kept all but the hardiest settlers away and today we are left with vast expanses of seemingly empty public lands to explore and enjoy.

But the lands are not empty. Bighorn sheep, desert tortoises, mule deer, lizards, rattlesnakes, fairy shrimp, mountain lions, and count-

less birds make their home in these arid places. The plants and animals that can endure the extremes that deterred people are not as hardy and durable as their appearance suggests, however. Because of the scarcity of water, the lack of organic soil and the radical temperature variations, arid lands recover very slowly from damage caused by backcountry visitors. The very fact that you can still find corncobs in the ruins left by the Ancient Puebloan people hundreds of years ago bears testament to the desert's ability to preserve—to preserve both good and bad. For this reason, as more and more people visit America's desert and canyon country, the need to Leave No Trace becomes increasingly imperative.



■ Major deserts of the U.S.

PLAN AHEAD *and Prepare*

Much joy can be found in wildlands, but mishaps are also all too common. Even short hikes warrant forethought to reduce risks to personal safety and to the land. Plan ahead by considering your own goals and the goals of your group. Prepare by gathering information, communicating expectations, and acquiring the technical skills, first aid knowledge, and equipment to do the trip right.

Build Leave No Trace into your plans by picking a destination that is appropriate for your group and by allowing plenty of time in your itinerary to travel and camp with minimal impact to the land, wildlife and others. Be prepared to sit tight or turn back when you first sense danger or sustain an injury. That way, you won't have to abandon Leave No Trace techniques for the sake of safety.

EDUCATE YOURSELF. Know the regulations and special concerns for the area you'll visit. Because every wildland is unique, regulations and permit stipulations vary. Vegetation and wildlife will also differ. A basic understanding of local ecology will help you minimize your impact on the plants and animals that live in the places you visit. Learn how to Leave No Trace wherever you go. Start by reading this booklet and inquiring about local minimum-impact practices and area regulations.

Land management agency websites, offices, and visitor information centers offer information on special regulations, environmental concerns, and trip planning, as well as educa-

tion and volunteer opportunities. Other information sources include sporting goods suppliers, bookstores, clubs, non-profit groups, local conservation organizations, libraries and nature centers. Often, these sources can be contacted via the internet.

PLAN FOR YOUR GROUP. Evaluate the size, skill and experience level of your group before choosing your destination. Always ask about group size limitations in advance. Recreation managers can help you select a destination suited to your individual needs. For example, most people expect some noise and commotion around picnic areas, large campgrounds, and developed recreation sites. In the backcountry, visitors want to experience nature and wildlife without these distractions.

Small versus large groups. Whenever possible, visit wildlands in small groups. Large groups can be boisterous and disruptive unless they are well supervised. Try to obtain sufficient numbers of experienced leaders to divide up large groups while hiking. Avoid problems by teaching everyone about Leave No Trace and appropriate wildland behavior before leaving home. Large and/or less knowledgeable groups are best accommodated in popular places where there are already developed trails and campsites. Once again, if you have questions about Leave No Trace or the application of minimum-impact techniques in a specific area, contact the land managing agency. Regardless of the size of your group

PLAN AHEAD *and Prepare*

and the purpose of your outing, practicing Leave No Trace techniques requires care and forethought.

SCHEDULE YOUR TRIP TO AVOID TIMES OF HIGH USE.

Visits to popular wildlands at times of peak use, such as holidays and weekends, are often fraught with traffic, crowding, delays, and conflicts with other groups. Exploring out-of-the-way areas during such times is usually a good bet. Better yet, for a less crowded experience visit during off-peak periods. Make reservations and obtain permits well ahead of time to prevent disappointment. Avoid travel when environmental conditions, such as drought, make impacts more likely or severe.

Lack of moisture and extreme temperature fluctuations define deserts and create stresses not only for the plants and animals that live there, but also for visitors who are unprepared. It is not uncommon for temperatures to vary as much as 40-50° Fahrenheit in less than 24-hours. Temperatures may be well above 100° F during the day and bitter cold at night. One minute you are craving moisture, the next a thunderstorm has transformed the canyon into a raging river.



Campers must be prepared to deal with these extremes. Plan your visit for the wetter, cooler months both to avoid competing with animals for water and to maximize your comfort.

USE PROPER GEAR. Prepare for extreme weather, hazards, and emergencies. Pack a camp stove and fuel, a pot, matches or a lighter, a signal mirror, a first aid kit, and a whistle or fluorescent vest for emergencies. Always carry a good map, plenty of food, a water filter or purification tablets, warm clothing, rain gear, sunscreen and a hat. Water sources are limited and may be separated by great distances in the desert. Each member of your party should carry enough bottles and canteens to ensure a day's supply of drinking water. A minimum capacity of one gallon or more per person per day is recommended. In extreme heat, two gallons per person may be required to stay adequately hydrated.

Often, equipment that keeps us safe will also reduce impacts to our surroundings. A camp stove, which provides a quick meal without charring a single stone, is a prime example. On sandy trails, where we might be tempted to walk along the edge or create a new route to keep grit out of our boots, gaiters let us forge through the dirt.

PLAN YOUR MEALS. While adequate gear can be essential to the success of a trip, bringing too much stuff along can weigh you down and make you miserable. Get a jump on waste management by planning your meals to avoid leftovers. Pack food in

PLAN AHEAD *and Prepare*

reusable containers or plastic bags. Get rid of wrappers and heavy packaging in advance, so you won't be tempted to leave them behind.

DEVELOP THE SKILLS. Know the skills and gear that go along with traveling through the desert. Take a course or hire a competent guide. Make sure that first aid, navigation, and self-rescue are part of your knowledge and be sure you're in adequate physical shape to tackle the trip. Know where to find water and understand desert hazards such as flash floods, poisonous animals, and extreme heat. Learn as much as you can about your destination and how to have fun there while staying safe and protecting the land.

TAKE RESPONSIBILITY. Getting lost can be a big deal in the backcountry. Your personal safety and well-being may be jeopardized if you end up spending a night or several nights out without adequate gear and clothing. Significant impacts to the landscape

can result from rescue operations involving vehicles or large numbers of people. Minimize risk by planning a trip that matches your skills and expectations. Be prepared to get yourself out of tough situations. Take responsibility for your own safety by practicing self awareness, caution and good judgment

Register at the trailhead or with the ranger. Use a map and compass or GPS receiver. Know where you are at all times, and stay with your group. Just in case, give a family member or friend a copy of your itinerary together with a map marked with your intended route and instructions explaining what to do and who to notify if you don't return on schedule. You can also leave a copy of your itinerary on the dashboard of your car.

Don't build cairns, use flagging, or deface rocks or trees to mark your way. In canyon country, cell phones and radios often do not work because of the topography and basic lack of service.

TRAVEL AND CAMP *on Durable Surfaces*

RECOGNIZE DURABLE SURFACES. What effect does a footstep have? The answer is, it depends. A footstep means different things to a tree sapling and small cactus, to leaf litter and cryptobiotic soil crusts, to a dry arroyo and a rain forest moss. Wherever you travel and camp, it is best to use surfaces that are resistant to impact. Because of the general scarcity of water and organic soils in

desert regions, recovery from damage caused by backcountry visitors takes longer than in more lush environments. A misplaced footstep in some parts of the desert can take decades to heal.

To reduce the damage your passage through the desert may cause, stay on durable surfaces such as trails, expanses of rock, established campsites, gravel, sand, or dry creek beds.

CONCENTRATE USE IN POPULAR AREAS.

In most popular areas, durable surfaces include trails, established campsites, and other developed sites. Their continued use helps minimize further disturbances to wildlife, soils and vegetation.

Stay on designated trails. On trails, walk single file in the center of the tread—even where it's wet, rocky or sandy. Trails become progressively wider and parallel paths form when people walk on the margins or detour around obstacles. Likewise, "social trails"—or paths that develop when people bushwack between campsites and kitchens—mar campgrounds and other popular areas. Always try to use established roads and trails to visit campsites and other places of interest. Please don't take shortcuts, especially on switchbacks. Shortcuts become trails or gullies requiring costly restoration. Keep out of areas where efforts to restore vegetation and soils are in progress.

Wildlife have learned to expect people on trails. They are more disturbed when they encounter people away from these corridors, so in general stick to established paths.

GOOD CAMPSITES ARE FOUND, NOT MADE.

What makes the perfect campsite? Safety, privacy, and comfort never go out of style, and securing such amenities does not entail a major remodeling effort. It is generally possible to find a flat site that does not have to be altered if you take the time to look around. We can even bring our own lightweight furniture

along to eliminate the need to create it on-site. Camp stoves, sleeping pads, chairs, lanterns, even showers, are readily available at reasonable prices, and they pack in and out with ease.

Leave your campsite clean and natural looking. In wildlands, we are visitors, but we are also hosts to those who follow. They will notice our hospitality or lack of it. Litter, graffiti, tree damage, human and pet waste, unsightly fire rings and the like are senseless signs of our passing. If we take the time to pick up after ourselves, and if necessary after others, we will all benefit.

Trees are relatively scarce in some parts of the arid Southwest, but you may find yourself camping in the welcome shade of a cottonwood, juniper or mesquite. Careless campers often harm these sanctuaries. Don't break off branches while securing tent or clothes lines, and be as gentle as possible when suspending food or game carcasses. Don't use wire or nails. Place a stuff sack or other material under ropes or where padding is necessary to protect bark. Likewise, place lanterns where they won't singe bark or branches. When traveling with stock, use highlines or another method to secure the animals without tying them directly to trees. Trees shouldn't be targets or storage for hatchets and knives.

Whenever a person breaks off a tree branch for firewood, an ugly scar is created and the tree is opened to disease. Proper firewood collection is discussed under the heading, "Minimize Campfire Impacts" on page 23.

TRAVEL AND CAMP on Durable Surfaces



Use established campsites. Choose a well-established campsite that's big enough for your group. Some popular areas have officially designated campsites, shelters or platforms for your use. This system has been shown to reduce damage to vegetation and other natural features. Where campsites are not formally designated, look for minimum-impact sites where the ground cover is already worn away or better yet, camp on unvegetated rock or sand. Wear soft-soled shoes and concentrate your activities in the center of the site to avoid enlarging it.

Tents, packs, gear and the kitchen area should be located on surfaces that are either already compacted, naturally resistant, or prepared—such as a gravel tent platform. This approach protects surrounding vegetation and prevents “satellite” sites from developing.

Also consider your visual impact on other users or wildlife. Take advantage of opportunities to tuck your tent out of view behind natural screening such as trees, large shrubs or rocks.

DISPERSE USE IN

PRISTINE AREAS. Visit remote or “pristine” areas only if you are committed and able to Leave No Trace in that particular environment. Your camping and traveling practices will be slightly different in places where there are no existing trails or campsites. Here it becomes even more essential to seek out durable surfaces. In deserts and canyons, the most

durable traveling surfaces include rock, gravel and sand. Dry grasses are also naturally resilient due to their hardy root structures and flexible stems.

Avoid creating trails and campsites.

Cross-country travel. Consult local land managers about cross-country travel and the appropriate use of game trails. In places where soils are prone to erosion or rare species such as the cactus ferruginous pygmy owls or southwestern willow flycatchers are present, off-trail travel should be avoided. If cross-country travel is allowed and deemed appropriate, seek out durable surfaces for your path. Slickrock acts almost like a paved trail in parts of the Colorado Plateau. Hiking and camping in sandy areas will preclude the creation of new trails and campsites. Dry washes also provide excellent travel routes because flooding washes away signs of your passage. The only drawback to traveling in a wash is the potential danger of a flash flood. These travel corridors should not be used if it is raining or there is any potential for upstream storms.

TRAVEL AND CAMP on Durable Surfaces

In general, spread out when hiking off-trail. If each person takes a slightly different route, a distinct trail is less likely to form because no single plant receives multiple footfalls. Walking single file is acceptable where there is little chance of trampling plants—such as in a dry wash.

Please see page 12 for information on travel where cryptobiotic soil crusts, vulnerable vegetation and desert pavement are present.



Campsites. Select the most durable camping location possible. In pristine areas that don't see much human traffic, pre-existing campsites, even those that are lightly used, are best left alone to recover. Before unpacking your tent, look for obvious bird nesting activity and other signs of animals such as tracks and burrows. Choose an area that seems safe, free of wildlife, and well-suited to minimum-impact camping. Look for a large rock slab, a graveled area, sandy spots, or other equally durable space to locate your kitchen. Concentrate your activities on this surface whenever possible to protect more fragile areas. If necessary, reserve less durable ground for your sleeping area.

Stay only one night unless your impact to the site will be negligible. Vary your route to water, and to the bathroom or to sleeping areas to prevent trails from forming. Carry a collapsible water container so you can minimize the number of trips you

need to make to collect water. In general, manage your activity to avoid harming the natural features of the site, especially ones that do not regenerate or do so very slowly—such as woody shrubs like blackbrush or cryptobiotic soil crusts.

BREAKING CAMP. After breaking camp and before departing, disguise the site by replacing any rocks or sticks you may have moved. Take a dead branch and rake away footprints in sand or gravel. Re-cover scuffed up areas with leaf litter or pine needles. Fluff up matted grass and make the place less obvious as a campsite. As long as overall visitor use is very low, the site will recover. Ideally, no trails or campsites will be created if visitors disperse their activities sufficiently.

PROTECT WATER RESOURCES.

Water marks the landscape of the desert Southwest. It has carved deep canyons through sheer walls of red and white sandstone and woven dendritic stream patterns across the bajadas; flashfloods deposit debris high along cliff walls or into the upper reaches of the cottonwoods that line the stream banks; glittering white salt flats mark the site of ancient seas and inland lakes. Yet in spite of this obvious power, the scarcity of water is what defines a desert. Annual rainfall varies from as little as 1.8 inches in Death Valley to 9 inches in Canyonlands National Park. Because of this scarcity, desert campers must respect and conserve water during their travels.

Regulations vary about where to camp in relation to water. In many

TRAVEL AND CAMP *on Durable Surfaces*

parts of the arid Southwest, land managers require campsites to be located at least 70 steps or 200 feet from water sources. In California, where some of the nation's driest deserts lie, state regulations require camps to be 210 steps or 600 feet from water, and human visits to water sources must last less than 30 minutes. (California Administrative Code-Section 730.) Finally, Arizona state law says that the minimum distance between a campsite and either natural or human-made watering holes must be a quarter of a mile when this water is the only reasonable source available to wildlife and domestic stock. (Title 17, Chapter 13: Taking and Handling of Wildlife, Article 1, General Regulations). These distances are all intended to ensure that animals have undisturbed access to their drinking water, as well as to reduce the chance that you will inadvertently contaminate the water source.

In some canyons or river corridors in the Southwest, thick riparian vegetation or steep canyon walls preclude camping 200 feet from water. Such tight quarters may be hazardous in the case of a flash flood, so use caution before choosing a campsite right along the canyon floor. If there is any sign of rain, either in the immediate area or upstream, keep hiking until you can get to higher ground.

If there is no danger of flash flood and you have to camp close to a water source, look for an established campsite or choose a durable spot and practice impeccable Leave No Trace techniques to ensure water purity and

minimize animal disturbance. Be particularly careful about where you defecate in these narrow corridors. If possible, climb up out of the canyon bottom, well above any high water line before digging your cat hole. For more detail on proper sanitation practices in the desert, see the section: "Dispose of Waste Properly" on page 14.

Because regulations regarding water use vary from state to state and agency to agency, it is imperative that you know the regulations for the area that you plan to visit before you reach the trailhead.

Conserve water. Conservation of water is essential given its scarcity and its vital importance to plants and animals in the desert. Regulations in some parts of the arid Southwest require campers to pack in all their water in times of extreme shortages. Again, the law is intended to protect wildlife. Animals do not have the option of carrying their water from place to place. When their supplies dry up, their lives are threatened. Therefore, where water is precious, human visitors must conserve the pools of life they encounter for the wildlife that live there.

Adjust your water consumption according to the size of your source. If your source is a single pot hole, use it only for drinking supplies and try to limit your stay to one night so you do not empty it. If you are next to a flowing stream or large spring, you may be more liberal with water use, but consider how much water is flowing before you jump in.

Swimming in pot holes, self-contained pools, or small streams is not

TRAVEL AND CAMP on Durable Surfaces

appropriate. Body oils, sunscreen or lotions can alter the pH of the water causing harm to aquatic creatures or polluting the drinking water. Pets, horses and other pack animals should not be allowed to defecate in the water. To prevent this, water them away from the source with a bucket or bowl.

Special considerations: cryptobiotic soil crusts, vulnerable vegetation, and desert pavement. On the surface, the arid lands of the Southwest may appear barren and devoid of vegetation—perfect territory for minimum-impact off-trail travel. However, soil crusts and desert pavement, features that may not be readily apparent to the untrained eye, are prevalent in many parts of the region. Both are quite fragile and may be damaged by a single misplaced foot. In addition, plants, such as the fishhook cactus (*Mammalaria microcarpa*) are camouflaged to look like stones making them difficult to see and avoid.

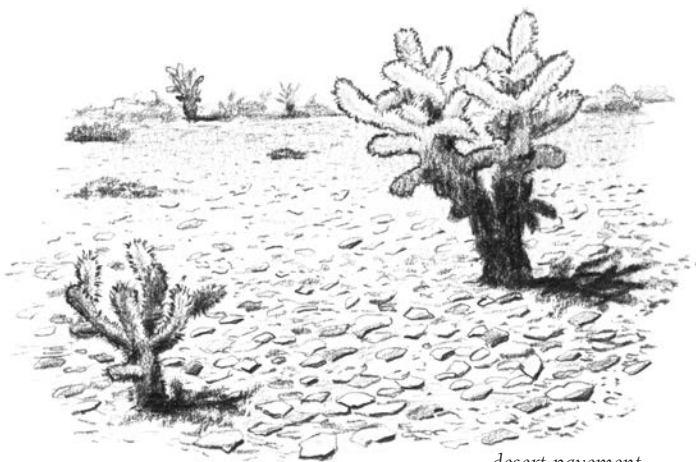
Protection of such small, inconspicuous desert plants requires special vigilance when traveling off-trail.

Cryptobiotic soil crusts, also known as cryptogam, represent as much as 70 percent of the living cover on the Colorado Plateau. Crusts are also present, though less obvious, in parts of the Mojave and Sonoran deserts. Looking like tiny, black, irregularly raised pedestals in the sand, cryptobiotic soil crusts form a self-sustaining biological community that is essential to the ecology of arid lands. By reducing erosion, fixing nutrients in the soil, and increasing water absorption, cryptobiotic soil crusts create a hospitable environment in which other plants may establish themselves.

Unfortunately, human activities are incompatible with flourishing cryptobiotic soil crusts. Compression from footsteps, bicycles, or vehicles destroy the fibers that hold the crusts together resulting in channels of exposed soil that may be eroded away by water or



cryptobiotic soil crust



desert pavement

wind. Burial of surrounding crusts by blowing sand can cut off the light required for photosynthesis. Under the best circumstances, a thin veneer of cryptogam may return to a disturbed area in five to seven years. Full recovery takes 50 years or more.

In areas with cryptogam, it is vital to concentrate use on durable ground. Open expanses of rock, known as slick-rock, and dry washes where no cryptobiotic soil crusts can grow, provide excellent minimum-impact travel corridors, while areas covered with dense leaf litter, such as found under pinyon and juniper trees, offer another durable surface for walking or camping.

If you find yourself surrounded by cryptobiotic soil crusts, step directly in one another's footprints as you move across the crusts to a more resistant travel path. The first footprint actually causes the most damage, so it is inappropriate to spread out when crossing cryptogam. Cross-country travel should be avoided in

such fragile places, and camping on these soils should never be necessary. Stay on rock or in dry washes.

Desert pavement is another fragile arid land feature that should be avoided by backcountry travelers. Found in the Mojave Desert of southern California and Nevada and in Arizona's Sonoran desert, desert pavement is characterized by a smooth veneer of varnished rocks embedded in the soil. Overturning these rocks results in a visible impact that lasts until the varnish returns, a process that can take hundreds, if not thousands of years. In fact, the ancient inhabitants of California's deserts created expansive geoglyphs by removing varnished pebbles and leaving behind outlines of animals and people on the land. You can still see these forms today, thousands of years after they were created. Since we don't want to leave a footprint that lasts a thousand years, don't camp on desert pavement and walk across it with care.

DISPOSE of Waste Properly

PACK IT IN, PACK IT OUT.

"Pack it in, pack it out" is a familiar mantra to seasoned wildland visitors. As users of recreation lands, it's our responsibility to clean up after



ourselves. Inspect your campsite and rest areas for trash or spilled foods. Pack out all trash, leftover food, and litter.

Plan meals to avoid generating messy, smelly garbage.

It's critical to wildlife that we pack out any by-products of food preparation, such as bacon grease and leftovers. Don't count on a fire to dispose of waste. Garbage that is half-burned or buried will still attract animals and make a site unattractive to other visitors.

Litter is not only ugly—it can be deadly. Plastic six-pack holders and plastic bags can strangle birds and mammals.



Fishing lines, lures and nets ensnare and injure everything from dogs to herons, so don't leave any behind.

Bring an adequate container to haul your trash, and maybe someone else's, back home. Before moving on from a camp or rest site, search the area for "micro-garbage" such as bits of food and trash including cigarette filters and organic litter such as orange peels, or egg, pistachio and sunflower seed shells. Invite the kids in your group to make a game out of scavenging for human "sign."

PRACTICE GOOD SANITATION.

Human waste. "¿Dónde está el baño?" "Ninahitaji kujisaidie?" No matter how it's said, "Where's the bathroom?" is an important question, even in wildlands. Where there is no bathroom per se, answering the call involves a little pre-planning, some initiative, and a bit of creativity. Proper human waste disposal will allow you to:

- Avoid polluting water sources
- Eliminate contact with insects and animals
- Maximize decomposition
- Minimize the chances of social impacts

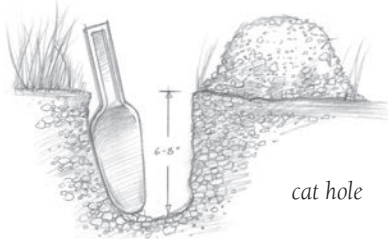
Improper disposal of human waste can lead to water pollution, the spread of

DISPOSE of Waste Properly

illnesses such as giardia, and unpleasant experiences for those who follow.

Facilities/outhouses. Whenever possible, take time to locate and use bathrooms, outhouses, and other developed sites for human waste disposal.

Cat holes. If no facilities are available, deposit solid human waste in cat holes dug 6 to 8 inches deep at least 200 feet from water, camp, trails, and drainages. Look for organ-



ic soil under trees and away from cryptobiotic soil crusts for your cat hole site. Bring a trowel to dig the hole, and disguise it well before leaving. Ideally, the microbes found in soil break down feces and the pathogens they contain, but in the desert, this process happens very slowly, so make sure your cat hole site is well-hidden and buried deeply so it won't be uncovered accidentally. Don't leave human waste under rocks or in alcoves because it will decompose slowly there. If the cat hole method is ill suited to your group, it's best to camp where an outhouse or pit toilet is available.

Good cat hole sites isolate waste from water sources such as lakes, streams, dry creek beds, ravines, pot-holes, and other visitors. Whenever

possible, use a remote location during the day's hike to help prevent high concentrations of cat holes near campsites.

Toilet paper. Plan ahead to pack out used toilet paper in a plastic bag. This practice leaves the least impact on the area. Packing soiled toilet paper with baby wipes deodorizes the trash bag, and the wipes help you stay cleaner. Double bagging your trash prevents any accidental contamination. Burying toilet paper in the desert is not recommended. The arid environment preserves paper—news-papers from the 1870s that were used to insulate mining cabins in the desert are still legible today. Burning toilet paper at the site is also not recommended both because it is hard to burn the paper completely and because the practice has caused wildfires. Natural toilet paper such as grass, river rocks, sticks, and snow can be surprisingly effective. If you choose to use natural toilet paper, bury it in your cat hole. Always pack out feminine hygiene products because they decompose slowly and attract animals.

If you do not believe your group is capable of packing out toilet paper hygienically, your only option may be to instruct everyone to bury it in their cat holes. If you choose this option, be particularly diligent about digging down deeply enough to prevent scavenging animals from excavating the contents.

Latrines. If you camp with children or plan to stay with a group in one place for several days, use a latrine to

DISPOSE of Waste Properly

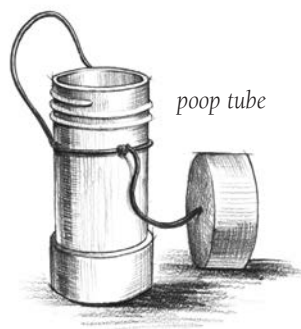
concentrate wastes and protect surrounding vegetation. Site the latrine as you would a cat hole and ensure the route to the latrine is over durable surfaces. Dig a trench six to eight inches deep, and long enough to accommodate the needs of your party. Soil from the trench is used to cover the feces with each use. Dispose of toilet paper by packing it out in a plastic bag. Naturalize the site before leaving.

The use of latrines should be a last resort—where developed restrooms, pit toilets and porta-johns are unavailable.

Carrying waste out. Often, visitor use is high and soils sparse in desert areas. Recreation managers seeking to protect human health and water sources employ a spectrum of toilet designs and approaches to managing human waste—even airlifting such waste out with helicopters. There are a number

of products available now for packing out your own feces. One effective, low-cost option is to carry and use a homemade poop tube (see illustration) or to purchase a device designed specifically for transporting human waste. Some of these products allow you to dispose of human waste in landfills or trash cans, others need to be deposited in pit toilets or porta-johns. Check with local land managers or Leave No Trace, Inc. for information about these products and other appropriate disposal techniques for human waste.

Urine. While the odor of urine can be a problem in arid areas, especially along river corridors, it is typically not a health concern. Urinate well away from camps and trails. Salt-deprived animals have been known to defoliate plants to consume the salt in human urine, so urinate on rocks or bare ground rather than on the vegetation. Where water is plentiful, consider rinsing the site where you urinate. One “solution to pollution is dilution,” so near big desert rivers like the Colorado, urinate directly into the water or on the wet sand along the riverbanks. For more information on this technique, see the Leave No Trace



DISPOSE of Waste Properly

Western Rivers Skills and Ethics Booklet.

WASTEWATER. To wash yourself or your dishes, carry water 200 feet away from your water source and use only small amounts of soap. Because biodegradable soaps rely on microbes in the soil to decompose active ingredients, it must be rinsed off away from your water source both to be effective and to prevent contamination. Hand sanitizers that don't require rinsing allow you to wash your hands without worrying about wastewater disposal.

For dish washing, use a clean pot or expanding jug to collect water, and take it to a wash site at least 200 feet (70 steps) away from fresh water. This lessens trampling along the stream banks and helps keep soap and other pollutants out of water sources. Use hot water, elbow grease, and little or no soap. Strain dirty dishwater with a fine mesh strainer before scattering it. Pack out the contents of the strainer in a plastic bag along with any uneaten leftovers. Animals should not be allowed access to any food or food waste for reasons discussed in the "Respect Wildlife" section on page 25.

In developed campgrounds, food scraps, mud and odors can accumulate where wastewater is discarded. Contact



your campground host for the best disposal practices and other ways to Leave No Trace at your campsite.

Contamination of water sources from wastewater and soap, or the loss of a small amount of water from humans drinking out of a pot hole may be the difference between life and death for wildlife. Remember, in some arid environments, you are required to pack in all your water, so be frugal when washing.

SOAPS AND LOTIONS.

Soap, even when it is biodegradable, can alter the water chemistry of lakes and streams, so minimize its use. Always wash yourself well away from shorelines (200 feet, 70 steps) and rinse with water carried in a pot or jug. This allows the soil to act as a filter. Where freshwater is scarce, it's better to conserve the resource and avoid bathing.

LEAVE What You Find



People visit wildlands for many reasons, among them to explore nature's mysteries and surprises.

While many visitors are most offended by finding litter in these wild areas, specialists are actually more concerned about impacts that impair the function of natural ecosystems and affect rare species. They are worried about what is missing from our favorite wildlands: things like native plants and animals, healthy soils, and archaeological artifacts, as well as rocks, wildflowers, antlers, feathers, fossils and other objects of interest. Leaving such things as we find them helps scientists understand the natural balance of the area and allows us to pass the gift of discovery on to those who follow.

Leave What You Find means retaining the special qualities of every wildland area-for the long term.

PRESERVE THE PAST. One of the most exciting aspects of traveling through America's deserts is coming upon relics from the past. The arid environment preserves human history and you often find rock art, potsherds, corn cobs, and ruins tucked up in canyons or spread across the mesas. Discovering such evidence of earlier cultures is exhilarating, and there is a great temptation to take samples home as souvenirs. This practice is illegal on public lands, however. Structures, dwellings and

artifacts found on public lands are protected by the Archaeological Resources Protection Act of 1979 and the National Historic Preservation Act of 1906, and may not be disturbed. These include seemingly insignificant potsherds, arrowheads, and mining or railroad equipment from fifty or more years ago. It is illegal to excavate, disturb, damage, or remove these resources from any public lands.

In spite of these laws, the single largest problem cultural resource managers face today is unintentional damage to historical artifacts by visitors. Ruins, potsherds, arrowheads and rock art are rapidly disappearing or being destroyed as more and more people discover the magic of the Southwest.

Cultural sites add to the mystery and allure of the desert, but take care when you come upon a ruin. Stop, look and think. Is your presence going to cause further deterioration? Can you "visit" the site by just observing it from afar? Try to locate the midden or ancient trash pile. These darkened, raised mounds of earth are usually found in front of a ruin and are extremely fragile. Archaeological artifacts and information may be buried in the midden, and walking on them can destroy pieces of the historical record.

If a trail has been built to the site, stay on it. Foot traffic causes erosion that can undermine the ruins. Climbing on walls or roofs may cause structures to collapse, while touching the ancient plaster makes it deteriorate. So watch where you walk and try not to touch anything. Leave

LEAVE *What You Find*

items where you find them, moving artifacts around rearranges history and makes an archaeologist's job harder. Enjoy rock art by viewing, sketching, and photographing it. Never chalk, trace or touch the paintings or carvings. Any kind of direct contact with the oils in our skin causes these ancient works of art to begin disintegrating. Defacing existing rock art or adding your own modern drawings is vandalism and is punishable by law.

There can be no compromises if we wish to protect these irreplaceable and fragile treasures. Visit cultural sites with care, respect and

impeccable Leave No Trace techniques.

LEAVE NATURAL FEATURES UNDISTURBED.

Load your camera, not your packs. Let photos, drawings, and memories be your souvenirs. Although natural objects may be collected on some public lands, a permit is often required. In the Sonoran and Mojave deserts, more and more people are collecting desert plants for landscaping and herbal medicine. Because of this, all cacti and many desert shrubs and trees are now protected by state laws. In addition, collecting is prohibited in



national parks, wildlife refuges, and many state parks. The nests and feathers of wild birds are protected by the federal Migratory Bird Treaty Act. Practice and encourage restraint and know the law before pocketing a feather or plant.

Help children investigate the role of natural objects in their own environments. Remind them that these things fill important ecological niches—an antler is gnawed by a kangaroo rat for nutrients; a scorpion finds shade under a piece of deadwood. We all need to remember that objects in nature derive much of their beauty from their surroundings and never look quite the same back home.

Modern-day recreationists should not build rock cairns for navigational aids. Pre-existing cairns should be left in place, however. For centuries, both Native Americans and European settlers used these rock piles to mark trails, hunting blinds or mining claims. In some parts of the desert, stone piles resembling people were built by Native Americans to herd wildlife into canyons. Because the mysterious rock piles you encounter may have historical significance, it is best to leave them as you find them.

It is not appropriate for recreationists to use paint, survey tape, or tree scars to mark a trail. If some kind of marker is absolutely necessary, use flagging and be sure to remove it before leaving the area.

AVOID SPREADING NON-NATIVE PLANTS AND ANIMALS.

Invasive species of plants, animals, and organisms can cause large-scale, irreversible changes to ecosystems by

harming or out-competing native species. For example, in parts of the Great Basin Desert, cheat grass is invading areas that were once dominated by sagebrush. Cheat grass burns frequently, something sagebrush can't withstand. As a result, the grass is gradually taking over as the dominant species, but it cannot replace sagebrush as an essential food and habitat source for animals such as pronghorn antelope or sage grouse. The spread of cheat grass, therefore, jeopardizes the future well being of these animals.

Recreationists play a role in the spread of invasives by transporting live animals, plants, seeds, and agents of disease. The potential for new infestations increases every day as more and more outdoor seekers travel from one wildland to another around the globe. It is less expensive and less labor-intensive to prevent non-native species invasion than it is to restore the original balance.

We can help prevent the spread of invasive species by following these guidelines:

- Don't transport flowers, weeds, or aquatic plants into wildlands.
- Empty and clean your packs, tents, stock trailers, boats, fishing equipment, vehicles, and other gear after every trip. Water, mud, and soil may contain harmful seeds, spores, or tiny plants and animals.
- Clean the dirt out of your boots or tire treads.
- Never discard or release live bait.
- Make sure packstock and pets are immunized and their coats are free of seeds, twigs, and harmful pests such as ticks.

LEAVE *What You Find*

- If you carry hay, or other feed, make sure it's weed-free. Feed your animals only food that is certified weed-free for at least three days before entering back-country areas.

Find out about the invasive species in your area and learn how recreationists can help curb their spread. If you locate an infested area, let the land owner or land managing agency know so that they can initiate control efforts.

Minimize site alterations.

For camping and all your activities, carry portable equipment that leaves no trace. Use electric fencing instead of wooden corrals, collapsible furniture rather than hand-hewn tables and chairs, and lightweight tents in place of makeshift “survival” shelters so the area retains its natural character.

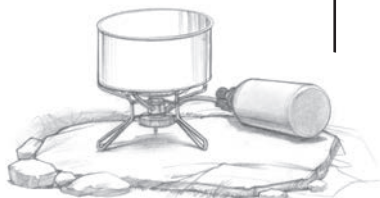
MINIMIZE *Campfire Impacts*

The natural appearance of many recreation areas has been compromised by the careless use of fires and the demand for firewood. Campfires are beautiful at night. But enormous rings of soot-scarred rocks—rings often overflowing with ashes, partly burned logs, food, and trash—are unsightly during the day. Most importantly, campfires can and do ignite wildfires.

Some of us grew up with the tradition of campfires but they are no longer essential to comfort and food preparation. Nor do most of our deserts rely on fires for forest rejuvenation or for getting rid of excessive undergrowth and dead wood, so your fire has

no place in the local ecology. Many lasting impacts associated with campfires in the back-country can be avoided by using lightweight stoves, fire pans, mound fires, and other Leave No Trace techniques.

USE A STOVE. Visitors should carry a stove, pot, matches, or a lighter, and



sufficient fuel to cook all meals. Another option is to pre-cook meals or to bring food that doesn't require cooking so that you can dis-

MINIMIZE *Campfire Impacts*

pense with a stove all together. Build fires only when conditions are right—the danger of wildfire is low, downed and dead wood is plentiful, regulations allow fires, and there is sufficient time to prepare the fire site, burn all the wood to ash, and clean up.

BUILD A MINIMUM-IMPACT FIRE. At your picnic or campsite, consider whether a fire makes good sense. Are campfires even allowed in the area you are visiting? Have you inquired about the possibility of a fire ban due to drought conditions? Do you have the necessary permits? Are the weather and wind conditions suitable? Is there a risk of scorching tents, tree limbs, or vegetation? Have you brought along sufficient wood? If not, can firewood be collected without damaging trees (live or dead) or depleting the local supply?

If a campfire is important to you,

- Ask about pertinent regulations and campfire management techniques.
- Consider the wind, weather, location, and wood availability. Decide whether it is safe and responsible to build a campfire.
- Where there are no fire rings or grates, bring a fire

pan or set aside time to build a mound or pit fire.

- Have a trowel or small shovel and a container for saturating the ashes with water.

Use an established fire ring or fire grate. If you camp near an existing rock ring or fire grate, use it rather than building a new fire site. The most inviting fire rings are of a reasonable size and free of excess ashes, half-burned wood and trash. Leave your fire ring in a condition that encourages others to use it.

Pit fires. Excavating a shallow depression in the sand or gravel found along the bottom of dry washes—sites that have no organic soil—makes a perfect minimum-impact fireplace. After you are done, collect the ash and scatter it in the trees or scrub alongside the wash before refilling the depression. If left in place, the ash will “float” through the sand or gravel and the fire site will be obvious to others.

True pit fires, where a layer of sod is removed and a fire pit dug, are no longer recommended because even when the overlying sod is carefully replaced and watered, an obvious depression usually forms. Ashes buried beneath the sod also tend to rise to the surface.

MINIMIZE *Campfire Impacts*

Pan or mound fire. Fire pans are unused metal oil drain pans, aluminum roasting pans, or commercially made pans that make good containers for low-impact fires. Use a pan on a durable, unvegetated surface away from cliffs or overhangs. Line the pan with a few inches of inorganic soil and elevate it with stones or place it on an old space blanket to prevent damage to vegetation and soils below. Drill two or three holes through the side of the pan to attach it to a pack with cord for transport.

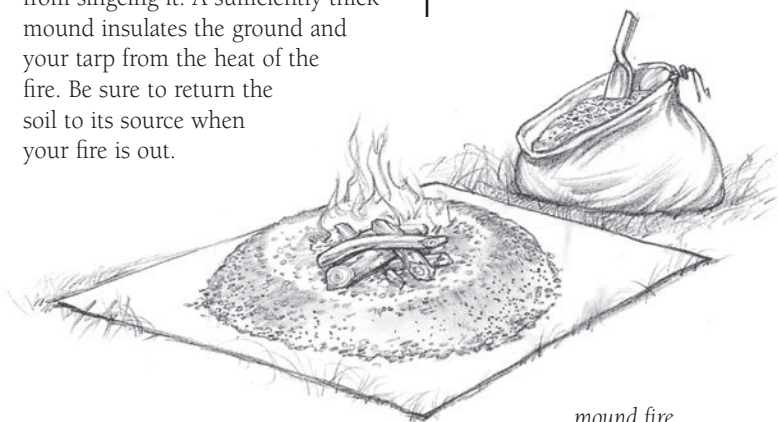
Mound fires are built on pedestals of sand, gravel, or soil with a low organic content. Locate a source for this material where you'll disturb as little vegetation as possible, often you can find such soil near an uprooted tree or in a dry wash. Haul sufficient quantities to a durable fire site using a stuff sack (it will require several loads). Construct a pedestal 6-8 inches thick and 18-24 inches in diameter on top of a tarp or ground cloth. The ground cloth helps facilitate cleanup. It can be rolled up along the edge of the mound to prevent embers from singeing it. A sufficiently thick mound insulates the ground and your tarp from the heat of the fire. Be sure to return the soil to its source when your fire is out.

USE DEAD AND DOWNED WOOD.

Keep fires small. For firewood, gather dead sticks from the ground that can be broken by hand. Using firewood smaller than an adult's



wrist makes clean up easier because wood this size burns completely to ash. Half-burned logs present a disposal problem—and often a disagreeable situation for the next campsite visitor. Don't snap branches off of trees, either living or dead, because doing so scars or destroys them. Standing snags or junipers with dead and gnarled limbs are part of the aesthetic beauty of the desert, but the hunt for firewood is rapidly causing these ghostly trees to disappear. Gather driftwood in washes or pick up scattered dead wood lying on the ground rather than break pieces off standing trees. The use of hatchets, axes, or saws isn't necessary or desirable. In the backcountry, gather firewood en route to your camp so the area around your site isn't depleted.



mound fire

MINIMIZE *Campfire Impacts*

MANAGE YOUR CAMPFIRE.

No matter which campfire technique you employ:

- Never leave a fire unattended.
- Don't put foil-lined packets, leftover food, or other garbage in the fire that will have to be removed later.
- Don't break large pieces of firewood up into smaller pieces until needed. Keep the wood natural looking and scatter all unused branches and logs away from the site after you are done.
- Burn the wood completely to ash. Stop feeding the fire and give yourself an hour or more to add all the unburned stick ends.

- Saturate the ash with water. Make sure it is cool to the touch and remove any trash.
- Scatter all the ashes widely with a small shovel or pot lid.
- Restore the fire site to its natural appearance.

In popular areas, leave a single, small, clean rock ring centered in the campsite. Dismantle and clean up any extra fire sites. If a fire grate is present, do not build or use a rock ring. Leave the grate clean and ready for the next person. In remote areas, clean up thoroughly and disguise the fire site to make it appear as natural and untouched as possible.

RESPECT *Wildlife*

The stark truth is, if we want wild animals, we have to make sacrifices.

—Colin Tudge, *Wildlife Conservation*

Encounters with wildlife inspire tall tales and long moments of wonder. Yet around the world wildlife face threats from loss and fragmentation of habitat, invasive species, pollution, over-exploitation, poaching, and disease. The desert Southwest is no exception.

Threatened and endangered species, such as the Peninsular desert bighorn sheep, the Mojave desert tortoise, and the Sonoran pronghorn, are struggling to survive as their worlds change and habitats shrink. Protected lands offer a refuge from some, but not all, of the problems facing wildlife. Consequently, wildlife need recreationists who'll promote their survival, not add to the difficulties they already face.

We know that animals respond to people in differ-

RESPECT *Wildlife*

ent ways. Some species adapt readily to humans in their domain and are said to be “habituated.” Other animals flee from humans, abandoning their young or critical habitat. Still others are attracted and endangered by our food and garbage. Desert tortoises may void their bladders and lose most of their stored water supplies when disturbed. Since tortoises often go for months without drinking, this loss can be devastating. A seemingly insignificant disturbance of a pronghorn antelope or a lesser-long nose bat can cause depletion of critical energy reserves or displacement from habitat or watering areas. Animal nesting areas are particularly sensitive to human disturbance, so if you find yourself being dive-bombed by a peregrine falcon retreat. Most likely you have entered its nesting area.

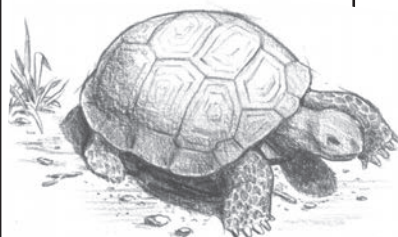
Since outdoor recreation is dispersed over large areas, its impacts on wildlife can be equally extensive. Fish, birds, and reptiles, as well as mammals, are affected by people using their habitats. We are responsible for co-existing peacefully with wildlife.

NEVER FEED ANIMALS.

Feeding wildlife damages their health, alters natural behaviors, and exposes them to predators and other dan-

gers. Headlines are made when wildlife are attracted to humans and their food. Bears get the most press for tearing into tents, coolers, and cars in search of a meal, but more commonly campers have to deal with the annoyance of rodents, skunks, or birds looking for a handout. These animals pose little threat to human safety, but their presence is a nuisance, they can be vectors for disease, and their reliance on human food is a detriment to their own well-being.

Human food is harmful to animals. Serious illness or death can occur when wildlife consume food wrappers, garbage, toiletries, vehi-



desert tortoise

cle antifreeze and other “inedibles.” Furthermore, human food does not meet the nutritional needs of wildlife, but because it is easy to obtain, it is an appealing substitute for foraging animals.

Animals are adept opportunists. When offered the temptations of an untidy backcountry kitchen or a

RESPECT *Wildlife*

handout from a curious camper, they can overcome their natural wariness of humans. Aggressive or destructive behavior may follow, and in conflicts with humans, animals ultimately lose. Prospects of an easy meal also lure wildlife into hazardous places such as



*desert
bighorn sheep*

campsites, trailheads, roads, and entry points where they are chased by dogs or hit by vehicles. They may also congregate in unnatural numbers, increasing stress and the spread of disease within their populations.

STORE FOOD AND TRASH

SECURELY. "Food" includes garbage, canned food, stock feed, pet food, fuel, and scented or flavored toiletries. The salt in hiking boots, backpacks, or clothing also attracts many small mammals. Appropriate storage and

transportation methods vary considerably from place to place, so consult land managers for the best practices in your area. Keep a clean camp by removing all garbage and even the tiniest food scraps. Be careful not to drop food on the trail as well.

You can often hang your food to keep it away from animals. In desert and canyon country where the primary scavengers are rodents, skunks, or ringtails, the food need only be suspended a few feet off the ground and away from tree limbs. Mice may be able to scamper up and down the line holding up your food, so try poking a hole through a plastic lid and securing it on the line to block their passage. You can also pack your food in plastic tubs or a cooking pot to keep critters out.

OBSERVE FROM A

DISTANCE. Always watch or photograph animals from a safe distance so they are not startled or forced to flee. Do not follow or approach them, even small reptiles and snakes. If you're hunting, know your game, identify your target, and take only safe, clean shots.

Use the observation areas, platforms, and trails provided in many areas, and binoculars, spotting scopes, and telephoto lenses to watch

wildlife. Back away if animals react to your presence. To leave the area, move away from the animal even if you must detour from your intended travel direction. You have more options in your movements than wildlife. Treat them with great respect.

Avoid quick movements and direct eye contact, which may be interpreted as aggression by certain animals. Don't disturb wildlife (i.e. by shouting to get their attention) to get a better photo. If wildlife are on the move, stay out their line of travel. Travel quietly. Be aware that nocturnal predators may be a hazard to your safety if you choose to hike at night. Many parts of the Southwest are home to black bears and mountain lions. Check with land managers to find out what camping and hiking practices they recommend to avoid an unexpected, unpleasant encounter with these animals.

The relationship of children to the natural world is influenced by adult behaviors. Model respect and restraint by teaching children not to approach, pet or feed wild animals. Always keep children in immediate sight: they're often the same size as animal prey. Don't encircle, crowd, tease or attempt to pick up a wild animal. Young animals removed or touched by well-meaning people may cause their parents to abandon them. Some creatures, such as the desert tortoise, are susceptible to diseases carried by humans. If you find an animal in trouble, notify a wildlife officer.

AVOID SENSITIVE TIMES AND

HABITATS. Consider the seasonal stresses that wildlife face. Typically, they are sensitive to recreationists while pursuing and defending mates and territories, birthing, guarding young or nests, and when food or water is scarce. Avoid entering their habitats at such times, for your safety and theirs. The more you understand about a species, the more considerate you can be of the animal's needs and temperament, especially at critical times and in critical places.

In the arid Southwest, times of high temperature and water stress—for example the peak of summer—are particularly difficult for animals. Be sure to allow wildlife clear access to water sources and avoid disturbing them during the heat of the day.

HANTAVIRUS. Many species of rodents carry hantavirus, particularly deer mice, which are common in the Southwest. Chances of infection from hantavirus are low; however, the illness can be fatal, so it is important to avoid exposure. Humans pick up the disease through contact with infected rodents or their excretions. Infection is strongly associated with disturbing rodent urine, droppings or nests, all of which are commonly found under overhangs and in abandoned buildings. Once disturbed, the viral particles become airborne and are inhaled. The virus can also be transmitted through direct contact if viral particles are introduced to broken skin or to the eyes. In addition, there are cases of people becoming infected by rodent bites.

RESPECT *Wildlife*

To prevent exposure to the virus, avoid disturbing rodents and their feces, and don't sleep under overhangs that support rodent nests.

CONTROL YOUR PET.

Wildlife and pets are not a good mix—even on-leash, dogs harass wildlife and disturb other visitors. The best option is to leave them at home. Obedience champion or not, every dog is a potential carrier of diseases that infect wildlife.

If you must travel with your pet, check for restrictions in advance. Most national parks prohibit dogs on trails. Ensure

your animal is in good condition for the trip. Dogs should have current vaccinations to avoid being carriers of, or contracting, infectious diseases such as rabies and parvo-virus, especially in areas with wolf populations. Always use a collar and a short leash to control your dog. Remove pet feces from trails, picnic areas, and campsites by disposing of it either in a cathole as you would human waste, or in a trash can. For day hikes, carry an extra trash bag for collecting and carrying dog feces.

BE CONSIDERATE *of Other Visitors*

Children and adults alike appreciate nature. Today, circumstances require us to share wildlands with people of all recreational persuasions. There is simply not enough country for every category of enthusiast to have exclusive trails, canyons, water holes, and campgrounds. Yet, the subject of outdoor "etiquette" is often neglected. We're reluctant to examine our personal behaviors, least of all in wildlands where to many, a sense of freedom is paramount.

RESPECT OTHER VISITORS AND PROTECT THE QUALITY OF THEIR EXPERIENCE.

We can choose to maintain a cooperative spirit in wildlands. Our interactions should reflect the knowledge that we can and do rely on each other when mishaps occur. More often than not, our experiences ultimately depend on our treatment of others and their attitudes toward us. Although our motivations and sense of adventure vary, there's always room on the trail for more people with open minds and generous hearts.

BE CONSIDERATE *of Other Visitors*

YIELD TO OTHERS. It's often the little things that are most important. Simple courtesies—such as offering a friendly greeting on the trail, wearing earth-toned clothing to blend in with the scenery, stepping aside to let someone pass, waiting patiently for a turn, or preserving the quiet—all make a difference.

Show your respect to native people who live in the Southwest. Be friendly, unobtrusive, and self-sufficient. Take note of tribal land boundaries, ask permission to cross private lands or to photograph the people, and obey special laws and restrictions. Uphold voluntary closures of public lands for Native American religious ceremonies.

Likewise, don't disturb the livestock or equipment of ranchers, anglers, loggers, trappers, miners, and others who derive their income from the permitted use of public lands. Leave gates open or shut, as you find them.

Groups leading or riding livestock have the right-of-way on trails. Hikers and bicyclists should move to the downhill side, remain visible and talk quietly to the riders as they pass, since horses and other pack animals frighten easily. You may even want to take off your pack if horses or stock are skittish.

Stay in control while moving quickly whether you are

jogging or riding a mountain bike. Before passing others, politely announce your presence and proceed with caution.

KEEP A LOW PROFILE.

Take rest breaks a short distance from the trail on durable surfaces, such as rock or bare ground. If the vegetation around you is thick or easily crushed, pick a wide spot in the trail. Camp away from trails and other visitors.

LET NATURE'S SOUNDS

PREVAIL. Avoid the use of radios, electronic games, bright lights, and other intrusive devices. To some, technology is a necessity even in wildlands. To others it's inappropriate. Avoid conflicts by making a conscious effort to allow everyone his or her own experience.

Some outdoor activities are necessarily loud. For example, the discharge of firearms can be heard for miles. As much as possible, keep the noise down, especially at night or in remote areas. Sight-in rifles on the firing range. Teach dogs to be quiet. Wear headphones to listen to music. Use cellular phones discreetly. Most of all, tune in to the sounds of nature.

For us the wilderness and human emptiness of this land is not a source of fear but the greatest of its attractions. We would guard and defend and save it as a place for all who wish to rediscover the nearly lost pleasures of adventure, adventure not only in the physical sense, but also mental, spiritual, moral, aesthetic and intellectual adventure.

-Edward Abbey

Once considered a place to avoid because of its harsh environment, hordes of people now migrate to America's desert and canyon country to ride bikes, tour national parks, drive jeeps, float down rivers, examine ancient ruins, or climb in pastel-colored canyons.

We are part of these hordes. Like thousands of others, you and I visit the desert because we need wild places. We need wild places to have an adventure. We need them to be eclipsed by the beauty and sheer power of wind, water, rock, and the tenacity of life. Walking under towering walls of creamy sandstone or through forests of twisted saguaro, we slow the pace of our lives and gain perspective on the things we truly value. We feel, live and are refreshed by the magic of the natural world.

But our need for refreshment and adventure is not without consequence. The plants and animals that flourish in America's deserts and canyons evolved over millions of years to withstand blisteringly hot days and frigid

nights, not the onslaught of humanity. Arid lands are fragile lands. A single footprint in cryptobiotic crusts may take 50 years to recover. A path through desert pavement may be obvious for a thousand years. America's deserts, as harsh and forbidding as they may appear, are suffering as a result of their popularity.

Once marred, the rock and ruins found in the desert won't grow back. Even the plants take a long, long time to recover from heavy hands. For many wildlife species, reproduction depends on unimpeded access to clean water. For many people, a sense of desert magic comes from blue skies, silence, and lots and lots of lonely space.

Those of us who feel the desert is like no other place on earth have a special responsibility to protect it. We need to make the ethical choice to Leave No Trace because it is a good and right thing to do, not because laws or rules tell us to. We need to make this choice to ensure that there are seemingly untouched places for ourselves and our children to explore.



Joshua tree

A FEW TERMS *Defined*

cryptobiotic soil crusts or cryptogam:

Living cryptobiotic soil “crusts” containing mosses, lichens and algae.

desert pavement: A smooth veneer of varnished rocks embedded in the soil.

established campsite: Campsite made obvious by devegetated ground or “barren core.”

invasive species: Plant or animal that aggressively out-competes native species.

pristine: A place where signs of human impacts are absent or difficult to detect.

social paths: Paths created by traveling on non-durable surfaces between campsites and other sites of interest.

switchback: A section of trail forming a zigzag pattern up a steep hillside.



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Tread Lightly!, Inc. 1-800-966-9900, www.treadlightly.org.
www.wilderness.net.

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Cover Photo: Carl Yarbrough Photography

A FINAL Challenge

Humans need to know about wild places, to experience them and understand the rhythms they follow. We need to contemplate our place within these wildlands, to discern what it is that draws us there. We need to carry with us an ethic that recognizes the value of wild places, and acknowledges our responsibility to treat them with respect, and apply good judgement as we visit and travel within them. We need to care for wild places as if they were our homes because, in many ways, they are. To do this is good for us, it's good for those who will surely follow, and it's good for the wild places, wherever they may be found.

Contact land management agencies and groups in your area and see how you can help. Be active in the planning and management of areas that are important to you. Volunteer for trail clean ups and maintenance, habitat restoration efforts, and public education programs, or organize them for your local area. Get involved and let your opinions on land use be known. Support wildlands and sustainable recreation.

Information on obtaining Leave No Trace curriculum materials, courses and trainings is available by calling 800-332-4100 or visiting the extensive Leave No Trace website: www.LNT.org.

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