Subject: Group Travel; On- and Off-Trail

Catchy Title:

Presenters Name:

When to teach this topic: This should be taught on the trail during the first part of the day and at the first pack off break before the group goes off the trail.

Who is this for (level of experience and age of participants): for those interested in the outdoors from 6th grade on.

Resources:
- NOLS – Soft Paths book
- LNT Teaching book – in class resources and for use at the Expeditionary
- Leave No Trace webpage - http://lnt.org/
- Web research
- Other:

Materials needed:

Outcomes: Things for you to know and teach so that all participants will be able to know and do each following bullet by the end of this lesson.

- Leaders will understand the LNT practices associated with traveling on-trail and off-trail and how to teach them. Topics include walking through versus around puddles, preserving switch backs, etc.

- Leaders will know when it is appropriate, necessary, and how to hike off trail with a group.

- Leaders will understand the verbal and visual impact of large groups on others and how to avoid these.

- Leaders will know how and why to go off-trail to take a long break.

- Leaders will know how to teach basic aspects of LEAVE NO TRACE regarding trail and off-trail travel to participants.

- Leaders will understand that different ecosystems are treated differently when traveling off trail. They will understand mountainous versus coastal areas.
**Introduction/Hook:** If you are going to take a horse to water...make sure it’s thirsty. Make sure you are doing this at a time when the participants need this information and are ready to hear it (are people warm, hydrated and well fed?). Make sure that you HOOK them in... ie. why do they need to know this information NOW?.

**Very short activity/introduction:**

**Procedures & Activities:** Steps, e.g. models, structured practice, guided practice, independent work. Include time allotments for all steps in each section. Usually 5-10 minutes per section. Timing is very important.

Explain & Demonstrate:

- Step 1 __ minutes
- Step 2 __ minutes
- Step 3 __ minutes
- Step 4 __ minutes

Practice (individually if appropriate):

**How to Assess each individuals skills:**

**Closure/Evaluation:** How will you close the lesson? How will the students remember what they learned today? Homework? Summary? Quiz? When? Usually allow at least 5 to as much as 10 minutes for this section.

**Evaluation:** Analyze the strengths and weakness of the lesson as it actually happened. Include things to avoid next time you teach the lesson, and what went particularly well. How was the timing of the lesson?
The Case for Minimum Impact

From the Appalachian Mountains in the eastern United States, to the deserts of Baja California, to the high peaks of California's Sierra Nevadas, and to the remote coastlines of Alaska, the story is the same: User impact is spreading faster than land managers can control it. People visit the backcountry because they both value and enjoy it, but in the words of one observer, "We are loving our wilderness to death." The following scenarios are typical:

- During a single night, as many as one thousand people have camped in one valley of California's San Gorgonio Wilderness.
- Campsites in the Boundary Waters Canoe Area of Minnesota have suffered an 80-percent loss of vegetation.
- So many hikers have traversed the Old Bridle Path up New Hampshire's Mount Lafayette that the trail has eroded into a gully four feet deep, prompting trail crews to call it the "Old Bridle Trench."

Recreational use of America's wildlands has exploded in the past forty years. Much of this increase occurred in the sixties when backpacking first became a major fad, but wilder-
ness use has continued to grow. In 1974, total wilderness visitation equaled approximately 7 million visitor-days (a twelve-hour stay by one person). Today our wilderness lands host close to 20 million visitor-days per year.

As the number of backcountry visitors grows, the responsibility to the land changes. No longer is it enough to simply pick up litter and extinguish matches. These efforts help, but wilderness is more than just an unspoiled environment. We need to be concerned about two dimensions of recreational impact: damage to the integrity of the land and injury to the wilderness experience of others.

**Solution by Default**

In his book *Basic Rockcraft*, Royal Robbins says, “A simple equation exists between freedom and numbers: the more people, the less freedom.” Today, this maxim guides many public land managers in their attempt to strike a balance between providing free and unconfined access to backcountry recreation, and protecting the same recreation.

In 1991, researchers at Manning Park were doing a research project. They found that the length of stay and number of people using the area had reached a critical point. In addition, they found that the total number of permit applications had increased by 300 percent in just five years.

The lands managed by the Land Manager had become restricted to a few, with more restrictive regulations. The trend at all ages had been to look for more secluded areas. They found that the Gorge Wilderness area was too crowded and that individual parties per day were limited to 30.

Sometimes, they would come to the area who valued solitude. Yet, the same area was where to camp. They sought the solitude of the wilderness, relief from a restless society.

The underlying damage to wilderness is a malice. In fact, it is more caring groups that are anxious to do the fallen short.

**The Path to a Minimum-impact approach to caring...**

Since 1965, recreational use of wilderness has grown nearly 400 percent, resulting in impact not only to the environment but to the wilderness experience as well. BILL PETERSON
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In 1991, researchers Jeff Marion, Joe Roggenbuck, and Bob Manning asked National Park Service managers what they were doing to minimize impact problems in the backcountry. They found that more than half of all parks limited group size and length of stay, and required that overnight visitors have permits. In addition, approximately 40 percent restricted the total number of people allowed to enter the backcountry.

The lands managed by the Forest Service, the Bureau of Land Management, and the Fish and Wildlife Service have few restrictions on their use than national parks, but the trend at all agencies has been toward more regulation. One need not look far for examples. Managers of the Linville Gorge Wilderness in North Carolina allow a maximum of thirty individuals per day to enter the area. In Yellowstone National Park, users must obtain a permit before hiking into the backcountry, and campsites are designated. Only seven parties per day are allowed to launch on Idaho’s Middle Fork of the Salmon River.

Sometimes such restrictions are unavoidable. But often they come too late, after the damage is already done. No one who values wilderness wants to see these lands suffer more abuse. Yet is the only solution to tell users how to camp, where to camp, and how long to stay? Many of us, after all, seek the solitude and freedom of wildlands as temporary relief from a restrictive society.

The underlying premise of this book is a belief that most damage to wildlands is the result of lack of education, not malice. In fact, it would be difficult to find a more intelligent, more caring group of individuals; most backcountry users are anxious to do the right thing. Yet good intentions alone have fallen short.

**The Path to a Wildland Ethic**

Minimum-impact backcountry use is a hands-on, practical approach to caring about both the land and the people who
share its richness. Its success hinges on the willingness of the individual user to learn, to think, and then to commit knowledge to action. The resulting techniques are flexible and tempered by judgment and experience. They depend more on attitude and awareness than on rules and regulations. As individuals and organizations, we must care enough about the land to be willing to change our techniques and attitudes about what is appropriate behavior in the outdoors.

"Rules are for fools," NOLS founder Paul Petzoldt used to say. But Petzoldt wasn’t advocating anarchy. He was reminding users that the most successful approach to being light on the land is to use good judgment, not to follow a set of rules blindly.

The Leave No Trace (LNT) program expresses the essence of minimum-impact camping in six basic principles:

- Plan ahead and prepare.
- Camp and travel in durable areas.
- Pack it in, pack it out.
- Properly dispose of what you cannot pack out.
- Leave what you find.
- Minimize use and impact of fire.

These principles are interwoven throughout the pages that follow and serve as guidelines that can be returned to time and again when trying to make ethical decisions about wildland use. The minimum-impact techniques described in this book are adaptable to changing conditions. Visitors must consider the variables of each backcountry decision—the soil, the vegetation, the wildlife, moisture, the amount and type of use the area receives, individual and group abilities, and the overall effect of their own use—and then use their judgment to determine which practices to apply.

"A step-by-step LNT rule book can never and should never be written," says Rich Brame, the NOLS outreach and training manager, who administers the educational side of the LNT program. "We do not seek to dictate anyone’s actions or ethics. We strive to tap users’ obvious love of the backcountry and challenge them to impact techniques."

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The practices outlined by the LNT principles demonstrate ways we can care for our wildlands, but more important, they point to a larger relationship that is the inevitable goal of any land ethic. Perhaps this relationship is best expressed in the beliefs of an old Eskimo man, related by the arctic explorer Knud Rasmussen: "His philosophy of life was to the effect that we human beings know so very little of life and its controlling forces that we have an imperative duty, not only to ourselves but also to those we hold dear, to live as carefully as possible . . . ."

By accepting responsibility for our remaining wildlands, we may take even better care of all of Earth's landscapes.
2

Backcountry Travel

Examine the gear of someone who is about to embark on a backcountry journey, and you are likely to find organized piles of lightweight equipment—everything from maps with trimmed borders to a toothbrush with a shortened handle. Why such fastidious organization? Because a successful trip depends on careful preparation and bringing just the right equipment.

These days, thoughtful backcountry visitors are asking another question: How can I travel through wildlands so that I make as little impact as possible? Many are learning that the same care and planning that contribute to a successful journey also serve to minimize disturbance to other visitors and the environment. If backcountry travelers find themselves wet and cold without the necessary equipment or clothes, they may be forced to build a large, environmentally destructive fire to stay warm. Visitor safety is clearly the priority, but careful planning often precludes unnecessary impact.

Methods of wildland travel vary greatly, but with a few exceptions, motorized recreation is either prohibited or impossible (or both). Hiking, horseback riding, and boating
are the primary modes of transportation for most visitors. Although many of our recommendations apply to all methods, this chapter looks primarily at how to reduce the impact of the most frequent mode of backcountry travel: hiking. Later chapters deal with the specifics of travel with pack stock and boats.

The Impact of Hiking
A superficial look at the numbers raises doubts about whether there really is an impact problem caused by backcountry travelers. Although wilderness areas are visited by millions each year, use intensity averages only about 0.2 visitor-days per acre annually. That’s less than a single three-hour visit by one person—not much compared with other kinds of land use. Yet according to a 1980 survey of land managers conducted by researchers Randy Washburne and David Cole, crowding was a problem in more than half of all wilderness areas. Why are so many managers complaining of crowding if visitor use is so low?

Visitors don’t distribute themselves evenly across our wildlands. Most use is concentrated in a few specific places in a few specific wilderness areas. In fact, more than half of all wilderness use occurs in a mere 10 percent of the total 100 million acres of designated wilderness. Similarly, in most wilderness areas, over half of all use occurs on only about 10 percent of the trail miles.

Visitation is also unevenly distributed over the course of the year. Certain seasons tend to be popular; others see little use. Weekend and holiday use is also high. In Yosemite National Park, for example, wilderness use on Memorial Day weekend is five times as great as on the weekends that follow. With this in mind, it is easy to see why crowding is a problem in many wilderness areas.
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Weekend and holiday use is high in many backcountry destinations. In Yosemite National Park, for example, wilderness use on Memorial Day weekend is five times as great as on the weekends that follow. - Anne Austin

Examining why so few acres are favored is even more revealing. The popular spots are often close to population centers—areas with easy access, scenic views, or attractions such as good fishing or pleasant camping. Researchers have learned that within these areas, people generally prefer to go where others have traveled; most often this means following a trail.

The Trail Dilemma
Why do people concentrate on trails? Sometimes travel off established trails is prohibited or impractical, perhaps even dangerous; sometimes visitors just like the familiarity and ease of following constructed paths. Whatever the explana-
tion, we users are profoundly affecting the areas we like the most. Trails may be a small part of the wilderness acreage, but they are crucial to our wilderness experience because we spend most of our time along them.

But trails are declining in number. In the 1930s, our national forests had 132,000 miles of trails; today there are fewer than 100,000 miles. The reasons for the decline are many. The primary one, however, is that land managers de-emphasized trails when fire control and timber harvesting became increasingly mechanized. As a result, road mileage increased while the number of trails declined. Today, although our national forest backcountry has 25 percent fewer trails, the public's use of trails has grown steadily. For every person hiking a trail in 1960, more than three people now leave their bootprints.

Increased trail use has prompted more than half of all wilderness managers to list human-caused soil erosion and injury to vegetation as major problems on trails. The next most

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Increased trail use has prompted more than half of all wilderness managers to list human-caused soil erosion and injury to vegetation as major problems on trails. The next most widespread trail problem is erosion caused by horses, mules, burros, and other pack stock. Although only 11 percent of all parties entering the wilderness use pack animals, pack stock damage on or near trails is considered a problem in almost half our wilderness areas.

Today, new trails are mostly wishful thinking, and existing trail maintenance budgets have been cut back severely. Some land managers have recommended increased off-trail use in the belief that visitor impact will spread more evenly throughout the backcountry, resulting in less damage to established trails. But cross-country travel has proven no panacea, say its opponents; indeed, the worst nightmare for these managers is a backcountry that looks in its entirety like their most heavily eroded trail. They point to how thoughtless off-trail use in New Hampshire's White Mountains resulted in having to limit travel strictly to trails. By 1977, surrounding alpine vegetation had suffered so much from cross-country use that scree walls were needed on both sides of a path to keep hikers confined to the trail.

As a user, you're often faced with a choice: Should you travel off-trail or on-trail? Our answer is that depending on
local regulations, your evaluation of the land, and your skill in minimum-impact techniques, either choice can be appropriate. Although heavy use of existing trails does increase contact with other visitors, staying on them is a good way to avoid disturbing fragile areas. When trails are well designed and maintained, they can accommodate a great deal of use and minimize impact—particularly in popular areas.

There are times, however, when cross-country travel is appropriate. Highly skilled travelers can often minimize their impact by choosing an off-trail route, but they have to be willing to exert special care. The message is clear: The user must carefully consider the trade-offs when deciding whether to travel by trail or cross-country.

**Traveling on Trails**

Even traditional, well-established trails can suffer abuse. Problems surface when they receive too much traffic or when hikers walk out of the established tread. Properly designed and maintained trails rarely suffer if visitors simply stay on them. But not all trails are well designed or properly maintained. What happens when they deteriorate, and how can we minimize the damage?

The major environmental problems with trails are erosion, muddy stretches, and the development of informal trails. Most often, the solutions to erosion and muddiness are effective trail location, engineering, and maintenance. These are the responsibilities of the wilderness manager. Still, there are several things visitors can do to avoid contributing to further damage.

When following existing trails, walk single file and stay on the path. This is an important part of concentrating impact. Walking outside the tread—for example, traveling abreast or trying to avoid rocks or mud—breaks down the trail edge and widens the path. Such behavior also leads to the development of multiple trails, which scar some of our most beautiful meadows. Staying on trails is sometimes difficult when conditions are wet, yet this is when they are the most susceptible.
throwing brush or logs across them to block hiker access. If an
established switchback is impassable because of erosion or
mud, walk on hard surfaces (such as rock, sand, or snow) as
much as possible, and notify the managers responsible for that
area. You may be surprised what action a few voices of con-
cern can bring.

Another major trail impact caused by hikers occurs when
they encounter other visitors. The result: less solitude for both
your group and the other party. Encountering others often
detracts from the user’s wilderness experience. The impact of
this situation can be lessened if you follow a few simple tech-
niques. Unless regulations prohibit it, take breaks some dis-
tance off the trail at a durable stopping place, preferably out of
view. Durable stopping places include rock outcrops, sand,
other nonvegetated places, and sites with resistant vegetation,
such as dry, grassy meadows. Here you can enjoy more nat-
ural surroundings, and other parties can pass by without
noticing you.

If you do meet other hikers on a trail, move off to one side
and stop; continuing to walk at the edge widens the trail.
When you meet a horse party, allow it plenty of room, as
horses can frighten easily. Your entire group should move off
to the same side of the trail, preferably the downhill side, and
stand quietly until the horses pass. It’s easier for the wrangler
to control a spooked horse if it bolts uphill rather than down-
hill. Sometimes it helps if one of your party talks in a low
voice to the first rider to give the horses advance notice of
your presence.

**Traveling Cross-Country**

Leaving the trail allows you to explore the 90 percent of wild-
lands not accessed by most backcountry visitors. Off-trail
travel can be difficult, however, and is not for everyone. In
particular, it is not for those who are unable to leave minimal
traces of their passage—those who hike in large groups,
choose routes over fragile ground, or travel with large num-
ing damage. Spend as much time as possible on durable surfaces such as bare rock, sand and gravel, snow and ice, the deep duff of the dense forest floor, and other nonvegetated surfaces. Watch where you put your feet—try to step on as few plants as possible. Travel in small groups of no more than four to six people, and when not on a hardened surface, spread out rather than follow the same route and create a path. Where places are so fragile that even the passage of one person leaves a trail, it is better to walk single file so that only one lane is created. Although this may be the best you can do under some circumstances, challenge yourself to find routes that avoid such impact.

Why all this concern for avoiding plants and unstable soil and minimizing the trampling any one place receives? Most plants die if stepped on more than a few times, and unstable soils start eroding even with light trampling. Once these processes begin, the impact accelerates quickly. An obvious path soon attracts others; footsteps on top of yours kill more plants and displace more soil. Trails develop where they are not wanted. Without the careful route selection and maintenance of constructed trails, informal trails erode into permanent trenches that continue to deteriorate even without use. When these trails finally become too difficult to use, cross-country hikers move away, initiating trails elsewhere.

Studies show that for many types of vegetation, just twenty-five people per year walking along the same route leave a discernible path. Even where effects aren’t immediately obvious, trampling alters plant communities, changing them in subtle ways. Damage begins with injury to plant tissues; through loss of leaves or stems, plants lose their ability to photosynthesize food. Growth slows, and plants produce fewer flowers. Reproduction declines. Plants that are most susceptible to damage become less common, and once trampling reaches levels where all plants are affected, barren areas develop.

On steep terrain, it’s generally less damaging to walk on rock or snow. In the eastern mountains, however, even walk-
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You create less damage ascending steep soil-covered slopes than you do descending. Boot heels carry extra force when moving downhill, and this increases erosion. If slopes are so steep that it’s necessary to dig toes and heels deeply into the surface to get a grip, some other route should be taken, if possible. Sometimes all that is necessary is to switchback your way down the slope. Spreading out on steep slopes also reduces damage. When descending loose scree, move slowly and cautiously. Rapid descents can be fun, but they move sizable quantities of scree downhill, causing erosion that would take years to occur under natural conditions.

Many of us know of places that were once little-known destinations but today are reached by webs of informal
trails—the all-too-frequent result of cross-country travelers not treating pristine areas with the care they require. These places will continue to deteriorate if they receive further concentrated use. But they still have the ability to recover if they are given a rest. Shun places where user-created trails are developing, and stay off trails that managers have closed. Either go someplace else or spread out and stick to routes that show no evidence of previous use.

**Respecting Wildlife**

The backcountry is the home of many different animals, from soil invertebrates to frogs, birds, deer, and bears. Although the potential impact of wilderness visitors on these animals varies, the principle remains the same: Respect their needs for food, water, and a secure home, and minimize the disruption of their lives. (It may be difficult to apply this principle to mosquitoes, when more than an occasional impact may be necessary.)

For most visitors, the kind of wildlife disturbance that is the easiest to avoid is that which attracts animals, causing them to lose their wilderness. When Ron Rau, an Alaska biologist, reports that wolves chase pickup trucks because oil pipeline workers toss sandwiches out of windows, it's easy to criticize such behavior. Backcountry visitors, however, are often equally at fault. When a bear ransacks a camp in the Great Smoky Mountains or Yosemite National Park because someone carelessly left food lying about, the effects of wildlife disturbance hit home.

Wolves and bears may be the most glamorous animals attracted to food, but they aren't the only problem. Careless scattering of food scraps attracts ants, which have become a nuisance at many desert campsites. Some birds—such as gray jays, which are nicknamed "camp robbers" in many wildland camps—and most rodents are also attracted by food scraps, food handouts, and even food left unprotected in packs or in tents. Camp-marauding raccoons are a problem at many campsites in the eastern states. Loss of food, damage to equip-
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Although attracting animals is an obvious problem, some of the most serious visitor impacts on wildlife are more difficult to detect. Few of us realize that camping near a water hole in the desert keeps bighorn sheep away. If the bighorns don't get enough water, or if they move to less productive habitat, they will be less healthy and less likely to reproduce. Ultimately, populations will decline. We also alter the habitat of smaller animals when we disturb vegetation, alive or dead. Many small mammals and birds live in shrubbery, standing snags, and downed wood that are disturbed when campsites are trampled or firewood gathered.

Unintentional, seemingly innocuous disturbances of animals, such as encountering them along the trail or camping close to a nest or den, can have severe effects—particularly on large mammals and birds. The animals often react with excitement, alarm, and even flight, all of which consume energy needed for growth and reproduction. Animals that are healthy, well fed, and able to escape are more capable of withstanding disturbance than those that are underfed, highly parasitized, weakened by severe weather, nesting, or giving birth.

Sometimes animals seem unconcerned even when approached closely, whereas other times they disappear in a flash when you come in sight. Animals tend to be disturbed by unexpected and unpredictable events; quick movements and loud noises are particularly stressful. Animals that are regularly disturbed by visitors are more likely to tolerate your intrusion than those that have had little previous contact with humans. In Yellowstone National Park, for example, elk that live close to the
town of Mammoth Hot Springs typically do not flee until
cross-country skiers get within fifty feet. In more remote parts
of the park, however, elk take flight when skiers are as much
as a quarter mile away. Studies elsewhere have shown that
hikers who stayed on trails disturbed marmots less than those
who left the trails.

Animals are particularly vulnerable to disturbances that
are reminiscent of interactions with predators or that block
their escape routes. For example, a person suddenly appearing
over a ridge will cause bighorn sheep to flee, yet humans
approaching from below are often watched with little concern.
When dogs accompany those people, however, the level of
disturbance becomes severe.

To be fair, we don’t always know how stressful it is to
cause an animal to flee. Sometimes they simply return a little
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numerous situations where rapid escape is clearly harmful.
Flights of pregnant animals have caused miscarriage. There
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have shown how frightened adult birds have either aban-
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Subtler consequences of flight have also been docu-
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What can you do? First, don’t come with unrealistic
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town of Mammoth Hot Springs typically do not flee until cross-country skiers get within fifty feet. In more remote parts of the park, however, elk take flight when skiers are as much as a quarter mile away. Studies elsewhere have shown that hikers who stayed on trails disturbed marmots less than those who left the trails.

Animals are particularly vulnerable to disturbances that are reminiscent of interactions with predators or that block their escape routes. For example, a person suddenly appearing over a ridge will cause bighorn sheep to flee, yet humans approaching from below are often watched with little concern. When dogs accompany those people, however, the level of disturbance becomes severe.

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What can you do? First, don't come with unrealistic expectations of close encounters with wildlife. Make it your
goal to observe animals in their habitat, rather than on your terms. Second, learn about the animals indigenous to the place you’re visiting. Your appreciation of the area and your chance of seeing wildlife will increase, plus your knowledge will alert you to the times of year (particularly birthing seasons) and places (nest sites, watering and feeding grounds) where disturbance is most critical. Armed with this knowledge, you can make informed decisions about where to travel and camp. Simple means of avoiding disturbance include observing animals from behind cover and at a distance, and collecting water from a spring but camping out of sight. Don’t continue to approach animals when you can tell they are aware of you. At this point, their behavior is being affected by your presence and stress is more likely. Give animals a particularly wide berth during the nesting and birthing season.

Finally, be fastidious about food storage and food scraps. Don’t pollute the animals’ homes or teach them bad eating habits. Store food in sealed containers whenever possible. Bearproof canisters are available for backpackers and can serve to protect all forms of wildlife from becoming habituated to human food.

Wildlife should be enjoyed, but remember that you’re entering the animals’ home. With knowledge, respect, and a lot of care, you can avoid adversely affecting them. As always, the need for care increases as you explore increasingly remote off-trail areas. These areas are the last bastions for truly wild species. You have the luxury of choosing to visit these places; wild animals have no place else to go.

**Keep in Mind**
Most backcountry visitors prefer not to encounter other people. In a study of visitors to two western wilderness areas, Forest Service researcher George Stankey found that people were most satisfied when they had no contact with others. In addition, he found that the type of visitor encountered was more important than the number of encounters. Most visitors are

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There are a few simple ways to minimize contact with other parties. Again, plan ahead and prepare. Whenever possible, visit the backcountry during seasons or days of the week when use is low. Avoid travel when the environment is particularly fragile or when animals are susceptible to disturbance.

Travel in small groups. Although large parties usually represent only a small percentage of total use, they can have a disproportionate impact on the experience of the people they encounter when traveling the backcountry. In Stankey’s study, most users, given the choice, preferred meeting ten groups of two to one group of twenty.

What is the optimal group size? Researchers admit that any optimum is arbitrary; still, most regard parties of more than ten or twelve individuals as large. A group size of at least four is optimal for safety reasons, especially when traveling off-trail. In case of sickness or injury, one person can stay with the victim while two people go for help. A group of four is also large enough for safe travel in grizzly country, while still being small enough to minimize impact on other visitors and the environment. Traveling in small groups is particularly important when moving off-trail.

Large groups can reduce their impact on other parties and the environment by hiking and camping in groups of four to six. For group activities such as classes, choose a durable site that is well hidden from trails and campsites, but then split up into smaller groups for cooking and camping. To reduce encounters, pay close attention to the planning element of the trip—consider off-peak seasons, and
avoid camping at popular destinations. Group size will vary whether people are hiking with friends, family, or organized groups, such as scouts. Each of these experiences seeks a sense of remoteness, so it is important to remember that even a larger group should choose to mimic the style of small groups to reduce both ecological and social impacts.

Whatever the time of year or the size of the group, whether on- or off-trail, always travel quietly. One exception, however, is in grizzly habitat, where it is imperative to make noise to avoid confrontations. But in places where you can travel silently, you’ll find that your senses are heightened in the still, slow pace found in wildlands. Such a setting is conducive to understanding more about the subtle rhythms and balances of nature. If you travel quietly, you will be more aware of your environment, wildlife will be less disturbed, and other visitors will appreciate the solitude.

To minimize the likelihood that others will see you and your camp, other than during hunting season, wear and carry earth-colored clothes and equipment, particularly tents. Although vivid yellows, oranges, and purples may be the hues of an alpine hillside in summer or autumn, bright human colors reinforce the feeling of crowdedness. Small objects, however, such as tent pegs or handkerchiefs, may not be visible and could be left behind if their color is muted.

Consider your route when selecting shoes. Always choose a hiking boot or shoe with comfortable yet safe support. Too often, inexperienced hikers pick a heavy, stiff-soled boot beyond the requirements necessary for the backcountry they plan to travel. One hiker, William Harlow, experimented with the amount of earth that was raised and exposed to erosion when a cleated hiking sole was pressed into wet soil. Harlow’s

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When hiking gentle country, consider using a light pair of footwear. Grandma Gatewood, the sixty-seven-year-old woman who hiked all two thousand miles of the Appalachian Trail three times, wore a pair of sneakers. Although such light shoes are not appropriate if you are carrying a heavy pack or hiking over boulders and snowfields, bring a pair of lightweight, smooth-soled shoes to slip into once a campsites is selected.

Carry out all of your litter, and on the way out—when your pack is light—pick up a little extra. Some hikers even reserve an empty pack pocket and a plastic bag for trash found on the trail. Allow others a sense of discovery by leaving rocks, plants, cultural artifacts, and other objects of interest as you find them. Enjoy an occasional edible plant, if it is not prohibited by law, but don't deplete the surrounding vegetation or disturb plants that are rare or do not reproduce in abundance, such as morel mushrooms and many edible lilies.

Traveling with dogs is prohibited in most national parks and increasingly discouraged in many other backcountry areas. A growing number of managers and users alike feel that a pet's place is in the home, not in our remaining wildlands. Arguments against dogs in the backcountry center on their tendency to chase wildlife, defecate in or near water sources, and harass other users when unrestrained. Where coyotes or wolves are found, another argument has recently surfaced: The tracks of a dog rob others of the certain knowledge that similar tracks may belong to resident wildlife. Yet many visitors feel that dogs have a place in the backcountry, especially if the owner accepts responsibility for minimizing the problems they may cause. One way to control a dog is to leash it or
load it with a pack. When heavy enough, a pack will keep a
dog close and restrains it from chasing wildlife. Dog feces can
have adverse impact on the backcountry. Remove them from
trails or campsites, and dispose of them as you would human
waste. Like a carelessly constructed fire, dogs can have
adverse effects and are certainly not necessary to the enjoy-
ment of a backcountry experience. Still, when handled in a
responsible manner, they are a comfort to many users and
need not be a problem.

Finally, whether you travel by trail or cross-country,
always keep in mind that someone else will be coming along
after you. Strive to make the effects of your passage through
the area invisible to them. This is the ultimate message of the
Leave No Trace program. We aren't alone in our wildlands,
and even though our impact may seem small, the overall
effect of our presence in wilderness is cumulative.

SUMMARY

Plan Ahead and Prepare
• Choose a route appropriate for your goals and out-
door skill level.
• Plan your trip for the off-season or a weekday to
avoid peak user times.
• Select the proper equipment, footwear, and clothing
to allow you to travel safely and with minimal impact.

Camp and Travel in Durable Areas
• Follow established trails. Walk single file and stay on
the path to avoid creating a wider tread or new track.
• Travel in small groups.
• Spread out when traveling off-trail.
• Take rest breaks off the trail and out of view on
durable surfaces such as rock or sand, or places with
resistant vegetation, such as dry, grassy meadows.

Respect Wildlife
• Learn visitation times.
• Be fast clean.
• Don't they a:

Leave What Y
• Allow plants
as you
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  the path to avoid creating a wider tread or new track.
- Travel in small groups.
- Spread out when traveling off-trail.
- Take rest breaks off the trail and out of view on
durable surfaces such as rock or sand, or places with
resistant vegetation, such as dry, grassy meadows.

- Select off-trail routes that avoid fragile areas, particu-
larly wetlands, unstable slopes, and places covered by
shrubs or dense-leaved herbs and ferns.
- Stay off developing user-created trails to allow the
area time to recover.

Respect Wildlife

- Learn about animals indigenous to the place you are
visiting to be able to understand and avoid places and
times when disturbances are most critical.
- Be fastidious about animalproof food storage, and
clean up leftover scraps.
- Don’t continue to approach animals when you can tell
they are aware of your presence.

Leave What You Find

- Allow others a sense of discovery by leaving rocks,
plants, cultural artifacts, and other objects of interest
as you found them.
end. Pull the standing end of the rope to tighten the knot.
(a) **Group 1: lecture directions**
   Slowly read the instructions to the group twice. Do not use any rope.
(b) **Group 2: lecture/demonstration directions**
   Read the instructions and demonstrate the knot to the group. Do not let students touch the rope. Demonstrate it twice.
(c) **Group 3: group participation directions**
   Give each student a piece of rope. While reading the directions, help each student tie the knot. Allow each student two opportunities to tie the knot.
(5) When the groups are finished with their lesson, have them come together for “testing.” Have all students tie the knot simultaneously.
(6) In general, group 3 should do the best and group 1 the worst. Have the group sit down and discuss the results. “Process” the experience (as in a debriefing) until students discover the different teaching methods that were used with each group.
(7) Ask students to consider why some methods are more effective for teaching various types of subject and skills.
(8) Ask the group to discuss which teaching method they would use for each of the following: building a fire pit; the history of a local wilderness area; and the expediter behavior of a dishonest group member. Discuss the reasons students give for the methods they choose.

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**19. Trail Technique: Introductory**

I. **GOAL:** To have participants understand the introductory concepts of trail technique so they may hike efficiently, comfortably, and safely while minimizing the chances of getting lost.

II. **OBJECTIVES:**
   A. Participants will understand the concept of energy conservation and why it is important.
   B. Participants will be able to practice the skill of rhythmic breathing.
   C. Participants will be able to follow a variety of different types of trails.
   D. Participants will be able to define the roles of scout, smoother, logger, and sweep.
   E. Participants will be able to understand the factors of pace, eating, clothing, and environmental awareness while hiking.
   F. Participants will understand the importance of group organization while hiking.

III. **CONTENT:**
   A. **The Energy Conservation Concept**
      1. **What is energy conservation?**
         a. The use of as little energy as possible to accomplish the task as efficiently and comfortably as possible (e.g., the tortoise and the hare).
         b. The concept involves coordinating the heartbeat and breathing to regulate the pace rather than the reverse (i.e., establish the pace, and then regulate heartbeat and breathing).
         c. The degree to which energy conservation should be practiced is related to the objectives of the outing (i.e., if physical challenge is a primary objective, then energy conservation techniques may be used less).

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8. Ask the group to discuss which teaching method they would use for each of the following: building a fire pit; the history of a local wilderness area; and the expedition behavior of a dishonest group member. Discuss the reasons students give for the methods they choose.

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**19. Training**

I. **GOAL:** To have participants understand concepts of comfort and control of getting tasks done.

II. **OBJECTIVES:**
   A. Participants v conservation
   B. Participants v breathing
   C. Participants v types of trails
   D. Participants v smooth, log
   E. Participants v eating, clothing
   F. Participants v organization

III. **CONTENT:**
   A. The Energy Cycle
      1. **What is:**
         a. The pit
         b. The heat
         c. The show of fire
      2. **How to:**
         a. The steps
         b. The process
         c. The tech
2. What activities require energy conservation?
Any activity that requires above-average physical demands (e.g., high-altitude climbing, backpacking, day hiking, canoeing, kayaking, cross-country skiing, and snowshoeing)

3. Why is it important to practice energy conservation?
   a. Energy conservation minimizes changes in body temperature by decreasing perspiration.
   b. Elimination of fast starts and prolonged rests minimizes the fluctuation of heart beat rates.
   c. Increased endurance
      (1) Increased chance of arriving in camp without being exhausted
      (2) Energy is saved for emergency needs
      (3) Minimized chance of emotional outburst due to exhaustion and frustration
   d. Availability of less oxygen at higher altitudes may affect the brain, and therefore judgment.

4. How are the components of energy conservation used?
   a. Rhythmic breathing
      (1) Synchronize steps with breathing.
      (2) If breathing rate increases from increased effort, slow down the pace.
      (3) Develop a rhythm by coordinating the number of steps with the number of breaths.
         (a) On level terrain with a moderate load, take three large steps for every breath.
         (b) As the terrain gets steeper, the load heavier, or the oxygen thinner, shorten the step length and the number of breaths between steps
      (4) The objective is to maintain a comfortable pace and still make forward progress.
      (5) With concentration and practice, rhythmic breathing will eventually become second nature.
   b. Pace
      (1) Pace is one of the most difficult things for a leader or scout to master. There is a tendency to hike too fast, which tires
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      (5) With concentration and practice, rhythmic breathing will eventually become second nature.
   b. Pace
      (1) Pace is one of the most difficult things for a leader or scout to master. There is a tendency to hike too fast, which tires group members. A good leader exhibits patience and has the ability to hike at a pace appropriate for the whole group.
      (2) The pace is probably appropriate if:
         (a) A conversation can be held at all times while hiking.
         (b) The group can hike all day without occasional short rests and not be exhausted at the end of the day.
   c. Rest step
      The rest step is the point between steps where the skeletal structure provides support and gives the muscles a rest.
      (1) Walk as flatfooted as possible, preventing the tiring of calf and foot muscles.
      (2) Swing the foot up to the next step, lifting it no more than necessary. This saves on muscle exertion.
      (3) Lock the knee with each step by putting weight on the skeletal system and not depending on the muscles for support.
      (4) The steeper the terrain, the shorter the distance between steps and the longer the period of rest between steps.
      (5) Dipping the shoulder on the side of the lead foot takes the weight of the pack off that shoulder, allowing it to rest.
   d. Rest breaks
      (1) The objective should be resting to prevent exhaustion not because of exhaustion.
      (2) If it is difficult to make it from rest break to rest break, either:
         (a) The pace is too fast
         (b) The time between breaks is too long
      (3) How often and for how long should the group break?
         (a) Establish hiking/resting times (e.g., hike 30 minutes, rest 5) and stick to them for a couple of hours; modify if necessary.
         (b) Be sure to communicate to the group what the break times will be and stick to them. This gives weaker members
of the group a goal to work towards and something to look forward to.

(c) Depending on factors such as the group's physical condition, trip objectives, and the hiking terrain, hiking and resting times range from hiking 20 minutes and resting 5, to hiking an hour and resting 5 to 10 minutes. Again, remember to rest before becoming tired, not when the group is already tired.

(4) **Length of break**
Five minute breaks will minimize lactic acid buildup, a waste product of muscle activity. While this is a worthy goal, it is difficult to achieve. Whatever length of time is decided on, try to stick to it unless judgment dictates otherwise.

(5) **Where to break**
(a) Have the scout pick a site that is reasonably comfortable with an available water source. It is usually worth hiking an extra ten minutes or taking a break five minutes early to have a good rest break location.
(b) Have the group rest on one side of the trail and well out of the way of others who may come down the trail.

(6) **Starting and ending the break**
(a) Start the break when the last person gets to the break location.
(b) Be sure to communicate clearly how long the break will be.
(c) Announce to the group when one minute is left. Be sure the group understands that they should start putting on packs at this time.

(7) **Eating and drinking at breaks**
Encourage the intake of fluids and calories during breaks to replenish lost water and burned up energy.
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(7) Eating and drinking at breaks
Encourage the intake of fluids and calories during breaks to replenish lost water and burned up energy.

(8) Flexibility
Be sure to remain flexible. If a break needs to be taken early, take it. If the group needs extra time, give it to them. Don't be so tied to a schedule that the fun is taken out of the hike.

B. Trail Hiking

1. Tips for following marked trails
   a. Understand the importance of knowing where the group is at all times. Make sure the trail goes where it is expected to go. Keep comparing the map with the terrain.
   b. Learn to follow trail markers, blazes, and cairns. (Cairns are piles of rocks that mark a trail.) Trails can give a false sense of security and may not go where expected.
      (1) A season's growth of vegetation may cover up trail blazes.
      (2) Missing just one marker can be misleading and throw hikers off a marked trail.

2. Tips for following rarely-hiked trails
   a. Pay careful attention to map, compass, and terrain, since the trail may be overgrown with vegetation and not clearly identifiable.
   b. Watch carefully for trail markers, since they may be covered or missing.

3. Trail courtesy
   a. Move to one side and let other groups go by.
   b. Come to a complete stop and stand to the downhill side when encountering horses. Horses are very easily spooked by humans wearing backpacks. Speak softly to the horse packers and make the horses aware of the group's presence.

C. Miscellaneous Hiking Considerations

1. Hiking uphill
   a. Stand straight to maintain balance or improve the chances of being able to recover quickly if
footing is lost. Use the rest step as described earlier in this lesson.

b. Smaller steps conserve energy.
c. If obstacles are too large to step over easily, go around them.

2. Hiking downhill
   a. Injuries may be more likely to occur while walking downhill.
   b. Bend the knees slightly and use small, controlled steps to help resist the force of gravity that pulls the body forward.
   c. Try different ways of tying boots to help minimize friction and maximize comfort.

3. Contouring
   a. A less direct route with fewer elevation changes will help conserve energy, and may also be easier and safer.
   b. Judgment should determine whether contouring is the best option.

4. Clothing
   Rest breaks should be used to add or shed clothing and maintain a constant and comfortable body temperature. (See “Clothing Selection” lesson for a more detailed discussion of climate control.)

5. Low impact considerations
   a. Walking along the trail
      If at all possible, do not widen the treadway if the trail is muddy.
   b. Human waste disposal along the trail
      Along the trail, hikers should dispose of waste in catholes using the same guidelines as those discussed in the “Latrine Construction and Use” lesson.
   c. Trail litter
      In addition to packing out whatever was brought in, participants should be encouraged to pack out any other litter that is found along the trail. This is a good way to express stewardship and avoid hypocritical practices. This issue can be further addressed in the
footing is lost. Use the rest step as described earlier in this lesson.

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2. Hiking downhill
   a. Injuries may be more likely to occur while walking downhill.
   b. Bend the knees slightly and use small, controlled steps to help resist the force of gravity that pulls the body forward.
   c. Try different ways of tying boots to help minimize friction and maximize comfort.

3. Contouring
   a. A less direct route with fewer elevation changes will help conserve energy, and may also be easier and safer.
   b. Judgment should determine whether contouring is the best option.

4. Clothing
   Rest breaks should be used to add or shed clothing and maintain a constant and comfortable body temperature. (See "Clothing Selection" lesson for a more detailed discussion of climate control.)

5. Low impact considerations
   a. Walking along the trail
      If at all possible, do not widen the treadway if the trail is muddy.
   b. Human waste disposal along the trail
      Along the trail, hikers should dispose of waste in catholes using the same guidelines as those discussed in the "Latrine Construction and Use" lesson.
   c. Trail litter
      In addition to packing out whatever was brought in, participants should be encouraged to pack out any litter that is found along the trail. This is a good way to express stewardship and avoid hypocritical practices. This issue can be further addressed in the

D. Trail Logistics and Organization

1. Assigning trail responsibilities
   Stress the importance of trail organization. Split-up groups that can't communicate are a contributing cause of lost hikers.

2. Group size
   Optimal group size should be determined using the following considerations:
   a. Safety
      How many people can be safely organized and monitored?
   b. Environmental impact
      What group size will have the least amount of impact on the area?
   c. Social carrying capacity
      What group size will have minimal aesthetic and psychological impact on the group and other users?
   d. Managing agency policies
      Does the managing agency have regulations that will determine or influence group size?

3. Group roles
   a. Leader
      The leader may want to travel back and forth among the group to stay aware of how participants are feeling. The leader has overall responsibility for the group and ultimate decision-making responsibility.
      (1) The leader may determine:
         (a) Rest stop times and locations (with the logger's input)
         (b) Lunch stop time and location
         (c) When and where the campsite should be established
      (2) Stress the importance of communication between the leader and the group.
   b. Scout
      The scout sets the pace and consults with the leader to determine the route. The scout is obviously at the front of the line.
c. **Smother**
   When hiking off-trail, the smother improves the route which the scout selects.
   (1) The smother must stay far enough behind the scout to make this effective.
   (2) Judgment can dictate when and where a smother is necessary.

d. **Logger**
   (1) The logger notes all times of the day's activities.
   (2) This information can be used to develop future "Time Control Plans."
   (3) Generally, these times are reviewed during debriefings. The logger is responsible for having the times available at debriefings.

e. **Sweep**
   The sweep is the last person in line.
   (1) The sweep makes sure no one gets behind and that the pace is appropriate for the group.
   (2) The sweep makes sure the group does not get too spread out.
   (3) The sweep should communicate with the scout and leader in particular.

IV. **INSTRUCTIONAL STRATEGIES & MATERIALS:**

   **Timing**
   1. An introduction and overview of the topics in this lesson are appropriate on a morning early in the trip. Most of the material can be taught and reinforced on the trail using "teachable moments."
   2. Debriefings are an important means of reinforcing these concepts and gaining an indication of how well participants understand them and can practice them. The importance of debriefing the previous day's trail experiences cannot be over-emphasized.