# UNITED STATES DEPARTMENT OF AGRICULTURE

# FOREST SERVICE

# WILDERNESS RANGER HANDBOOK

 [INSERT REGION]

 [INSERT FOREST]

 [INSERT DISTRICT]

 [MONTH, YEAR]

Table of Contents

Intent and Acknowledgments

1 Wilderness History

1-1History of the Wilderness Concept

1-2Wilderness Legislation

1-3The National Wilderness Preservation System

2 Wilderness Management Direction

2-1Congressional Direction

2-1.1[Specific Provisions for Wilderness Areas on Your Unit]

2-2Department of Agriculture Direction

2-3Forest Service Direction

2-3.1Wilderness Management Objectives

2-3.2Forest Service Manual and Handbooks

2-4Management Plans

2-4.1[Status of Local Plan]

2-5Chain of Command

2-5.1Local Organizational Chart/Chain of Command]

2-6Relationships with Other Agencies

2-6.1National Park Service

2-6.2Fish and Wildlife Service

2-6.3Bureau of Land Management

2-6.4State Agencies

3 The Wilderness Ranger's Roles and Responsibilities

3-1Wilderness Living

3-2Base Stations and Barracks

3-2.1[Local Quarters Occupancy]

3-2.2Patrol Cabins

3-2.3Base Camp Check List

3-3Tool Maintenance and Use

3-4Stock Use

3-4.1Llamas

3-4.2Horses and Mules

3-4.3[Local Stock Policy]

3.4.4Stock First Aid]

3-5Wilderness Visitor's Permit

3-6Oufitter-Guide Camp Inspections

3-6.1[List of Local Guides, Outfitters and Permittees]

3-7Hunting Season Responsibilities

3-7.1Deer Tag Validation

3-7.2[Local Hunting Procedures]

3-8Data Collection

3-8.1Statistics Collection

3-8.2Recreation Information (RIM)

3-8.3Water Quality Testing

3-8.4Trail Log and Prescription Surveys

3-9Supervision

3-10Uniforms

3-10.1[Suggested Clothing List]

3-10.2[Local Uniform Policy]

3-11Law Enforcement

3-11.1Philosophy

3-11.2 [Local Regulations]

3-11.3Writing Citations

3-12End-of Hitch-Duties

3-12.1Administrative Reports

3-12.2Wilderness Rangers Meeting

3-12.3Rigs

3-12.4Tools and Equipment

3-12.5Stock and Tack Care

4 Safety

4-1Water Purification

4-2Hypothermia

4-3Thunderstorms

4-4Stream Crossings

4-5Bear-proofing

4-6Poison Plants, Insects and Snakes

4-6.1Ivy, Oak and Sumac

4-6.2Rocking Mountain Spotted Ticks

4-6.3Chiggers

4-6.4Black-widow Spiders and Scorpions

4-6.5Bees, Wasps, and Yellow Jackets

4-6.6Snakes

4-6.7[Local Poison Plants, Insects and Snakes]

4-7Trail Side Meetings

4-8Radio Procedures

4-9Vehicle Travel

4-10Search and Rescue

4-10.1Initiating Search and Rescue

4-10.2[Local Search and Rescue Procedures]

4-10.3Air Operations During Search and Rescue

4-10.4Patient Head Injury Report

4-10.5Transporting Patients

4-11[First Aid Supplement]

4-12[Aircraft Use and Safety]

4-13[Canoe and Kayak Use and Safety]

5 Visitor Contacts and Wilderness Education

5-1Public Contact

5-2General Information

5-3Minimum Impact Philosophy

5-4Trip Preparation

5-4.1Clothing and Equipment

5-4.2Planning

5-4.3Ethics

5-5Backcountry Travel

5-6Campsite Selection and Behavior

5-6.1Heavily Used Areas

5-6.2Remote Areas

5-6.3Site Selection

5-6.4Campsite Behavior

5-6.5Concentrate Activities

5-6.6Disperse Activities

5-7Campfires

5-7.1Firewood

5-7.2Site Selection

5-7.3Heavily Used Areas

5-7.4Remote Areas

5-8Waste Disposal and Sanitation

5-8.1Organic Garbage

5-8.2Nonorganic Litter

5-8.3Human Waste Disposal

5-8.4Waste Water Disposal

5-9Stock Use

5-9.1General Considerations

5-9.2Feed and Water

5-9.3Confinement

5-9.4Grazing

6 Interpretation

6-1Wilderness Information

6-2Earth Sciences

6-2.1 Geology

6-2.2Soils

6-2.3Rocks types/characteristics

6-2.4Water

6-3Climate and Weather

6-3.1Wind

6-3.2Precipitation

6-3.3Temperature

6-4Biological Sciences

6-4.1Fish

6-4.2Birds

6-4.3Mammals

6-4.4Plants

6-4.5Poisonous Plants

6-5Historical

6-5.1Native Culture

6-5.2Early Settlers

7 Site Maintenance

7-1General Considerations

7-2Firerings

7-3Removing Improvements

7-4Dishing by Stock

7-5Site Recovery

7-6Toilet Structures and Areas

8 Trails and Signs

8-1[Local Standard for Trails]

8-2Training

8-3Basics of Trail Maintenance

8-3.1Loose Rock and Root Removal

8-3.2Slough and Berm Removal

8-3.3Drainage Maintenance

8-3.4Maintain Waterbar

8-3.5Logging Out

8-3.6Brush Cutting

8-3.7Other Maintenance Activities

8.4Signs

8-4.1Sign Inventory and Specifications

8-4.2Post-mounting

8-4.3Sign attachment

8-4.4Wilderness Boundary Signs

8-4.5Sign Mounting Procedures

8-4.6Recording Signs

9 Other Responsibilities

9-1Fire Management

9-2Cultural Resources

9-4Training

9-4Additional Handbook Topies

10 Suggested Reading and References

10-1Laws, Regulations and Policies

10-2Books and Publications

10-3Other Materials

INTENT AND ACKNOWLEDGMENTS

Many wilderness managers and rangers have called for a Wilderness Rangers Handbook to provide guidance, direction and technical information. No single handbook could reflect the specific needs of our vastly different wilderness areas. However, to fill the need for such a document, this Handbook was created electronically to furnish generic material while allowing for specific information to be inserted at the local level.

This Handbook was written to be a guide only to accomplishing work and does not attempt to tell the manager or Wilderness Ranger how it must be done. Use this material as an "idea-jogger" and take liberal literary license to add or delete, information to meet local management needs. Therefore, use what you can, contribute what you need and share the knowledge with others.

This handbook was designed to be a pocket field reference guide for Wilderness Rangers measuring 5.5" x 8.5", printed on both sides and bound at the top or at the sides. (Two pages of this handbook can be printed on each page of 8.5 x 11" paper.) To facilitate this, a format ruler of 52 characters and a page length of 39 lines was used. For top binding, print the page number at the top and bottom of each page (using headers and footers in CEO, or pagination in desktop publishing). For side binding, adjust the margins to accommodate the plastic spiral binding. Periodically throughout the Handbook, brackets [] appear with capitalized text, where, local units can add material specific to their areas. "Text attributes" can also be used to place emphasis on important local concerns. Since artwork can not be transmitted electronically it is suggested that diagrams, forms or other artwork be inserted to add clarity to the text. The Handbook can also be reduced and printed on lightweight water resistant paper for increased durability.

Many individuals across a broad spectrum of backgrounds and Regions have contributed to this Handbook. I express my gratitude to those many units and writers who shared copies of their Wilderness Rangers Handbooks, especially Michael Olwyler of the Sierra National Forest who produced the electronic version that become the first draft of this Handbook. David Cole, Project Leader at the Intermountain Research Station, provided valuable information on low-impact recreational practices. David Michael, Wilderness Recreation Technician from Misty Fjords Wilderness in Alaska, compiled, rewrote and edited this document, while on detail to the Washington Office in February, 1990. But most of all, I'd like to thank that cadre of Wilderness Rangers whose love of wilderness and desire to share their knowledge exemplifies the true professionals they are.

ANNE S. FEGE

National Leader for Wilderness Management

Recreation Management Staff, Washington Office

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[INSERT LOCAL ACKNOWLEDGMENTS HERE]

WILDERNESS RANGER'S HANDBOOK

As a Wilderness Ranger you have a unique opportunity to help preserve our planetary environment and maintain healthy wilderness ecosystems. You will influence people to further this preservation effort by fulfilling management policies. You are essential. You are the most important person in carrying out the mandate of Congress written in the Wilderness Act of 1964 stating that wilderness "... shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness and so as to provide for the protection of those areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use as wilderness..."

As a Wilderness Ranger, you are the primary representative of the Forest Service in the field. In fact, you may be the ONLY one who knows the conditions throughout your area, and the only Forest Service representative the visitor ever meets. Because your experience is important, your comments and suggestions about the preservation of wilderness areas and the Wilderness Ranger's input toward that goal are needed. Your observations, reports and knowledge of the condition of the Wilderness, are essential for monitoring and planning priority work for subsequent years.

This Wilderness Ranger's Handbook is designed for patrols and work assignments related to National Forest wilderness management. It provides a quick and ready reference to information you will need in performing your day-to-day activities. More detailed information should be provided through training, background reading and your supervisor. The Handbook is designed to accommodate insertion of Forest Supplements, which should be provided to all Wilderness Rangers. This Handbook may be used as a reference guide, does not replace the "last word" of local management policy, since each wilderness (and often each unit within a wilderness) is different biologically and socially.

The goals of this Handbook are to improve field administration of wilderness; improve the quality of the wilderness, both biologically and socially; and provide better recreation opportunities for the public. This Handbook will provide both a baseline for the new Wilderness Ranger and improve the veteran Ranger's performance in the field and the office. It will also help reduce, but not replace, training time. All Wilderness Rangers will be familiar with the same guidelines to fulfill their unit's goals and tasks assigned them. Do not misconstrue the guidelines in this handbook as being the only way those goals can be accomplished. Read this Handbook at the beginning of your season, then meet with your supervisor to ask questions that occur while you're reading it.

1 Wilderness History

1-1History of the Wilderness Concept

Wilderness has always had special meaning for the American people. From the discovery of our land and through centuries of its development, wilderness has been part of our national culture and the character of our people. As America began its spread from the Atlantic to the Pacific, the land and its boundaries seemed limitless and were often used with careless disregard and abandon. Eventually, voices raised in protest. Slowly, toward the turn of the century, the idea of preserving some American lands began to take hold. Congress created Yellowstone National Park in 1872, the first national park in the world. Other national parks followed: Yosemite, Sequoia and Mt. Ranier.

Forest reserves, which later became National Forests, were set aside to be wisely managed or used. Yet, early in Forest Service history, there were also voices for preservation. In 1919, landscape architect, Art Carhart was asked to design a vacation home development at Trapper's Lake in Colorado. He also traveled that summer to the Quetico-Superior area in Minnesota and recommended that the best use for both areas was wilderness recreation. Young forester Aldo Leopold argued that some National Forest land be preserved without human influence, and was instrumental setting aside more than 500,000 acres in the Gila National Forest as a reserve for wilderness recreation in 1924.

Within 5 years, the Forest Service promulgated Regulation L-20, which defined primitive areas as those managed to maintain primitive conditions of "environment, transportation, habitation, and subsistence, with a view to conserving the value of such areas for the purposes of public education and recreation." Tighter regulations for primitive area management were formulated largely by Bob Marshall, Chief of the Division of Recreation and Lands, who had devoted much of his career and leisure time to wilderness preservation. These 1939 U-Regulations defined wilderness areas, wild areas, and roadless areas, all to be established by the Secretary of Agriculture or the Chief of the Forest Service.

1-2Wilderness Legislation

Out of the increasing demand for natural resources after World War II and the concern that the Forest Service could reverse administratively-designated wilderness came the first efforts to protect wilderness legislatively. Howard Zahniser, Executive Director of the Wilderness Society, drafted the first bill that was introduced in 1956. After 8 years, 65 different wilderness bills, 18 hearings, and considerable compromises with the grazing and mining interests, the Wilderness Act was passed by Congress and was signed into law on September 3, 1964. The 9.1 million acres of National Forest land set aside as wilderness areas became "instant wilderness."

Since then, there have been 81.7 million acres of wilderness designated by more than 100 wilderness bills. Among the more significant are the 1975 Eastern Wilderness Act, that allowed for small tracts of wilderness near major population centers. The Endangered American Wilderness Act established 16 wilderness areas that had been highly controversial. And the Alaska National Interest Lands Claims Act of 1980 designated about 50 million acres of wilderness in Alaska.

The process of designating land as wilderness continues in the political area, based on agency recommendations. The Forest Service reviewed the suitability of roadless areas in 1972 and, more comprehensively, in 1979. Statewide wilderness bills have passed for most states (except Idaho and Montana), designating wilderness and releasing other areas for multiple use. Some National Forest Plans contain further recommendations for wilderness. The National Park Service and Fish and Wildlife Service have recommended about 12 million acres, that Congress has yet to act on. The Bureau of Land Management is currently reviewing the suitability of lands it manages in wilderness study areas.

1-3The National Wilderness Preservation System

The National Wilderness Preservation System now spans 91.5 million acres, an area almost the size of California. It includes mountains and valleys, alpine lakes, wetlands, seashores, deserts, unusual geologic formations, wildlife habitat, streams and swamps. The largest is the 8.7 million acre Wrangell-St. Elias National Park in Alaska. The smallest is the 6-acre Pelican Island National Wildlife Refuge off the coast of Florida. The largest in the lower 48 States is the Frank Church-River of the No Return Wilderness in the National Forests of Idaho.

2 Wilderness Management Direction

2-1 Congressional Direction

The basic management direction for National Forest Wilderness was given by Congress in the Wilderness Act (P.L. 88-557). There are 7 sections, and the key phrases are:

Section 1. Statement of Policy

"(a) In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions... [there will be secured] for the American people of present and future generations the benefits of an enduring resource of wilderness... [T]hese shall be administered for the use and enjoyment of the American people in such manner as well leave them unimpaired for future use and enjoyment as wilderness..."

Section 2. Definition of wilderness

"(c) A wilderness, in contrast with those

areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpairied condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

Section 3. Classification of existing wilderness, wild or canoe areas

Section 4. Review primitive and roadless areas

Section 4. List of prohibitions

"(c) Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

Section 4. Special provisions

Existing use of aircraft or motorboats

Control of fire, insects and disease

Mineral prospecting, claims and leases (before December 31, 1983)

Authorization of water developments by

 President

Livestock grazing to continue

Commercial use of wilderness

Section 5. Access to state and private lands

Section 6. Acceptance of gifts or bequests of land

Section 7. Annual reports to Congress

Wilderness is thus recognized by Congress as requiring the above described attributes of naturalness, opportunities for solitude, and minimum size and may include other desirable natural features of scientific, educational, scenic or historical value.

Congressional Acts designating individual wildernesses may contain language specific to a wilderness. This specific language is not applicable to other units of wilderness, but applies only to that specific wilderness. If you work in a wilderness that was designated after the 1964 Wilderness Act, be familiar with any specific language in legislation that may differ from the 1964 Act.

2-1.1 [SPACE TO INSERT SPECIFIC PROVISIONS FOR WILDERNESSES ON YOUR UNIT]

2-2Department of Agriculture Direction

Management direction for the Wilderness Act is further interpreted through U.S. Department of Agriculture regulations. The Code of Federal Regulations, Title 36, Part 293, provides the following objectives for wilderness management by the Forest Service, a USDA agency.

"Except as otherwise provided in these regulations, National Forest Wilderness shall be so administered as to meet the public purposes of recreational, scenic, scientific, educational, conservational and historical uses; and it shall also be administered in such a manner as to preserve and protect its wilderness character. In carrying out such purposes, national forest wilderness resources shall be managed to promote, perpetuate, and where necessary, restore the wilderness character of the land and its specific values of solitude, physical and mental challenge, scientific study, inspiration and primitive recreation. To that end (a) natural ecological succession will be allowed to operate freely to the extent feasible; (b) wilderness will be made available for human use to the optimum extent consistent with the maintenance of primitive conditions; (c) in resolving conflicts in resource use, wilderness values will be dominant to the extent not limited by the Wilderness Act, subsequent establishing legislation or these regulations." (36 CFR 293.2)

Title 36, Sections 293.3 - 293.15 also deal with wilderness but are concerned primarily with allowable but non-conforming uses such as mining, grazing, structures, and so forth. Grazing is often the most controversial of the "accepted non-conforming uses" of wilderness and is allowed where grazing was permitted prior to establishment of the wilderness.

2-3Forest Service Direction

National direction for Forest Service wilderness management is provided in the Forest Service Manual (FSM), Chapter 2320. Sections 2320 through 2320.3 contain definitions, objectives and policy. The Wilderness Act (P.L. 88-577) and interpretations of the law by the Secretary of Agriculture and Forest Service, prescribe definite direction for wilderness management. They direct that wilderness will be managed to feature naturalness, opportunities for solitude, challenge and inspiration; and within these constraints to provide for recreational, scenic, scientific, educational, conservational and historical uses.

Regions can further define wilderness management policy in various supplements (blue pages) to the FSM 2320 section.

Exceptions allowed by the Act for non-primitive uses specified in Section 4(d) of the Act will be carried out under restrictions designed to minimize their impact on the wilderness. The decisive criterion in all conflicts will be to preserve and protect the wilderness character of the resource.

2-3.1Wilderness Management Objectives

The following objectives were established by the Forest Service to implement the Congressional directive for wilderness management to the Chief. They are outlined in FSM 2320.2.

1. Maintain and perpetuate the enduring resource of wilderness as one of the multiple uses of National Forest System land.

2. Maintain wilderness in such a manner that ecosystems are unaffected by human manipulation and influences so that plants and animals develop and respond to natural forces.

3. Minimize the impact of those kinds of uses and activities generally prohibited by the Wilderness Act, but specifically excepted by the Act or subsequent legislation.

4. Protect and perpetuate wilderness character and public values including, but not limited to, opportunities for scientific study, education, solitude, physical and mental challenge and stimulation, inspiration, and primitive recreation experiences.

5. Gather information and carry out research in a manner compatible with preserving the wilderness environment to increase understanding of wilderness ecology, wilderness uses, management opportunities, and visitor behavior.

2-3.2Forest Service Manuals and Handbooks

Direction for management of wilderness areas is found in Forest Service Manual and Handbook 2320, filed in each District and National Forest office. Forest Service Manuals contain definitions of terms used in wilderness management, authorities and responsibilities from the President to District Rangers, and policies and guidelines regarding wilderness uses and activities.

This is the most important written information on the direction that managers will take on the ground and applies to all wildernesses.

In the front of each manual or handbook is an index of titles and chapters. To find what you want check this first then refer to the section indicated. There are four colors of pages:

White is for national direction and applies to all National Forests in the United States.

Blue pages give regional direction and often are the most pertinent to on-the-ground work.

Pink pages are emergency directives issued by the Chief of the Forest Service, Regional Forester, or a Forest Supervisor as an interim mandate and expire one year from the date of issue or are incorporated as a supplement.

Green pages are Forest direction providing specific information for your area.

2-4Management Plans

Wilderness management is not an exact science. It is through implementation plans for individual wildernesses that the hierarchy of applicable direction, i.e., legislation, departmental regulation, and agency policy, is translated into action.

The Land and Resource Management Plans contain broad management directions for managing each wilderness. Ask for and read through the section of your Forest Plan that addresses wilderness.

A Wilderness Implementation Schedule (WIS) will be developed for each wilderness and will contain specific steps to accomplish the management direction that is provided in the Forest Plan. The WIS is developed with an interdisciplinary team and with public involvement. Lack of a WIS and unclear management plans can leave succeeding managers and wilderness rangers working in opposition to previous management direction.

The Wilderness Implementation Schedule is basically an action plan that lays out the activities, responsible staffs, schedule and resources needed over the next 5 years. All resource management activities should also be incorporated in the WIS, notably management of fire, wildlife and fisheries, range, minerals, resource inventories and recreation. The WIS will often identify the wilderness's unique inherent qualities and problems, and baseline data needed to provide information for comparing changes in wilderness condition.

2-4.1[ADD SPACE FOR STATUS OF LOCAL FOREST PLAN AND WILDERNESS IMPLEMENTATION SCHEDULE.]

2-5Chain of Command

The organization by which policy is executed is called the chain of command. In descending order, the chain of command flows from the Secretary of the Department of Agriculture to the Chief of the Forest Service, F. Dale Robertson. There are nine Regions in the National Forest System with Regional Foresters each providing management direction. Within each Region are a number of National Forests, each headed by a Forest Supervisor. Each Forest is made up of individual Ranger Districts.

From the District Ranger, the chain of command descends to the Resource or Recreation Officer (for the District), the Wilderness Unit Manager and to you, the Wilderness Ranger. There are various organizational schemes. On some Districts, the Recreation Officer answers to the Resource Officer or the Recreation Technician answers to the Fire Management Officer (FMO). Have a clear picture of your organization so you can use the proper chain of command.

2-5.1[INSERT LOCAL ORGANIZATIONAL CHART/CHAIN OF COMMAND]

2-6Relationships With Other Agencies

2-6.1National Park Service

The National Park Service (NPS) is an agency within the Department of the Interior. The NPS philosophy is very similar to Forest Service wilderness management philosophy, though regulations do vary. The purpose of national parks is to preserve outstanding areas of our country for the enjoyment of this and future generations. Similar wording is used in the Wilderness Act.

You are encouraged to become familiar with National Parks and Monuments in your area and, instead of feeling a separateness from them because they are administered by "a different agency," find the similarities and help to preserve all backcountry and wilderness area. Some wilderness areas are contiguous with NPS backcountry areas; an exchange of information is essential for proper management of both areas.

A few differences in regulations are listed below. There may be others particular to a specific area.

1. Pets are not permitted in National Park backcountry areas. Stock is permitted because they are not considered pets.

2. Some motorized equipment, such as chain saws, is permitted for administrative work.

3. Party size and length of stay may be different.

4. Hunting is not permitted within National Parks and Monuments.

2-6.2 Bureau of Land Management

The Bureau of Land Management (BLM) is another agency in the Department of Interior. It manages the largest acreage of land of all government agencies and collects the largest revenues, mainly through mineral leases. There are about 700,000 acres of designated wilderness and about 25 million acres of proposed wilderness areas on BLM land.

2-6.3Fish and Wildlife Service

The Fish and Wildlife Service (FWS) within the Department of the Interior manages about 18 million wilderness acres in Alaska on Wildlife Refuges, and less than a million acres in the lower 48 states. Little distinction is made for wilderness designation.

2-6.4State Agencies

State agencies are responsible for all wildlife on public land within the state. The Forest Service is technically responsible only for the habitat but works very closely with Departments of Fish and Game (DFG). You may be involved in hunter patrols with DFG officers or wildlife census with DFG biologists.

The State Departments of Forestry are responsible for forestry on state-owned public lands, rural fire protection and enforcement of forestry practice laws on private land. The Forest Service has mutual agreements to assist with fires on each other's land. You may be on a fire working next to a State employee.

There are also state wilderness areas that are administered by the Department of Parks and Recreation, notably to Adirondack Park Reserve in New York State.

3 The Wilderness Ranger's Roles and Responsibilities

The Wilderness Ranger's function is to carry out management direction on the ground by: maintaining wilderness facilities (a trail is a facility), collecting needed information, disseminating information to the public, monitoring use, demonstrating no-trace camping, and sharing observations with the wilderness manager. Most of the Ranger's major responsibilities are included in this Handbook.

As a Wilderness Ranger, you are also the "on-the-ground" information source, the necessary link between the office and the field. You are important if an emergency arises, because you are trained in first aid and carry a two-way radio. You are expected to handle dangerous situations with care and deal with law enforcement as you are trained. You are also expected to handle your equipment as if it were your own, taking good care of expensive radios and cameras.

Occasionally throughout the season you may be asked to work with other crews to do special projects. In other words, you will occasionally be asked to do some grunt work that may, at first glance, appear to be unrelated to the job you were hired to do. In the Forest Service, special projects are considered an important part of your job. In these times of reduced funding, we all try to pitch in and help each other meet mission goals. It is a great way to learn new skills, and work with people you might otherwise not meet. If you find yourself working on a special project, be sure to follow standard District safety practice.

You are constantly in the public eye, both on duty and off. Project an image of professionalism and pride in your work in the way that you were your uniform, pack your animals, or cut a log from the trail. Impressions that visitors form of Forest Service activities are shaped by your contacts with them, and so we expect you to be outgoing and competent.

3-1Wilderness Living

"Home is where you sleep at the moment." Unknown.

The selection of your campsite is extremely important. It will set an example for the visitor. Refer to Sections 5-4 to 5-9 for "leave no trace" practices. A few things to consider:

Should the site be located out of view for privacy? Much of the your time will be spent with the public and it's good to have some privacy.

Should the site be within view of the visitor? If there is an emergency, how will the visitor find the ranger? If anyone has a question, how will he get an answer? You must also consider theft and vandalism while you're out patrolling.

A site must be chosen that conforms to the minimum-impact rules of thumb: 200 feet away from water and the trail, and on mineral or duff soil. Water must be available within a reasonable distance of the camp for cooking and drinking (of course, you must purify your water). Often you will need to scout around for a while to find the ideal site.

3-2Base Stations and Barracks

Living quarters must be kept clean at all times. If you are staying in a cabin, you may need to stain the wood or paint it, replace broken windows, re-shingle the roof, do rock work, re-chink, etc. Visitors are often invited in to your cabin so the interior must be clean as well. In most wildernesses, cabins are not allowed to remain, but if you live in one, keep it neat.

Fences need annual maintenance or reconstruction. Boards or poles should be placed between the tree and the barbed wire to prevent the wire from strangling the tree and killing it. If old wire has been embedded in the tree, it should be pulled out. Broken wire must be mended and loose wire tightened. Where snowfall occurs the fence is usually a drop fence, lowered at the end of the season and put up in the spring. To make this job easier, two staples are hammered in close to each other with the barbed wire running between them. To secure it once the wire is in place, another staple is dropped through the loop made by the other two staples.

Refer to USDA FS Technology and Development publication 8824 2803, "Fences," July 1988, 2400-Range.

3-2.1[INSERT LOCAL QUARTERS OCCUPANCY REGULATIONS]

3-2.2Patrol Cabins

Often there is controversy surrounding cabins within wilderness. Some feel they should not be permitted because they are non-conforming improvements. Keeping the cabins clean and well-maintained will reduce the controversy and visual impact on visitors. Some cabins are quite old and have significant historical value. Leave information on bulletin board or on the door as to where to get emergency help and other pertinent info. Break-ins are common in patrol cabins.

3-2.3Base Camp Check List

Tent with stakes, ropes and ground cloth. Stove with fuel, pots, pans, pot scrubber, biodegradable soap, pot grabber. Tools including hammer, pry-bar nail puller, whisk broom to clean tent, brace and bit for sign placement, shovels, Pulaskis, pry bar, plastic bags, cross-cut saw, hand axe, small D saw, gunny sacks, and special tools you may need. First Aid kit, radio, leather gloves and ash sack.

3-3Tool Maintenance and Use

Safety. Many accidents are caused by improper tool maintenance procedures. Safety is for your health. Use gloves, guards, and all safety gear.

Keep tools in good repair. Replace them if they are questionable. A broken shovel handle means you may fail to meet your objectives. Check handles carefully for breaks, splinters and rough spots. The heads should be securely mounted on the handles. Forcefully wiggle the head on the handle to assure it is not going to come off.

3-4Stock Use

Stock can be very useful in accomplishing your objectives. Base camps are often packed in by mule and they can haul out trash you've collected. They also supply trail crews.

3-4.1Llamas

Llama use is increasing in wilderness areas. Hikers like these usually congenial animals who can carry 70 to 90 pounds at a 2 mph leisurely rate. They have a padded foot which lessens damage to the terrain. Aside from small amounts of pelletized grain little food has to be packed for them. They mainly browse for their food eating only 4 to 6 pounds a day.

3-4.2 Horse and Mules

Stock are used in different ways in wilderness areas by Wilderness Rangers. It is most common to have a packer who oversees the use of stock, takes care of their health and trains employees in their use. The ranger may take a horse and pack one or more mules by her/himself, or she/he may lead an animal and walk. Some packers and rangers feel that packing a mule and leading it doesn't make sense, but in some wilderness areas this arrangement works exceptionally well. Rangers packed their gear, food, tools, and feed for the animal and easily do trail maintenance. If you ride a horse, it is unlikely that you will get off the horse to pick up a small piece of trash. You must tie the horse and mule up every time you stop to work and your working time is cut down.

Special care around horses, mules and burros must be taken as they are unpredictable animals. Some important rules for working with these animals:

Always assume that the animals will kick.

Always mount a horse or mule (yes, sometimes mules are ridden) from the left side (the horse's left if you are facing the same way it is).

When moving around an animal while packing, stick close to its rear or beyond kicking range. Don't duck under the lead rope when it's tied to rails or buildings.

Never approach stock from behind and/or without making yourself known to the animal. The constant talking to the animals around barns and corrals is not because cowboys are lonely.

Animals get rowdy at feeding time. Don't get crushed in the feeding frenzy.

If you have a packer, s/he will generally be in charge of all stock. Listen to what s/he says and take carek of stock the way s/he wants them to be taken care of. This does vary from packer to packer, so, if you go to another wilderness area, find out how and why procedures may differ.

The packer is responsible for taking care of shoeing veterinary needs and animal health, buying feed, pastures, fences, water troughs, tack, barns and buildings. If you have questions, ask. If you notice something s/he should be aware of, let him know. These responsibilities may differ from unit to unit.

If the Wilderness Ranger is responsible for stock, s/he should be trained in care and maintenance of the animals. Horses and mules can be dangerous if handled improperly. It's not a source of pride to say you've been kicked. Packing stock is an art that must be learned and can take years before even the best will be recognized as competent. Don't get into the bad habit of pretending you know it all. Most Wilderness Rangers don't. But learn packing. Most packers will be glad to show you what they know and they should teach you how to handle and feed stock and recognize health problems.

Obtain and read "Horse Safety Guidelines" (USDA publication) or "Guide for Using Horses in Mountain Country" (Robert W. Miller, 1974). Also quite good is "Working Safely With Horses and Mules" by Leo Porterfield (Inyo National Forest).

3-4.3[INSERT LOCAL STOCK POLICY]

3-4.4[INSERT STOCK FIRST AID]

3-5Wilderness Visitor's Permit (Form FS-2300-30)

Some wilderness areas are so heavily visited that use limits are in effect. Reservations can be obtained for wilderness permits, but reservation procedures and dates vary from unit to unit. These dates change yearly to some degree, so know what are the essential dates for permit administration for your unit.

Other important functions of wilderness permits are the visitor contact made when the visitor obtains his permit and the information generated from recording the party's trip schedule. By monitoring trip schedules, visitor use patterns can be deduced. By keeping count of the number of permits issued, the trailhead quotas will not be exceeded.

Basically, the quota of a trailhead is determined by the carrying capacity of the area it feeds. Carrying capacity is defined as, the use an area can tolerate without unacceptable impact occurring. The carrying capacity of an area should not be exceeded by visitor use even though fed by the visitor use patterns of an interlacing trail system.

3-5.1[INSERT LOCAL PERMIT SYSTEM, IF APPLICABLE]

3-6 Outfitter-Guide Camp Inspections

Your role in administering outfitter-guide permits will be as a field observer, to inspect and report on certain phases of outfitter operations. You will be in a passive rather than active management role. You will not and should not be asked to take on the responsibility of giving directions to the permittees. If you should observe an apparent permit violation, let your supervisor know. Do not assume someone already knows, because it is often difficult to know what is going on in the far reaches of the Wilderness. You may be asked to relay specific instructions to an outfitter to your supervisor.

Outfitter contacts should be handled as any other public contact. Identify yourself and seek out the outfitter or her/his representative in charge of the operation. Be professional, courteous, and friendly. Conduct your business in an open and efficient manner and time your visits to avoid inconvenience to the permittee. Also be sensitive to the guides and their guests. If disagreements arise, do not argue. State your point, listen to her/his views and tell her/him that you will relay the feelings to your supervisor.

3-6.11[INSERT LIST OF LOCAL GUIDES, OUTFITTERS AND PERMITTEES]

3-7Hunting Season Responsibilities

With the start of hunting season contacting hunter's camps will be added to your responsibilities. An information meeting before you enter the field will help you to understand what your responsibilities are and to guide you with maps, files, camp inspection forms, names, and "histories" of camps. After each season you may find it necessary to write letters to some hunters to address problems and concerns, or you may just want to send a "thank you" note. Camp inspection forms, law enforcement needs, and other duties should be completed at this time, too.

A base camp will be your home away from home during this time, so coordinate camp set up and supply runs with the other crew members. This is also the best time to cut firewood, set up hitch rails, and dig a latrine.

Pay special attention to your stock as they especially need the right amount of grain, pellets, salt, and water to keep them going. Keep their feet picked and free of ice balls, think about hazardous trail conditions, and start your day early as daylight fades fast in the fall.

Remember to equipment your vehicle with chains, scrapers, flashlights, etc. before you hit the road. Pack high energy food and plenty of warm clothes. This is no time to be on a diet! Watch out for each other, think safety, and this could be the most rewarding part of the season yet!

What to look for...and to address in camps

1. Trail litter, camp litter, aluminum foil in firepit

2. Buried garbage

3. Dismantle structures and take out nails!

4. Proper use of latrines

5. Cutting excessive trees for poles or using green boughs.

6. Leaving campfires unattended

7. Caches are illegal!

 8. Trying stock to trees, evidence of stock impact

9. Motorized equipment, chainsaw use

10. Using salt blocks to bait game

11. Illegal outfitting

3-7.1Deer Tag Validation.

As a Forest Service employee, you may need to validate deer tags during hunting season. Become familiar with hunting regulations, seasons and procedures. Not all units allow the Wilderness Ranger to validate kills and procedures vary unit to unit. Check with your supervisor.

3-7.2[INSERT LOCAL HUNTING SEASON PROCEDURES]

3-8Data Collection

Different types of surveys are used to obtain information on resources. These may include studies to evaluate conditions at individual campsites, trails, forage in meadows, fuel wood abundance, visitor use, etc.

3-8.1Statistics

You may be required to collect various statistics using various methods. Some types and methods of statistics collection are: Wilderness Management Information cards for the collection of data as described earlier, creel census for determining number, size and species of fish that are caught, bear incident cards for information related to problem bears, etc.

3-8.2Recreation Information Management

The Recreation Information Management (RIM) System is an electronic system of banking, or storing, recreation information. RIM data is taken from wilderness permits and other sources to determine recreation visitor days (RVD). This system can be used for requesting funds or obtaining information to make a management decision.

3-8.3 Water Quality Testing

Some wilderness management plans require water quality testing within the wilderness. One reason that improvements are not acceptable at springs and water sources is that improvements imply that the water is safe for consumption. Water quality is a good indicator of carrying capacities.

Giardia lamblia is becoming a common pest in most wilderness waters and it's a miserable sickness to get. Giardia is a protozoan cyst that survives in water. Symptoms of Giardiasis are cramps, nausea, weakness, flatulence, and a sulphur smell to burps and gas. Giardia is extremely difficult to identify and requires laboratory testing to identify.

There are several methods of water quality testing. The most common are incubation methods. Most are difficult to perform and are not totally reliable because of the lag time between taking the samples and incubation. Check out sampling methods with your supervisor or forest hydrologist if water quality sampling is required.

3-8.4Trail Log and Prescription Surveys

Trail log and prescriptions are necessary especially if maintenance or reconstruction contracting is to be performed on trails. The log describes features of the trail such as water bars, rock walls, blazes, etc. The prescription describes the actions that must be performed on the trail to bring it up to standard. (Refer to FSH 7709.12, Chapter 5, 340--3).

Proper training in how to do these is essential. The recorder must be familiar with construction requirements as well as maintenance requirements. Logs and prescriptions can be performed at the same time, but once the log is completed, it rarely needs to be changed except when adding new items such as water bars or eliminating an old trail section. The prescription is performed regularly depending on the maintenance level of the trail. The higher the maintenance level, the more often the prescription is done.

Standard abbreviations that can be used in performing a log or prescription are as follows:

1. Meadows WM=wet meadow DM=dry meadow

2. Streams WS=wet stream DS=dry stream

3. Side Slope =SS %

4. Tread Grade =TG %

5. Switchback =SB

6. Waterbar =WB

7. Step =S

8. Clearing Inadequate =CI

9. Tread Materials

Tread material is humus or dirt T=A

 Tread is loose rock T=B

Tread is solid rock T=C

10. Rock Wall =RW

11. Hazard Tree =HT

12. Log Removal =Lr

13. Drainage =Drng. (usually seasonal)

14. Small, Medium, Large =Sm., Med., Lg.

A form is included in the Trails Handbook that can be used to perform logs and prescriptions. A different form is used for doing a log for a trail with a cyclometer. Record the number of feet measured by the cyclometer. Record of feet measured by the cyclometer on the left, next to it the log, and also the prescription.

The beginning and end of the trail must be described clearly. Often there are no signs indicating where the trail is. New employees transferring to the area may not be able to find the trail without your accurate description.

3-9Supervision

Some Wilderness Rangers supervise other employees or volunteers, adding increased responsibilities. Being a good supervisor takes a lot of time and a dedication to people in addition to the environment. Much has been written about supervision and leadership styles what's important is to find your which style works for you. You have more than project work to think about, you have the personal welfare of those who work for you. Several concepts are offered here.

1. You can't make people do anything. Meaning ultimately it is the individual who weighting the consequences makes a choice to do the task.

2. Head by example. Never ask anyone to do something you wouldn't do yourself.

3. Develop in employees a feeling of ownership in the task to be accomplished.

4. Teach employees correct principles and why you're doing the task, then allow the employee to accomplish the task in any acceptable safe manner. There is usually more than one way to accomplish a task.

5. Never criticize nor discuss employee shortcoming in front of others.

6. Praise publicly for good work.

7. Be a good listener.

8. When laying out work explain in detail and have employee feedback to you what needs to be done.

9. Confront difficulties immediately.

 10. Evaluate your people to let them know how they're doing.

11. Provide ALL necessary tools and equipment to complete assigned tasks.

Remember good supervisors you've had and follow the most basic of all guidelines: treat others in a manner you'd like to be treated.

Feedback is extremely important to your supervisor. Just as you like to be made aware of your successes and acknowledged for your work, so does your supervisor. After all, a supervisor is as human as you are. If you have complaints or suggestions, your supervisor should be made aware of them too.

The Forest Service operates on a system called "Management By Objective." Your supervisor has objectives performance standards which must be met. He/she will be rated on how well he completes his objectives and performs to the standards given. He/she may delegate some of those objectives to you, in which case you will need objectives and performance standards as well. You should be made aware of your own objectives as well as your performance standards.

3-10Uniforms

Uniform allowance (Form AD-660) is generally submitted at the end of the season for returning employees, while new seasonals can get an advance toward the purchase of their uniform as soon as they begin work. Your district will inform you about uniform options.

Your uniform must be as clean as possible at all times but the public doesn't mind seeing you grubby if you've been working on th trail or rehabilitating campsites. It lets them know you're earning their tax dollars. Whenever possible, though, keep a clean and neat appearance. Take a spare shirt along to change into when doing dirty work.

Remember that shorts should be worn only for hiking and never when doing work with tools. One Wilderness Ranger carries her long pants in her day pack at all times so she change into them when working on the trail or fighting fire. Official Forest Service coveralls may also be worn.

Employees will receive a uniform allowance for fed uniform. Uniforms are ordered through an approval supplier. Check with your supervisor for a copy of the uniform catalog or help in ordering. During regular patrol hours, the rangers will wear the Forest Service field uniform consisting of the following items:

1. Official shirt with badge, patch, and name tag. The badge will be worn on the left pocket, the name tag on the right pocket flap.

2. Official green field pants or shorts (see FSM 6159.15b). The shorts should be worn only if trail work or other work requiring tools is not expected.

3. Leather boots with eight inch high tops and lug soles. If you're on horseback follow local policy.

4. Forest Service hat (optional).

3-10.1[INSERT SUGGESTED CLOTHING LIST]

3-10.2[INSERT LOCAL UNIFORM POLICY]

3-11Law Enforcement

Wilderness Rangers follow an expanding or progressive level of law enforcement. Start law enforcement at the lowest level necessary to accomplish the goal of resource and public protection and a recurrence of the infraction. The progression is from attempting to educate the user and verbal warning, to written warning, to citation. Different Forests have different policies regarding citing minors. Find out what your Forest policy is.

If you start a contact by telling a visitor she/he will be issued a citation for a violation but then find out there were unavoidable circumstances that led to the violation, it is much more difficult to drop the tone to a reasonable enforcement level.

Most Forest Service employees do not like issuing citations (Form FS-5300-4). It seems to go against the grain of the idea of a wilderness experience. However, the ranger must keep in mind that failing to take action may cause the wilderness quality to be degraded. Don't compromise by issuing a written warning (Form FS-5300-1) if a citation is truly in order. Check with your supervisor about the level of enforcement authority you have.

Although not all areas require a permit, wilderness visitors are becoming well aware of ways to circumvent the wilderness permit system. They often will enter the wilderness without a permit, knowing that one is required, but they got away with it last time, so... The permit system has been in effect for over 10 years in many areas and compliance is generally between 60 and 90 per cent. There is little excuse for not having a permit if they're required.

Wilderness rangers will not make arrests. If you feel that an arrest is warranted, back off, contact your dispatcher and give details of the incident. This also applies if you find yourself in a potentially threatening situation (riding inadvertently into a poacher's camp). Back off and call for help.

3-11.1Regulations Related to Wilderness

Refer to Title 36, Part 261, Code of Federal Regulations for a complete list of prohibitions.

Subpart B regulations apply only if a Forest Supervisor or Regional Forester has issued an order for the prohibition. Subpart A regulations are in effect at all times for all Forests. For example, the firing of guns is restricted to emergencies and the taking of legal game in some wilderness areas but there are no restrictions in other Wilderness areas. Don't get subparts confused.

3-11.2[INSERT LOCAL REGULATIONS HERE]

Refer to your law enforcement guide and bail schedule for a full account of prohibitions for your area. Bail schedules are set within a judicial district. Magistrates answer to the district judge and each one assigns specific times to hear cases. Check with your Forest law enforcement officer about when and where your magistrate hears cases.

Volunteers may not issue citations, but they may record information for a citation to be processed by a qualified employee. A warning (Form FS-5300-1) may be used for this.

3-11.3Writing Citations

Writing a citation can be a nerve-wracking experience, especially if you are not familiar with the forms and procedures. To issue a citation you must have taken USFS Level II Law Enforcement training. If your supervisor permits it, you can issue a written warning (form FS-5300-1) without this training. During your training, make a copy of a citation and set up a simulated real-life situation, then issue the citation. Keep a copy of a completed example containing the location codes, magistrate's name and address, etc.

If for some reason you do not have a citation or are unsure about the application of a regulation to a situation, it is acceptable, to take down all pertinent personal information (a Notice of Violation can be used) and inform the violator the incident will be discussed with your supervisor. Tell the visitor that if the supervisor feels a citation is warranted, one will be sent to him by mail. This should not be standard practice. It is only for those instances where it is unavoidable or there is some question of applicability.

3-12End-Of-Hitch Duties

When you come out of the field there are a variety of tasks and reports that need to be accomplished.

3-12.1Administrative Reports

Trail Work Summary Sheets are used to record the amount of work accomplished on each section of trail and the time involved. Include travel times. This can then be a measure of the funds needed to accomplish goals. That is, if it takes 1/4 person hour to clean each waterbar, and there are 60 waterbars, funds are needed to pay for this, plus travel time, plus preparation time. The longer these records are kept, the more accurate the estimates of the average amount of time to accomplish work.

Keep a diary. The purpose of maintaining a daily diary is so that supervisors and managers can identify problems, know how much work is being accomplished by the Wilderness Ranger, and provide statistics. The diary can take different forms. A written diary, which explains the details of trail work, public contacts, wildlife sightings, law enforcement action, Search And Rescue, first aid rendered, etc., can be maintained daily. Some units use management information cards.

Time and Attendance (Form AD-319-4). This is how you get paid. If your district requires you to complete these, check with your timekeeper for the proper procedure.

Per diem (Form AD-616). This is how you are reimbursed for expenses you incur due to requirements made of you in your job. Per diem is not taxable.

[INSERT EXAMPLES OF LOCAL SUPPLY FORMS]

3-12.2Wilderness Rangers Meeting

This is your opportunity to meet with your supervisor to discuss work accomplishments, problems and to plan your next hitch. It's an important information sharing time and one which you should be adequately prepared for. You'll need to coordinate transportation post itineraries in the office and dispatch office, and make other logistical arrangements.

3-12.3Rigs

This is the time to WASH your rig, clean the inside, fill the tank, back it into the proper space, arrange for service and a replacement rig if needed, and put keys at their assigned location. Someone else may need to use your rig on your days off, so remove all of your personal gear and leave it ready to hit the road. If the vehicle needs servicing, check with your supervisor to make sure that it will be done in time for the next hitch.

3-12.4Tools and Equipment

This is an excellent time to clean, sharpen, or replace broken handles, and round up special tools, tack, and camping equipment you might need for your next hitch. You should get your tools and gear cleaned up and organized for your next trip out. The more you do now, the less you'll have to do the first day of your hitch. If you don't know how to fix a tool, ask other crew members or the equipment manager. Don't just dump it in the tool room. Everyone is responsible for keeping the tool room in order.

3-12.5Stock and Tack Care

It is your responsibility to make sure that your stocks' needs are met until used again. Insure that they have adequate feed and water. If you have any concerns about leaving your stock short of feed or water, let your supervisor know. He/she can arrange to check up on the critters turning your time off.

It is also your responsibility to check your horses' shoes and hooves regularly and contact a farrier when they need to be re-shod. Farriers are often hard to find and sometimes harder to schedule. Don't wait until the last moment to contact them....think ahead at least two weeks.

Report any stock health problems or replacement needs to your supervisor right away.

Oil tack as needed and brush blankets every hitch, if not every day. Wash cinches. Before leaving, clean up after yourself, sweep tack room and empty trash.

4 Safety

"Safety is for your health" is the motto of safety for the Wilderness Ranger. The Wilderness Ranger's job is inherently more dangerous due to your distance from help, the places you must travel, and the tools and stock you must use. Your attitude as well as your actions make safety a reality. A job hazard analysis is required for your job. It covers all aspects of that job and explains what hazards may be encountered and how to avoid them. What if you are injured in a fall? What if you are bitten by a rattlesnake? Think about this type of situation and develop a plan to get yourself out of these situations.

4-1Water Purification

Giardia lamblia is becoming a serious problem in wilderness waters. DON'T GET IT, IT'S A MISERABLE SICKNESS. Boil water for a least 5 minutes after it reaches the boiling point to kill any protozoa and amoeba. This is the surest method of purification. Chemical treatments for water, such as Halazone tablets or tincture of iodine, are not as dependable; but extending the time between treatment and consumption reduces the chances of infection.

There are filters which claim to be a sure method of eliminating Giardia. Although filters have been used effectively by Wilderness Rangers and have been effective, they can be expensive and may not filter out all microorganisms. Boiling is the best way to purify water to eliminate contaminates of all sizes.

4-2Hypothermia

Hypothermia is the rapid, progressive mental and physical collapse that occurs when a person's body is chilled to the core. It is caused by exposure to cold, aggravated by wet, wind and exhaustion. It occurs most often when the temperature is between 30 and 50 degrees--making it hard for people to accept its danger.

Cold kills in two distinct steps: (1) exposure and exhaustion and (2) hypothermia. Exposure occurs when your body begins to lose heat faster than it produces it. It compensates you with exercise to stay warm or your body makes involuntary adjustments to preserve normal temperature in the vital organs. Either of these responses drains your energy reserves until they are exhausted.

Symptoms: When your energy reserves are exhausted, lowered body temperature affects the brain, depriving you of judgment and reasoning power. (You do not realize this is happening.) You may have uncontrollable fits of shivering; vague, slow or slurred speech; memory lapse or incoherence; fumbling hands; frequent stumbling, lurching gait; drowsiness; apparent exhaustion, and inability to get up after a rest.

This is Hypothermia. Your internal temperature is sliding downward. Without treatment, this slide leads to support, collapse and death.

Treatment: Treatment must be immediate and drastic. The victim may deny being in trouble. Believe their symptoms. Get them out of the wind and rain and strip off all wet clothes. If they are only mildly impaired, give warm drinks, keep awake, and get them into dry clothes and a warm sleeping bag. If semi-conscious, leave stripped and put in a sleeping bag with another person, who is also stripped. If possible, put victim between two warmth donors.

Defense: The best defense against hypothermia is to avoid exposure. Recognize hypothermia weather and dress for it. Stay dry and protected from the wind. If you cannot stay dry and warm under existing weather conditions with the clothes and equipment you have to get out of the weather. Build a fire and make camp while you still have a reserve of energy.

The dangerous thing about hypothermia is that victims don't realize what is happening. They may feel fine, but the fact may be that exercising is the only thing preventing going into hypothermia. When they stop, the rate of body heat production instantly drops by 50 per cent or more. Violent shivering may begin and the victim may slip into hypothermia in a matter of minutes.

4-3 Thunderstorms

In some areas, local thunderstorms are common in the summer. Some signs indicating the advent of a thunderstorm are Formation of massive cumulous clouds, quiet calm air combined with hot temperatures,and oppressive, sultry atmosphere with a cloudless morning sky.

The distance to the center of a thunderstorm can be determined by dividing the time in seconds between the lightning and the thunder by five with five seconds being equal to one mile. Thunder can usually be heard over a distance of between 6 and 16 miles, depending upon intervening elevations. The direction of a storm may be predicted by watching the upper wind about 2 or 3 miles high since thunderstorms normally move with the main air current. The speed of these upper clouds will also give you some idea of the likely speed of the approaching storm.

Lightning is the principal hazard in any thunderstorm. It is an electrical discharge between two clouds or between a cloud and the earth. In order for this discharge to be made, there must be a "negative" charge of electricity in one place, and a "positive" charge in another. When these two charges meet each other, the lightning flash is produced. The presence of an electrical charge generally makes itself felt as follows: insect-like buzzing noise, unprotected parts of the skin feel as though they were touched by a spider's web, tickling of the scalp, standing-up of the hair, or "signing" of metal objects.

The frequently expressed theory that lighting strikes only the highest point is only partly correct. Electricity travels downward in lightning flashes and upward along ridges to the sky. Because you are low down on the ridge does not mean you are safe. An electrically charged cloud may be just below the summit so that the lightning discharges into a lower secondary peak or ridge. Also certain trees, including oaks and poplars, are more susceptible to lightning strikes.

During lightning storms, do not pass between or stay under boulders, as lightning has been known to flash through one boulder to another. Avoid Summits and ridges or any exposed points at all costs, and do not approach them nearer than about 15 yards. Avoid lone trees, streams, gullies containing water and rocks. Overhangs and recesses are no protection against earth currents. Find shelter in dense forests areas at lower elevations. If no shelter is available, sit on your foam pad with only your buttocks and feet touching the pad. Clasp your hands around your knees. Stay out of shallow caves. Remove metal from backpacks and metal tent poles, as lightning is attracted to them. Crouch in the middle of your tent and do not touch the walls if the tent is pitched in an unprotected opening.

4-4 Stream Crossings

There are few bridges and footlogs in the wilderness. Most stream crossing may be accomplished by rock hopping or by using a fallen log as a bridge. Extreme care should be used with either method since rocks and logs around streams can be very slippery. Occasionally it may be necessary to wade the stream, particularly during times of high water.

Pick a spot with the least rapids or current. It may not necessarily be the most shallow spot.

Cross streams whose source is in snowfields or glaciers in the early morning when their flow is lower.

Wear your pack in a normal position, but with the waistband unfastened. In case of a fall the pack can be easily removed if necessary. Use a stick for balance. Face upstream, placing the pole into the river bottom while moving sideways.

Wear your boots to prevent injury to your feet. Remove socks and lace boots firmly. Once across, whipt out the inside of the boots with a handkerchief or sock top before putting on. (This is a good chance to clean out your boots!). Getting your boots wet will not hurt them if they are dried properly.

From The Wilderness Handbook by Paul Petzoldt.

4-5Bear-Proofing

You must bear-proof your food or risk having it stolen by bears or squirrels. Find a tree with a branch that protrudes from the trunk at least 12 feet and at the end is only an inch or so in diameter. Throw a long end line over the branch (don't get konked by the rock on it's way down!). Tie one stuff sack with half your food to one end of the line and haul it up to the branch, which should be at least 15 feet from the ground. Tie your other food sack to the other end of the line, tie a loop with the end of the rope that hangs just below the food bag, and tie the extra line to the food sack. Give a toss and try to get the bags to hang evenly in mid-air. To retrieve it, poke a long stick through the loop and pull down on the sack. Also bear-proof your garbage bags and horse feed.

Since you are often at a base camp in the wilderness, you're going to want fresh vegetables. One method of keeping them fresh is to wrap all the vegetables, cheese, and other perishables in canvas and wet it thoroughly. Put this bundle in two burlap sacks and pour water over these, then hang the sacks as per above. The cooling action of evaporation will keep the veggies cold and crisp for quite a while. You must wet the sacks at least twice a day, in the morning and evening.

4-6 Poison Plants, Insects, and Snakes

4-6.1 Ivy, Oak and Sumac

Instruct all employees in plant identification are subject to exposure to these hazards. Highly sensitive persons should not be exposed. When working in affected areas, employees should Fasten trouser legs closely over boot tops. Wear gloves, and keep them away from face or exposed parts of the body.

After work, wash exposed parts thoroughly with thick soapsuds. Yellow laundry soap is best in hottest possible water. Clean tools with cleaning solvent before putting them away. Wash exposed clothing in thick, hot suds separately from other clothes.

Destroy poisonous plants around improvements where practicable. Apply approved chemicals to kill plants.

Burn only in isolated areas. Avoid contact with smoke; particularly avoid getting in the eye or inhaling it.

Immunization or application of body ointments or salves is recommended.

4-6.2Rocky Mountain Spotted Fever Ticks

Ticks are carriers of agents that cause Rocky Mountain spotted fever, Colorado tick fever, tick paralysis, Lyme Disease, and tularemia.

When working in an area likely to have infected ticks, wear clothing that fits tightly at wrists, ankles, and waist. Each outer garment should overlap the one above it. Cover trouser legs with high socks or boots and tuck shirttails inside trousers.

Search the body repeatedly (rest periods, lunch, etc.), especially hairy regions and inside clothing, as ticks seldom attach themselves within the first few hours.

Remove any ticks that may have become attached. Do this with your fingers or tweezers. Grasp the tick as close as possible to the point of attachment and pull gently and repeatedly. Do not jerk it loose, as the mouth parts will often break off and remain embedded in the skin. This could cause infection. Treat the bite wound with an antiseptic and wash your hands thoroughly with soap and water. NOTE: Do not try to burn the tick or cover it with heavy oils.

Once the tick is removed, do not kill or throw away. Place it in an empty pill bottle or other container. Record dates of tick exposure and removal. Should you experience general malaise with fever, headache, chills, and muscle ache within 2 weeks of removal, seek prompt medical help, give the physician the tick and record of exposure data.

4-6.3Chiggers

Persons working in areas with chiggers should avoid sitting on ground or on logs and avoid low vegetation when practicable, apply powdered sulfur to legs and hands, bathe in hot, soapy water, and use insect repellants such as dimethyl pthalate and indalone.

4-6.4Black-Widow Spiders and Scorpions

In black-widow spider and scorpion areas, you should wear work gloves, turn them inside out after placing them on ground temporarily, inspect material before handling be careful in outdoor toilets, and see a doctor if any bite shows rapid inflammation and pain.

4-6.5Bees, Wasps, and Yellow Jackets

Prevention: Persons who are known to be allergic to insect stings should obtain vaccine and/or allergy medication before going into the field. Wear long-sleeved shirts with close-fitting collar and sleeves, with trousers tucked in boots.

First Aid: Remove stinger if possible. Apply paste of baking soda and cold cream. Cold applications will relieve pain and calamine lotion will relieve itching. Take anti-allergy medication if reaction is severe. If the reaction is unusual, apply constricting band above bite, apply cold packs, and rush to doctor.

4-6.6Snakes

Prevention: Wear high boots in poison snake country. Be observant around places obscured by foliage or otherwise when walking in rocky country or climbing ledges.

Use a bar for moving materials and timbers that have been stacked or piled in snake areas. Do not put hands under any stored material where snakes might be present. Take care not to step over any logs. Step on them and look down before stepping off.

First Aid: If bitten, remain quite and, if possible, avoid movement under your own power. If necessary to walk, move slowly with frequent rests. Carry a snakebite kit in poisonous snake infested areas. It should be used only if unable to get to a doctor or hospital within an hour. In isolated areas 2 hours or more from medical attention, employees should be trained to use anti-venom.

4-6.7[ADD PRECAUTIONS AND TREATMENT FOR ANY POISON PLANTS, INSECTS AND SNAKES IN LOCAL AREA]

4-7Trailside Meetings

(More commonly called tailgate safety meetings by the Forest Service, but since there are no trailgates in the wilderness, they are often called trailside meetings.)

Trailside safety meetings are your responsibility as a first-line supervisor. These meetings are meant to stimulate your crew's safety juices and hopefully prevent some near misses and accidents. The challenge for you is to take your responsibility seriously, display a good attitude about these meetings, make them pertinent and applicable, and maybe even make them fun.

Examples of subjects to discuss might be camping hazards, took use and sharpening, stock use, public contact, first aid, stream crossing, food handling and cooking, bears, giardia, hypothermia, law enforcement hazards, etc., etc., etc. There's no shortage of hazards to talk about in wilderness work.

Document the meeting, who attended, what was discussed, the date and time, and any near misses, new procedures, or suggestions that you came up with. You guessed it, there are safety meeting forms that you can fill out and submit with your hitch reports. Try to have at least two of these meetings each week, and more if you need to.

Our goal is to have a good safety record each year. Not because we want a good record, but because we want you to come out of the woods in one piece.

4-8Radio Procedures

It is not good practice to travel alone in the wilderness without a radio. Budget restraints often limit the number of radios available for the rangers on a unit. If you won't have a radio for your tour, leave an itinerary with the supervisor or the district office and then stick to it. If you have no radio, consider traveling in pairs.

You're on the air, and everyone can hear you! Be professional and clear. Use plain English. The "ten code" is no longer used because National Park Service ten codes were different from Forest Service codes, which were different from County Sheriff codes. If you speak English, everyone will understand you.

When contacting your dispatcher, use the Forest's call name first, then your assigned call number or your last name. Your supervisor will supply you with a list of call numbers for your District.

Key your radio and wait one second before you begin talking, otherwise you may cut off the call number of the person you are trying to contact. Then, be sure you don't release the key until you have finished talking or you will cut off the end of your transmission.

Most Forests have a repeater system. Generally, channel one on your radio transmits on a direct line of sight and reaches a short distance with limited range. Channel two transmits through a repeater. Your radio sends out the message which is then retransmitted more powerfully with a wide range. It takes a moment for the repeater to engage and therefore, if you begin speaking too quickly, the first part of the transmission will not be heard.

Check-in times are established by your supervisor so that if you are injured and can't respond, a search will begin. Emergency messages and other information is also transmitted at this time. Check-in times are scheduled for the least interference with other Forest radio traffic. It is not always possible to make contact with the outside world from many areas of the backcountry. There are lots of dead spots and you should get to know where they are and go to a different location if you can't "get out."

4-9Vehicle Travel

Motor vehicles are one of the greatest killers. All drivers shall adopt a policy of defensive diving. This means driving so as to avoid accident situations created by the mistakes of others or by weather and road conditions, yielding the right-of-way even when, by all rules of the road, it is actually yours, and making an unbroken series of concessions to other drivers who are thoughtless, unskilled, or ignorant of the hazards they create.

Be aware of traffic situation developing as far ahead of the vehicle as possible. Be confident that you can drive without ever having a preventable accident.

Be aware of traffic situation developing as far ahead of the vehicle as possible. Expect reckless, illegal, and clumsy behavior on the part of the other driver and be prepared to avoid accidents. Be especially courteous to pedestrians. Honor their right-of-way privileges. Watch particularly for erratic behavior by children, and those who have been drinking. Wear restraining belts and harness whenever provided. Adjust the headrest to prevent whiplash if stuck from rear.

Vehicles, owned or leased by the Forest Service, must be driven only by physically fit persons who have qualified for State Driver's License and are thoroughly familiar with the Forest Service Driver Operator Guide.

In an emergency, others who hold a valid State Operator's Permit and have no apparent physical defects may be permitted to drive a vehicle owned or leased by the Forest Service.

Nonemployees in cooperating public agencies whose duties may include driving Government owned or leased vehicles may be issued a regular permit when qualified by an operator examiner.

Daily, before driving any assigned vehicle, the driver should check for adequate brakes, steering, windshield wipers, tires, lights, horn, and tight exhaust system. Keep vehicle windows clear of dirt, grease, steam, or snow. Any vehicle found unsafe to operate must not be moved except for repair.

Drive at a speed that permits full control of the car, allowing for all factors, such as posted speed limits, stop signs, weather, visibility, traffic and road conditions, and safe stopping distance.

On narrow roads, either surfaced or unsurfaced, and blind curves keep well to the right and be able to stop the vehicle within less than half of the visible distance.

4-10Search and Rescue

Wilderness Ranger initiation or involvement in search and rescues is common and you should be well prepared to assist. First aid skills are of primary importance and if you don't have the skills, inform your supervisor and take an advanced First Aid class as soon as possible.

The County Sheriff is responsible for search and rescue (SAR). The Sheriff may request that you assist in the incident or s/he may request you handle the incident. Read and be familiar with any SAR agreement your District has with the Sheriff's Department. (Search and Rescue is covered in FSM 1599.)

4-10.1Initiating Search and Rescue

When initiating Search and Rescue:

1. Contact the Forest dispatcher. If it is a life-threatening emergency, you can say, "Emergency" after the call numbers.

2. Indicate your needs, such as a helicopter, horse, medical assistance, additional personnel, etc. Describe the extent of injury, where person was last seen, and other known details.

3. Communicate information from 'Head Injury Report' and 'Air Operations - SAR' if applicable.

4-10.2[INSERT LOCAL SEARCH AND RESCUE PROCEDURES, DISTRICT CONTACTS AND PHONE AND CALL NUMBERS OF LOCAL SAR LEADERS]

4-10.3Air Operations During Search and Rescue

The following information is needed for helicopter rescue:

1. Is it a search, or is it a rescue?

2. Nature of injury, if known.

3. Is the patient ambulatory? Can the victim sit in a helicopter seat? Or is a litter needed?

4. Is a doctor, search and rescue team or qualified first aid person at the scene? Will someone accompany the victim?

5. Exact location where helicopter must land. Legal description and nearby prominent landmark.

a) size of helicopter landing site

b) surrounding terrain and vegetation

c) altitude and temperature

d) wind direction and speed (steady, gusty), up or down canyon

e) distance from victim

f) number of persons at scene

g) weight of victim and his/her gear

6. Medical supplies needed? What?

7. Are there any fixed-wing aircraft in the area on another search?

8. Who is the reporting party? Telephone number.

9. Keep the helicopter informed of any changes in the original information while the helicopter is in enroute.

10. Destination after pickup of victim (for fuel computation).

4-10.4Patient Head Injury Report

Patient's Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_

Age\_\_\_\_\_\_\_\_\_\_\_ Time of accident\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sex\_\_\_\_\_\_\_\_\_\_\_

Orientation: 1. Knows name?\_\_\_\_\_\_\_\_\_\_\_\_\_

 2. Knows date?\_\_\_\_\_\_\_\_\_\_\_\_\_

 3. Knows where he/she is?\_\_\_\_\_\_\_\_\_

Is patient unconscious?\_\_\_\_\_\_

If yes, how long?\_\_\_\_\_\_\_\_\_\_

Has patient been drinking alcohol?\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Was patient using drugs?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Describe injury:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Eyes:Pupils are Small\_\_\_\_ Medium\_\_\_\_ Large\_\_\_\_

Same size\_\_\_\_ Different size\_\_\_\_

Draw pupils in diagram below:

 RIGHT EYE LEFT EYE

Do Pupils constrict in response to light?

Right\_\_\_\_ Left\_\_\_\_

Ears: Fluid or blood in ears?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pulse rate: \_\_\_\_\_\_\_\_\_\_\_\_per minute.

Regular\_\_\_\_\_ Irregular\_\_\_\_\_

Respiration rate: \_\_\_\_\_\_\_\_\_\_\_\_\_per minute.

Patient can move:

Right arm\_\_\_\_\_\_\_\_\_\_\_\_

Left arm\_\_\_\_\_\_\_\_\_\_\_\_\_

Right leg\_\_\_\_\_\_\_\_\_\_\_\_

Left leg\_\_\_\_\_\_\_\_\_\_\_\_\_

Patient feels touch of hand on:

Right arm\_\_\_\_\_\_\_\_\_\_\_\_

Left arm\_\_\_\_\_\_\_\_\_\_\_\_\_

Right leg\_\_\_\_\_\_\_\_\_\_\_\_

Left leg\_\_\_\_\_\_\_\_\_\_\_\_\_

Comments:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Your name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4-10.5Transporting Patients

A disabling injury or life and death emergency are the only justifiable uses of helicopters within wilderness areas.

If helicopter use has been approved by the Forest Supervisor, find a helicopter landing site and verify the specifications for a landing area with the dispatcher or helicopter service.

Follow these helicopter procedures:

1. Check the helicopter landing site and move any debris and objects away from the site that may blow around or get caught in the rotor. The helicopter landing site must have a clearance of at least 75 feet in diameter for a medium size helicopter (Llama, Bell, etc.).

2. When the helicopter is close enough to see you in the clearing where you want it to land, put your back to the wind and point straight ahead of you to indicate the direction the wind is blowing. Make sure you are standing well away from where the edge of the rotor will be. It is acceptable to throw dirt in the air to allow the wind to blow it, indicating wind direction to pilot. Don't throw it toward the helicopter but straight overhead.

3. To prevent injury, turn your back to the helicopter, crouch down and cover your face with your arms as it approaches the ground.

4. Once the helicopter has touched down, turn and watch the pilot until he motions for you to approach. Don't approach the aircraft until the pilot indicates for you to do so. If for some reason he must take off suddenly, you may lose your head-it has happened!!!

5. Follow the pilot's or helitack crew's directions at all times. If you're not sure what's expected of you, ask!!!

6. If you fly in a helicopter, make sure no part of your seat belt is hanging out of the helicopter door. Don't indicate your ready for the pilot to take off if you aren't.

7. Forest Service employees may not fly in a military helicopter without authorization from the Forest Supervisor.

Forest Service or pack station stock may be used to transport a victim to a pick-up point. Other sources for transportation include volunteer stock users or local packers.

5 Visitor Contact and Wilderness Education

5-1Public Contact

One of the most important parts of your job as a Wilderness Ranger is public contact. You are the one who is in the eye of the public. After talking with yo, the visitor will form an opinion of you as an individual, of the management of the Eagle Cap Wilderness, and of the Forest Service in general. The visitor will look upon you as one of the ways "their" tax money is spent and you must make visitors feel that it is spent wisely. Remember, you are a public servant.

One of the major purposes of your public contacts will be to educate the visitor on low impact camping and stock use techniques, and inform visitors of wilderness regulations. Most parties in heavy-use areas should be contacted and a special effort made to visit groups that might leave unnecessary impacts.

Making that initial contact with visitors may seem difficult until you get used to it. The approach you use will vary depending on the situation. As in any other personal communications. There are things you can do to better the chances of a successful exchange. Portray your positive attitude with a smile and a friendly greeting like "How's the fishing?" or "Where the tone for the entire conversation. Don't be timid, people generally like to talk. As you are talking, make good eye contact (take off your sunglasses?) and approach their personal space enough to show your interest. Get off your horse if possible, especially if you are contacting a hiking party. Listen well to what they are saying, and observe the situation as it develops. Always stay alert to potentially dangerous situations and do not push it if you suspect the party may be at all hostile. There are situations where approaching the person will take sensitivity, or where you will want to wait until another time, but these are rare.

As you approach the group and begin talking, observe the situation. Look around camp and see if it is littered or if they are damaging the resource, and think of what message might be the most appropriate for the situation. It might deal with burned-out cans and foil in the firepit, tying stock to trees, or even a compliment about using light-weight stoves for cooking. Be ready to discuss and even demonstrate low impact camping techniques, but do not get yourself into arguments or confrontations. If visitors wish to argue, it is best to back off on the preaching, inform them of regulations if need be, and go on with your duties. When dealing with visitors whose camp is less than desirable, get their name and inform them that you will be back through the area. By doing this, you will give them some incentive to clean up their camp.

Some visitors do not have a strong wilderness ethic, others lack wilderness skills, and some just don't care about wilderness. Your job is not easy when you see someone damaging wilderness values. The manner in which you go about handling this situation is very important. You must be tactful and firm. However, it is encouraging to realize that a Wilderness Ranger contact is often very effective in changing an individual's behavior as it relates to the wilderness.

If you can, it is helpful to gather information about where they are going, what they are doing, how long they will stay, and other bits of information we are interested in. The specific types of information may vary from year to year as we define needs. The types of information to gather will be covered during training session.

Remember what it is you are trying to do by contacting users. You want to educate them, inform them, and collect visitor use information. Never give out false information because you want to appear knowledgeable. A simple "I don't know" works okay. Refer visitors to someone who can answer their questions.

5-2General Information

General information should be available for each Wilderness Ranger and information station, that includes answers to questions such as distances, elevation changes, packers serving the area with names and addresses, etc.

Maps are essential. Review your Forest map and a good topographical map of your unit with someone who knows the area well. They can show you obsolete or incorrect info on your maps. If practical, carry field guides on flora and fauna for your own use as well as that of the visitor. Know wilderness management policies, as you will be asked questions like "Why are wilderness permits required?" "What's so bad about tying my horse to a tree?"

Programs for groups should be developed to educate them before they use wilderness areas. Outfitter guide groups, conservation, school stock-user and other groups all use the wilderness; the better the information they have, the better the chances of their being able to enjoy themselves without impacting the area. A study in the Rocky Mts. indicated that 6th grade students were the best contacts for environmental education as they were the most influenced by rangers' interpretation programs.

5-3Minimum Impact Philosophy

Teaching and using minimum impact (or "no trace camping") techniques may be the single most important practice for the perpetuation of a high-quality wilderness. Minimum impact is described as the users' ability to cause the least amount of change in the environment.

Minimum impact rules may be stated in different ways, but the intent is the same; to minimize impacts on resources. Not all minimum impact rules are regulations. Know which one you can and can't take law enforcement action on. Check your Forest orders to see which rules you can enforce.

All minimum impact techniques are to be applied by wilderness ranges and all Forest Service employees and are applicable even outside wilderness. We need to set the example.

Distances are not easily measured in the wilderness. To a visitor, 100 feet is a guess. It is recommended that along with a distance, the number of paces be included. "100 feet" would be followed by the average number of paces the average adult would take,i.e., "Camp at least 100 feet (45 paces) from water and trail." "Stock must be 'high lined' at least 200 feet (90 paces) from water."

For rationale on all of the minimum impact or "leave no trace" methods in this section, refer to USDA Forest Service Intermountain Research, Station, General Technical Report INT-265 "How Impact Recreational Practices for Wilderness and Backcountry" David Cole , 1989.

5.4Trip Preparation

5-4.1Clothing and Equipment

To help you travel and camp inconspicuously, select dark-colored tents, clothing, and pacts when you buy new gear. Earth-tone rusts, browns, and green blend best with the forest. Oranges, blues and other bright colors stand out like spotlights and contribute to a crowded feeling.

Major exceptions are the increases safety provided by bright equipment for winter camping (to improve visibility during inclement weather) and bright clothes during hunting season (to decrease the likelihood of being shot). Bright equipment during hunting season is not a problem because the likelihood of encounters is generally low. Safety (bright clothes) takes precedence over reduced crowding.

Certain equipment items can be helpful in reducing impacts. The most commonly suggested items are a small stove, a fire blanket, tents with poles and waterproof floors, trashbags, trowel, soft-soled shoes for around camp, hammock, and large water container. Items not to carry are more controversial. These items do not necessarily cause problems, but they increase the potential for impact. Leave at home: cans and bottles, axes and saws, guns, lugsoled boots, radios and tape players, wire, and nails.

Rafts, and to a lesser extent canoes and kayaks, have the ability to carry specialized and often heavy equipment designed to minimize impact. The most common and important is a fire pan, a piece of equipment that minimizes the ecological impact of campfires and facilitates the disposal of charcoal and ash. A box for carrying out charcoal and ash further reduces the esthetic impact of campfires. Finally, portable toilets of varying degrees of sophistication have become an increasingly common means of dealing with problems of human waste at popular campsites.

5-4.2Planning

Be sure that you have a topographic map of the area you will be hiking, sold by the US Geological Survey. Also be sure that you know how to read a map and compass.

Keep party size small. Keep the number of people in your party as few as possible, but remember that visitors traveling alone take more risk.

Large groups tend to have more impact than you would expect from increased number alone (for example, social trails developing between tent sites). Groups larger than 10 people traveling together are discouraged. This size wears out campsites by compacting soil, destroying ground cover, and using up available wood supplies, and their gregarious behavior tends to destroy the wilderness solitude of others visiting the area.

In grizzly or Bear country it is safer to travel in groups of four or more. There is little advantage to a very large group, but parties of less than four are more likely to surprise a bear and less likely to repulse an attack.

Avoid visiting places during seasons when soils are water saturated. The season during and immediately after snowmelt is the most important time to avoid, particularly by parties with stock. Give trails time to dry out before your trip. Then you will not have to wade through the mud and churn up the trails surface, making it rough for others to follow.

The impacts associated with cross country travel are minimized when group size is small, routes are carefully selected to avoid fragile terrain and critical wildlife habitat and special care is taken to avoid disturbance.

5-4.3Ethics

Where pets are allowed (they are prohibited in all National Parks and in some backcountry areas managed by other agencies), they should be kept under vocal or physical restraint (leashed). They disturb wildlife, hikers, campers and stock.

Stay as quiet as possible and enjoy the quietness. Avoid making loud noises, such as by yelling or playing recorded music.

The major exception to this practice is in areas with grizzly or brown bears. There it is important to make noise, particularly while traveling, to alert bears to your presence. That gives them time to move away without conformation.

Leave rocks and flowers where you find them so others can enjoy them as you do. Minimize disturbance of stones, soil, and plant life, so as not to disturb the conditions in which plants and animals live.

Do not dig up plants, pick wildflowers, or cut branches from live trees. Enjoy an occasional edible plant, but be careful not to deplete the surrounding vegetation or to disturb plants that are either rare or do not reproduce in abundance (such as edible lilies).

Observe animals from a distance-do not disturb. Respect the need of animals for undisturbed territory. When tracking wildlife for a photograph or closer look, stay downwind, avoid sudden movement, and never chase any animal. These precautions are particularly important at birthing or nesting sites and at watering or feeding grounds, especially during times of year, such as winter, when animals are already stressed. Find out as much as you can, before entering the area about the species, places and times when disturbance is likely.

Do not give animals food, either accidentally or deliberately leaving food scraps behind. Feeding wild animals produces numerous undesirable effects. It creates unnatural, unbalanced populations which become dependent on unnatural foods. This causes increased susceptibility to disease, and unnatural stresses within the population. Serious personal injury from the larger animals may result as they lose their fear of humans. Help maintain a natural, balanced ecosystem.

5-5Backcountry Travel

In places where undesired user-created trails are developing, or where trails have been closed to use, they should not be used. Either walk on constructed trails or walk off trails some distance away from the developing or closed trails. This may be difficult in popular places where user-created trails are proliferating. Here it may be best to treat one trail as the officially sanctioned one and confirm use to that trail. Cross country travel is undesirable where user-created trail systems are developing.

When you step off a trail make sure that you are the first to do so in that spot. If you can see the tracks of one other person, you will be contributing to trail cutting, erosion, and vegetation loss. This is especially true in muskeg-type organic soils.

When following an existing trail, walk single file down the middle of the trail even if it is wet or snow-covered. If there are several braids to the trail, stay to the main tread even if the footing is bad. Do not walk on developing parallel trail treads.

Don't step off the side; that will create a new trail, which will soon become wet and muddy, so more people will start stepping off to the side, cutting a new trail. This is one of the prime causes of the multiple trails that create a freeway look in the backcountry.

When approaching a trail switchback, stay on the trail. Do not follow a shorter route between trail levels. Never short-cut switchbacks. Shortcutting switchbacks on steep trails damages soil and plants, leading to severe erosion problems. Switchbacks are designed and built into trails on steep terrain to minimize erosion and to conserve your energy as well.

When taking a break along the trail, move off the trail some distance to a durable stopping place. Here you can enjoy more natural surroundings and other parties can pass by without contact. Durable stopping places include rock outcrops, sand, other non-vegetated places and sites with durable vegetation, such as dry grasslands.

Horses are easily spooked by strange sights and sounds. When hikers and riders meet along the trail, bucking horses and possible injuries to rider. To avoid spooking horses along a trail, hikers need to move off the trail, preferable on the downhill side, avoid sudden movement, and sometimes talk to the lead rider in low voice. If you have a pet, make sure the animal is restrained and quiet.

If you choose a route without trails the group should spread out rather than walk one behind other (especially in muskeg, tundra or meadow areas.) Ten people tramping in a row can crush plant tissue beyond recovery and create channels for erosion.

Avoid leaving your mark (cairns or blazes) when bushwhacking or traveling cross-country. Leave it as undisturbed as possible, so that the new group will have the some experience of traveling through trail-less country.

If you strike out away from trails, select rocky or hard ground or forested routes rather than meadows and wet places. When traveling in areas without trails walk on snow and rock where safe.

When it is necessary to ascend or descend steep slopes off trail, special care is needed to avoid severe erosion. It is important to spread out and avoid developing trails, to switch-back, to move slowly, and to avoid digging boots into the slope. On mountainous areas, follow the backbones of gradual ridges instead of cutting down steep side slopes. If you must hike on a steep slope, make your own switchback as you ascend and descend. Do not glissade down gravel or scree slopes.

5-6Campsite Selection and Behavior

5-6.1Heavily Used Areas

In popular locations, select a well-impacted site. In places that receive consistent camping use and have established campsites use of previously unused and lightly impacted sites is likely to lead to the creation and deterioration of new campsites. Sites that are already well impacted, if used with care, need not deteriorate substantially over time. Impacts are confined to these sites instead of being allowed to proliferate thus creating the spread of bare areas.

The primary cause of ongoing campsite deterioration problems in popular destination areas is not selecting sites that already are well impacted. Moreover, this is among the most pervasive recreation management problems in wilderness. Therefore, this is of critical importance. Where not heeded, destination areas will be afflicted with numerous unnecessary and highly disturbed sites.

5-6.2Remote Locations

When in areas without trails and established campsites, camp where there is no evidence that others have camped before.

Careful use of durable sites need not cause disturbance. The key idea behind this action is to minimize frequency of use. If sites are not camped on after disturbance becomes evident, they should still be capable of recovering rapidly. Widespread dispersal and rotation of use between sites prevent any site from deteriorating substantially. For this strategy to be successful, however, use levels must be quite low. This action must also be accompanied by careful selection of durable site and extra care in avoiding and camouflaging disturbance.

Many wilderness areas, particularly those managed by the National Park Service, prohibit camping except on designated campsites. One should always adhere to regulations of the managing agencies.

Never camp on a lightly impacted campsite. Lightly impacted sites-those that have obviously been used but with a substantial amount of vegetation surviving on-site-should always be avoided such sites will deteriorate rapidly with further use. If unused, they should recover rapidly.

Lightly impacted campsites are on the verge of becoming permanent, well-impacted sites; continued used will cause this deterioration. If their use is curtailed, however, they still are capable of recovering. Therefore, it is better to camp on heavily impacted sites-where the most severe damage has already occurred-or on undisturbed impacted sites that are capable of supporting infrequent use without deteriorating.

5-6.3Site Selection

Select an established campsite with an already impacted area that is large enough for your party. It should be possible to locate the kitchen and all sleeping places in areas that are already highly disturbed. Select a larger site elsewhere, rather than risk enlarging the site by camping on its periphery.

Select a site that is durable enough so that your stay will not cause impact. Durability concerns differ between well-impacted sites and previously unused sites. Selecting a durable site is generally more important on unused sites; on well-impacted sites, the potential for damage has already been reduced by previous impact. Flat sites, without vegetation or easily disturbed soils, are always preferable. Sleeping and cooking areas can be separated; cooking can be done on highly durable sites (such as rock slabs) that might be uncomfortable sleeping places.

Durable sites are those that have little erosion potential and have either thick organic horizons or unconsolidated mineral soil. Choose a site on sand terrain or the forest floor, rather than meadows, streambanks, fragile alpine tundra, and other areas that plants can be easily trampled or scarred. Avoid locating campsites in areas that have delicate plants.

Camp on snow or gravel rather than on vegetation; or select a site which is covered by dry sedge rather than heather, huckleberry or other less-resilient plants.

Select a concealed campsite away from trails, occupied campsites, lakes, and other water bodies. You will enjoy more solitude and be less conspicuous if you select a campsite away from favorite spots. Locate your camp 200 feet or more from lakes, streams, meadows, and trails. Camping next to a busy trail or in full view of lakes, streams, and in meadows robs others of an unmarred scene and a feeling of solitude and also creates water and visual pollution.

If other parties are close to where you want to camp, move on or choose your campsite so that terrain features ensure privacy. Trees, shrubs, or small hills will reduce noise substantially.

5-6.4Campsite Behavior

Campcraft (rock wind screens, wood construction, trench lines around tents, etc.) is not only unnecessary, but it is also extremely destructive. Pick a well-drained campsite and use a tent with waterproof or a waterproof groundcloth so trenching won't be necessary.

Avoid cutting live branches, or pulling up plants to make a parklike campsite. If you do end up clearing the sleeping area of twigs or pinecones, scatter these items back over the campsite before you leave.

5-6.5Concentrate Activities

On established campsites, confine tents and activities to already impacted areas. When you camp at a well-marked site, you try to make most use of the ground that is already bar, already stamped by human presence; a little more traffic won't alter it further. when paths and pad are there, use them. But avoid doing anything to extend the barren area.

When you arrive at camp, take off lug-soled boots and put on soft-soled shoes such as tennis shoes or moccasins. Heavy-soled shoes have a great impact on the ground cover. Besides, your feet deserve the rest.

Watch where you walk to avoid crushing vegetation...try not to step on tree seedlings.

Dismantle any structures that were built. Structures built by others should also be dismantled, if they are inappropriate and not likely to be immediately rebuilt. Leave a single firering (but dismantle and additional rings) and any agency-built structures. Primitive log seats should probably also be left, and there are situations where user built stock facilities should be left.

The basic philosophy is to keep facilities to a minimum, but to avoid having them rebuilt on different parts of the site, spreading impact around. This requires striking a balance between the ideal goal of having no "permanent" facilities and the practical value of confining the impact associated with a facility to a small area. It is also important to leave the site clean and attractive so that other parties will be attracted to the site, rather than use some less appropriate site.

5-6.6Disperse Activities

On previously unused sites, disperse tents and activities. If you are at a pristine site, especially if there is vegetation underfoot, try to avoid repeated traffic over any one piece of ground. In moving between kitchen and spring, or tent and toilet area, take a slightly different route each time, and try to walk on duff, rocks, and mineral soils. Try not too mill around to much in one place, at the entrance of the tent or in the cooking area.

Arrange your site to avoid concentrating activities in the cooking area. Carry water to your site in large containers so fewer trips are needed. Further reduce your impact by choosing a different route each time you go for water. Spend no more than a night or two at any site, to give plants a change to recover.

Make every effort to camouflage any inadvertent disturbance. Twigs, cones, and duff can be scattered on places where organic horizons have been scuffed up. Broken vegetation can be picked up and scattered elsewhere, while flattened vegetation can sometimes be fluffed up. Fire sites in particular should be carefully camouflaged.

Before leaving camp, naturalize the area. Replace rocks and wood used. Scatter needles, leaves and twigs on the campsite.

5-7Campfires

Limit the use of campfires. Fires should be used sparingly, and they are among the most serious visual impact in the backcountry. Use of stoves is always preferable to building a campfire. Always carry a stove; use it for most if not all cooking; and only build a fire where it is safe and not cause further damage or deplete wood supplies.

Proper equipment, clothing and technique will provide more warmth than a fire. Fires are inadvisable because they sterilize the soil, destroy ground cover, and remove materials that continue the decomposition/rejuvenation process. In addition, fires create an artificial barrier between you and the sights, sounds, and smells of the outdoor environment.

5-7.1Firewood

You should use a campfire infrequently and only when there is abundant dead wood available on the ground. Be very critical about the necessity for campfires. In many areas, wood is being used faster than it grows. In overcamped areas or near timberline, choose an alternate campsite or use a portable stove. Avoid the use of fires when fire hazard is high.

Walk some distance from the immediate camp area to collect firewood. Gather a few pieces here and there, always leaving some wood on the ground. Do not take the last pieces of wood from any area.

Remember when you gather wood that it must be both dead and down to be eligible. Rooted, rotten snags are not firewood. They are habitat and hunting territory for owls, woodpeckers, and a whole community of animals small and large. Don't use wood you can't break. Axe and hatchet are not part of the wilderness tool kit today. Stop adding fuel well before you wish to put the fire out. Keep pushing all half-burned wood into the center of the fire until white ash remains. Thoroughly soak the entire fire pit with water.

You should not have collected more wood than you needed, but if you have, scatter it also. Diffusion is a major strategy of minimum-impact camping; extra wood should be spread lightly so it will not be noticed.

5-7.2Site Selection

Select a fire site where it is possible to build the fire on mineral soil, rather than on duff, vegetation, or rock. Usually this involves finding an established fire site or a place where mineral soil is exposed or underneath a thin layer of duff that can be removed. It is also possible, with care, to build a fire on a mound of mineral soil placed on rock (see action 45). The fire should also be far enough from trees, roots, overhanging branches, and large rocks so they are not blackened or harmed. Avoid building a fire in dense vegetation.

Build small fires, not large warming fires. Resist the temptation to build a rock fire circle. You may want to use a small rock or two to support cooking pots, but a full circle is not needed and does not prevent fire from spreading.

5-7.3Heavily-used Areas

When camping in an area that has well-impacted campsites and existing firerings, build campfires in an existing ring, or at least in a place that has already been scarred by fire. Do not build a campfire on a previously undisturbed spot. When selecting among several existing firerings, select one that will make it easy to concentrate onsite activities.

Attempts to make universally applicable rules about either always building fires in existing firerings or building fires on previously unused sites have been contradictory. Use of existing firerings is most appropriate in frequently used areas, while previous fire sites should be rehabilitated and avoided in remote places. The concept is to concentrate use in impact in popular places and to disperse use and impact in little-used places. The controversy results from attempting to develop a single simple rule.

A small, clean fire site should be left. If there was originally a ring of rocks, leave a ring of rocks. If the ring was overly large and built up, excess rocks should be scattered, away from campsite. If it was clogged with charcoal and ash scatter them lightly in a number of places, to be as inconspicuous as possible. Other firerings on the site should be dismantled completely. Scatter rocks, charcoal, and ash away from the site and attempt to camouflage the fire scar. Any litter should be carried out.

Some low-impact materials suggest that all firerings on campsites should be dismantled, regardless of circumstances. On frequently used sites, this frequently results in fire impacts spreading around a site as new firerings are built in different places. As a universal suggestion, dismantling all firerings is not recommended; it is appropriate in remote, little-used places.

5-7.4Remote Areas

When in a infrequently used area without well-developed campsites, dismantle and camouflage any firerings that you find. Do not use them and do not camp there. Select a site without obvious disturbance for camping and fire building.

If a fire ring show signs of recovery, such as plant recolonization, you should disassemble the fire ring and camouflage the area so that future camping in the area will be discouraged.

When looking for a potential fire site in a pristine area, choose a surface of mineral soil, thin duff (less than 2-3 inches thick), sparse vegetation, or a flat rock. Never build a fire in thick duff because the danger of fire spreading is great. Avoid fires in dense vegetation because it is difficult to not damage the vegetation.

Fires can be built either on a mound or in a pit. Mound fires are preferable if an adequate supply of sand or mineral soil can be found without damaging the source area.

To build a mound fire; spread a layer of soil about 6 inches deep on top of the ground surface, over an area larger than the fire will occupy. Build the fire on the soil. Mound fires are most likely to be built on mineral soil, duff, or rock. When cleaning up, scatter the soil and ash and camouflage the surface with mineral soil or litter and duff (whatever matches the surroundings). If the mound was built on a rock, rinse the rock off.

To build a pit fire, in mineral soil, simply dig a shallow pit several inches deep. Build the fire in the pit. Where there is a thin duff layer or sparse vegetation, clear the duff down to mineral soil from a circle several feet in diameter; build the fire in a shallow pit in the center of circle of mineral soil. To clean up, scatter ash, fill the pit in, and camouflage the site.

Many educational brochures also describe a technique for building fire in a hole cut in dense vegetation. This technique has a high potential for causing damage and has been abandoned, due to poor success, by the National Outdoor Leadership School (NOLS), which was largely responsible for developing the original technique.

If you have been using a firepit, drown the ashes and coals, scatter all remaining ashes, and return most of the mineral soil you removed back to the hole. Now look at the surrounding ground cover, and camouflage the top of the firepit to match. Use duff, aspen leaves, pine cones, whatever it takes to restore the surface to its natural state. Always be careful not to overcamouflage. A big pile of duff is a sure giveaway that there is something underneath. Good camouflaging is an art that takes a subtle touch. If you have built a flat rock (mound) fire, scatter the ashes and landscape the entire area.

5-8Waste Disposal and Sanitation

5-8.1Organic Garbage

Pack out or burn organic garbage. Select low-waste food and prepare them in quantities that will be eaten completely. If you do have leftover debris, however, pack it out with your other garbage.

Litter and food scraps can be minimized with careful planning and preparation. Food can be carefully measured so leftovers are minimized. When food is left, it should be packaged up and either eaten later or packed out. Partial burning, which is likely to occur when food is burned at the end of a meal, is unacceptable. Fish viscera are generally a natural part of the ecosystem. They should be scattered widely, out of sight and away from campsites. Do not throw back into lakes and streams (unless bear danger is high and viscera can be thrown into deep water); the cool temperatures in most mountain waters prevent rapid decomposition.

In grizzly bear country, food scraps should not be packed out. Special care in planning is required. Leftovers that cannot be burned should be scattered a long way from camp.

5-8.2Nonorganic Litter

You will want to pack out every bit of garbage that cannot be completely burned. Don't bury it.

The basic rule of waste disposal is to pack out what cannot be otherwise disposed of by careful meal planning. Only waste water and fish viscera should be scattered and burning of waste should be minimized.

Minimize the use of toilet paper. If it is used, either pack it out (ideally) or burn it as completely as possible and burn any remnants. Do not burn toilet paper if fire hazard is high or regulations prohibit it. One or two wildfires are started each year from someone burning toilet paper. So do not recommend this to wilderness visitors in hazard areas. Tampons should be packed out (unless you are in grizzly bear country) or burned in a very hot fire; they should never be buried.

The concept of packing out what you pack in is generally accepted. The handling of toilet paper is controversial, however. Many land managers dislike the idea of burning it because this increases the risk of wildfire; users dislike the idea of packing it out. Burying toilet paper is the less-than-desirable compromise that is often suggested.

In grizzly bear country, odorous materials can attract bears. Do not pack out containers that hold odorous materials. Through careful pretrip planning, odorous food should be kept to a minimum and containers that are not burnable should be avoided.

In addition to packing out your own litter, pack up as much of that left by others as possible.

5-8.3Human Waste Disposal

In an area without toilets, human waste should be disposed of in cat holes, in a place where it will not pollute waters and where other people will not find it.

Catholes should be widely dispersed, as far from campsites, trails, lakes, and streams as possible. Waste should be widely dispersed, as far from campsites, trails, lakes, and streams as possible. Waste should be buried in a small hole excavated in mineral soil, a place where disturbances will be minimal. For individuals, dig small cat hole in the top 6 to 8 inches of soil at least 200 feet from water, camp, and trails. Fill it in with soil after use, and cover with rocks, needles and twigs. Do not simply cover feces with a stone. A small trowel can be helpful.

Certain environments offer unique opportunities for human waste disposal. Crevasses on glaciers can make good disposal sites. Otherwise, proper waste disposal on snow and ice is difficult. Selecting a site far from places that are used during any season becomes critical. Waste disposal below high tide offers an opportunity on low-use beaches. On rivers, equipment is available that permits all waste to be carried out in portable toilets. This is an extremely effective means of minimizing problems. Waste deposition on the surface may be appropriate in very lightly used areas where excavation of holes can cause long-term impact. Spreading the feces on a dry and exposed sites will maximize exposure to sunlight and therefore, decomposition.

Generally, do not build latrines, although they may be necessary for long stays by large groups in popular areas. This situation should be avoided, however, because decomposition rates are extremely slow in latrines, and excavation by animals is a serious problem. Large groups (sever or more) that are camping in the same location for more than one night should use the trench method. In a well screened location, several hundred feet away from any water, dig a narrow trench approximately 2 feet long and 10 inches deep. After each use sprinkle a small amount of dirt over the excrement. The trench can be used to within four inches of surrounding ground level and then filled completely and the site naturalized.

5-8.4Waste Water Disposal

Bathe, wash, and dispose of waste water away from water bodies and campsites. All soap pollutes lakes and streams. If you bathe with soap, jump into the water first, then lather at least 100 feet from the water, and rinse the soap to break down and filter through soil before reaching any body of water. Clothes can be adequately cleaned by thoroughly rinsing. Soap is not necessary.

Dishes should be washed away from water sources. Dishwashing is simple; don't use soap. If food sticks, fill the pan with cold water and let it soak several hours overnight (except in grizzly bear country). Clean jars or narrow-mouthed containers by shaking pebbles and water inside them. Scrub the inside of pots with sand, gravel, pine cones, or a pine needle cluster.

In grizzly bear country it is important to wash dishes immediately after use, in an area far from sleeping places. Where risk is very high, washing directly in water may be justified as a means of minimizing orders.

5-9Stock Use

It is acknowledged that stock use is proportionately more damaging to resources than hiking. Because of this, care must be taken where possible to minimize the impacts of stock. Often, in his need to defend the use of stock and his income, a packer will argue that stock do not significantly affect resources. But the packer must be made to understand that by using minimum impact techniques, their resource (and the livelihood) can be perpetuated.

Refer to "Techniques and Equipment for Wilderness Horse Travel" from the USDA Forest Service Equipment Development Center, Missoula, Mont. Publication 2300-Recreation 8123 2403.

5-9.1General Considerations

Animals conditioned to strenuous mountain travel are at home on the trail and accustomed to supplemental feeds and various methods of containment. Horses that react to strange looking ropes or corrals can cause damage or injury to themselves. Introducing stock to hobbles, picket pins, hitch lines, and various temporary corrals in a familiar environment may avert a major calamity at some remote camp.

Take the minimum number of stock to make your trip successful.

Parties with stock should travel as much as possible on designated trails, rather than taking off-trail routes. When on trails, stock should be tied together and led single file along the main tread. They should not be allowed to spread out or to walk on parallel or developing trails. Neither should they be turned loose and herded down the trails.

Horses should be shod with flat plates or not at all. Other items to bring include supplemental feed, nosebags (for feed), hobbles, a hitch line with "tree-saver straps," and bug repellent and fringed eye guards to reduce aggravation caused by flies and mosquitoes. Carry an ax to chop out downed logs, but avoid using it to gather firewood. Follow the recommendations on equipment for all wilderness users. Otherwise, take as little equipment as possible to minimize the number of stock.

When encountering a trail obstacle, such as a fallen log, stock parties should remove it and make the main trail passable again. Do not leave the trail to skirt the obstacle. Notify the managing agency if the obstacle cannot be removed.

Move to another campsite before forage is overgrazed and before where stock are confined show excessive trampling damage. In fragile areas and during particularly vulnerable times of the year this may mean moving every day. In places with abundant forage and durable sites for confining stock, long stays and acceptable. Find out about forage conditions before going into an area.

Never confine or allow stock to roam on the campsite. They should be kept some distance away, where they will not foul the site. If necessary, bring them into the campsite to be quickly loaded or unloaded. If they relieve themselves during this period, be careful to remove the manure.

In addition to normal camp cleanup, several of the disturbances unique to stock parties must be dealt with. If picket pins were used, they should be removed. If salt and feed are left over, they should be packed out. Temporary hitch rails and corrals are dismantled, and manure piles are scattered to aid decomposition, discourage flies, and as a courtesy to others.

5-9.2Feed and Water

Plan on carrying supplemental feed for your stock. In many backcountry areas forage is limited and grazing may be restricted or unavailable. Inquire at the local Ranger Station about the conditions so that you know how much supplemental feed to carry.

Weed-free oats or pelletized feeds are preferable to hay, which is much bulky to pack. If hay is used it should be certified weed-free. A number of wilderness areas require all feed to be packed in. A number prohibit the use of hay or unprocessed feed.

Pick a spot downstream from your camp and others in the vicinity to water your stock. Pick a spot that can handle the trampling, preferable a place with low banks that are hard and rocky or gravelly. Take stock to this place shortly after arriving in camp. Watering stock with a bucket can also reduce streambank impacts.

Place salt blocks on a tarp, a notched log, or some other container. This prevents rain from leaching salt into the soil, destroying vegetation, and attracting wildlife that paw up the ground. Better yet, use processed feed, with salt added, so there is no need for supplemental salt. Supplemental feed should be placed in a nosebag or on a trap. Do not place directly on the ground. When feeding hay or grains that have been packed in, lay the hay out on a pack trap or sheet of plastic.

5-9.3 Confinement

Where confinement is necessary, use a hitch line on a durable site away from water. Remember, any time stock is restrained, particularly if they are away from home and their special partners, they can cause considerable damage to trees, plants, and soil by pawing and tramping. If it is necessary to keep stock tied for any length of time, use a rope hitch rail at least 200 feet from any water, trail, or campsite. Select a site where they cannot tramp on treeroots and where damages to plants will be minimized. Rocky, hard ground is usually best. If an animal is inclined to paw while tied, it can do considerable damage to the soil and plants. This type should be hobbled while tied. If some horses are kept tied, while others are turned loose to graze at night or in the day-time, it is almost always best to keep two horses tied rather than one. Two will usually stand quieter. Tie stock to hitch line so their noses can just touch the ground.

A hitch line is a good idea. Stock can be quickly tied, kept in order and easily watched. Wide nylon "tree-saver straps" with quick-adjusting buckles are used for speed and convenience. Rope is run between the straps, tied with a quick-release knot, and pulled taut.

When it is time to take a break, move off the trail far enough so that other parties can pass unnoticed. For breaks that last only a few minutes, it is acceptable to tie stock directly to trees, if they are larger than about 8 inches in diameter. Never tie stock to any tree for a long time. Use a hitch line between two trees instead.

At rest stops--even short ones--stock are tied well off the trail. It's courteous and minimizes trail wear. If it's a scenic overlook, historic site, or other popular stop, stock are kept out of the area.

5-9.4Grazing

Grazing minimize confinement of stock when grazing; move picketed stock frequently

Some wilderness managers are more favorable toward picketing than others. This probably reflects their tradition of use. Meadow deterioration is likely to occur wherever stock is picketed, unless great care is exerted. Temporary corrals have also been suggested as a means of confining animals, particularly for long periods of time. This is likely to result in overgrazing of the corral area and, therefore, is not generally recommended.

Restrained animals can do considerable damage by pawing and trampling the vegetation. Hobbles are the best device for restraining stock. The animal can move enough to graze but is not confined as in picketing.

Once in camp, travelers can allow their stock to graze. Because picketing can cause considerable plant and soil damage, most stock is hobbled. Picket only enough horses to keep other from straying. Since they know it is illegal and environmentally improper to cut green trees, carry metal picket pins for moving the horses easily two or three times a day.

Be certain meadows in the areas will support the grazing needs of the livestock. Both water and grass supplies should be carefully examined. Frequently used areas are often exposed to heavy grazing through the season. Overgrazing contributes to a reduction in the active strength of the grasses, adds to the trodden-out appearance of the meadows, provides opportunities for unwanted weeds to grow and generally adds to the degradation of the area. The amount of feed available or the amount of feed packed in will determine the length of your stay.

In some areas, overgrazed meadows have been closed to grazing.

6 Interpretation

Interpretation is the art of translating what the five senses are absorbing into another sense and is usually done verbally or through visual aids. Not only must you interpret for the public the natural history of the wilderness and its ecological niches, but you must also interpret for them the philosophy behind wilderness management and the laws you are enforcing. A good book on this art is "Interpreting for Park Visitors" by William J. Lewis, Eastern Acorn Press. It is oriented toward National Park Service interpretation, but applies to any interpretive situation.

6-1 Wilderness Information

Visitors often have many questions about the wilderness before they start a trip. This information must be collected and disseminated to the public information points in your District. Sources of public information are bulletin boards, District offices, wilderness information booths, Supervisor's Offices, adjacent Districts, entrance stations, and trailheads. These should be updated as needed.

Example of information contained in visitor information sheet are given below. A note like this with current information together with the wilderness Rangers comments will usually be read whereas a lot of printed material isn't. It's an effective way to add a personal no-trace message also.

MINARETS WILDERNESS INFORMATION

(West of the Ritter Range) As of \_\_\_\_\_\_\_\_\_\_

Clover Meadow Office Hours - 8 a.m. to 5 p.m.

1. Safety Tip -

2. Snow Conditions/Elevation -

3. Water (availability, not potability!)

4. Trail Conditions -

5. Wildflowers -

6. Mosquitos -

7. Fishing -

8. Bears -

9. Problem Areas -

6-2Earth Sciences

[INSERT LOCAL INFORMATION IN EACH SECTION]

6-2.1Geology

6-2.2Soils

6-2.3Rock types/characteristics

6-2.4Water

6-3Climate and Weather

6-3.1Wind

6-3.2Precipitation

6-3.3Temperature

6-4Biological Sciences

6-4.1Fish

6-4.2Birds

6-4.3Mammals

6-4.4Plants

6-4.5Poisonous Plants

6-5Historical

6-5.1Native Culture

6-5.2Early Settlers

7 Site Maintenance, Restoration and Monitoring

7-1General Considerations

The actions of managing a wilderness vary considerably. As stated earlier, wilderness management is not an exact science. Because of the differences in wilderness units, the actions taken often differ. In one wilderness overuse of a lake may require the closing of camping within a certain distance of that lake while in another wilderness reducing or shifting quotas at trailheads may accomplish the same goal.

The question to ask is, "Does this action benefit the quality of this wilderness in the long run, biologically, and/or socially?" We must look to the future 50, 100 and even more years from now. As stated in the Wilderness Act, wilderness areas shall be preserved "...for the benefit of all American people of present and future generations." To this end, consider the following considerations before taking action on a site:

1. Is this good or poor camp site location?

2. Will impacts be elsewhere if these sites are removed?

3. What are alternate sites for ones that are removed?

4. Can use be discouraged by "trashing" site with manure, logs, rocks, etc?

5. Allow revegetation only if a loss of the wilderness resource has occurred due to human influence and there is no reasonable expectation of natural regeneration.

6. Is restoration of over used sites (a cost- and time-consuming affair) effective?

7-2Firerings

Fire rings are the center of activity in the campsite and the area around the campsite that is the most impacted. Good fire rings should be small in size with enough rocks to put a small grate on and away from rocks and cliffs that may get soot scarred. Dispose of rocks from unwanted fire rings by scattering them widely under bushes, and burial in "dishes" created by stock pawing the ground and removing the dirt at the base of trees. The effects on fisheries habitat and water quality must be considered when rocks are to be disposed of in streams or lakes. The stream should not be blocked.

Remove all litter, burned cans and plastic as well as foil from the charcoal and ashes before dispersal or burying. You will have to stir up the charcoal. A full size shovel works well for this job. Wear leather gloves and use a shovel, or trowel, and carry an ash bag to out soot in for dispersal.

Disperse charcoal from unwanted fire rings (make sure the fire is dead out) by widely scattering it in bushes or by digging a hole in sandy soil with no vegetation and burying it. If you use water to make sure the fire is dead, it will also keep you clean by reducing dust, and make it easier to gather and disperse charcoal if it's wet. After a fire ring has been eradicated, cover the soil site with forest litter, or other available native material.

It is a common sight to see charcoal remains in a meadow where years before a campfire was built. Usually no vegetation has grown back because the charcoal absorbs radiant heat and effectively kills off plant growth. The same will be true of campfires you naturalize unless you cover the old fire scar with native material to reflect some of the heating rays of the sun. To assure regrowth get as much charcoal out as possible, mix the rest up with soil. This aerates the soil and keeps old fire rings from getting over grown with moss.

Old campfires that are not surrounded by a used campsite and are in meadows or a more fragile community can be handled in the following ways.

1. If rocks still surround the charcoal, remove and scatter them as above.

2. Remove litter and foil disturbing the charcoal as little as possible.

3. Use sharp end of shovel or a trowel to gently cut into soil, give it a twist to help aerate the soil. Usually well-used fire rings have a layer of baked clay soil below the ash, and has to be broken up and preferably mixed with duff or organic litter.

4. Transplant a few plugs of grass, forbs, or spread seeds in soil.

5. Cover the charcoal on site with a layer of pine needles, dirt, etc., at least 1/2" thick, water transplanted material.

6. Small branches laying on the ground can be placed over the site also.

7-3Removing Improvements

Improvements include old fences, boards nailed to trees, structures, and everything else imaginable! Do not remove a structure unless you have District Ranger or Forest Supervisor approval, since it may be an historic site or belong to an outfitter, grazing permittee or other wilderness user.

You may need the following tools: fence stretcher, pry bar nail puller, hammer, screwdriver, wire cutters, adjustable wrench, gloves, hacksaw, plastic bags, burlap sacks, nylon ropes.

Disassemble and remove unauthorized structures including: nails, wire, bear bars, tables, seats, swings, hitching posts, pipes and plastic from springs, lean-tos, rock wind barriers, etc., and fill in trenches. It's important for the wilderness ranger to know the location of and authorized structures in permitted (outfitter) camps so they are not inadvertently removed.

7-4"Dishing" By Stock

Stock tied to trees paw at the base of the tree causing a "dishing" effect. Roots are exposed and damaged and water collects in the depression causing root rot. Trees with dishing often die. Also, halter rope, abrasions where the bark has been girdled causes death to trees. Some dishes measured up to 4 feet deep.

Fill in the dishes with the dirt that surrounds the tree, seen as a slight mound a few feet from the tree. These are generally around the entire circumference of the tree. It is acceptable to put manure and rocks from campfires in the dish and then bury them with the dirt. Don't put charcoal in these dishes as it may be scattered later by pawing stock. Large rocks can be planted in the surface area when done. They will stick out, look natural, and will discourage further use of that tree to tie up to.

7-5Site Recovery

Transplanting for site and abandoned trail recovery is time consumptive. It takes much work for the benefit derived. So only attempt this if you feel fairly confident of success and will not scar the borrow site too severely and there is no reasonable expectation of natural revegetation.

Transplant plugs by removing dirt from the naturalized site to a depth that will accommodate the roots of the new plant and the sod. Find an area that is away from the site and has plenty of species of the type you wish to transplant. Be sure you know which species transplant well in your area. Some do fine, others are impossible to propagate. Check with your Forest's Range conservationist or botanist for help. Push a spade or shovel deep into the earth around the entire sample, then slowly pry it out. Put it in the new location and fill around the edges so there is no air under or around the sample. Be sure to water it. Fill the "home" site with free dirt and forest litter.

Use only native plant species for re-seeding. "...the introduction of non-indigenous species is never justified." Transplanting plugs of vigorous species (grass) works in the early season. Later, seeds can be gathered from plants in the immediate area. Transplanting works again in the late season when it's raining. For further reading see "Propagation of Plant Material for Subalpine Revegetation", Joseph W. Miller, Margaret M. Miller, North Cascades N.P., Sedro Woolley, Wash. USFS No. R-6-001-1979.

Compaction of soil is a serious problem that discourages natural revegetation. To encourage natural seeding, loosening or scarifying the soil was quite effective in furthering the establishment of grass, shrub and tree seedlings. Loosening soil with a shovel or spade to a depth of approximately 6" will be adequate in most cases.

If you want to discourage further use of the site, put large logs and rocks in a natural-looking arrangement to provide microclimate for new plants as well as to keep people off it.

Enforcing closures can be difficult though they may be effective through proper education and signing. The most effective approach consists of helping visitors understand the reasons for closures and letting them know about alternatives. Closures signs should be placed at the site, and attached as a supplemental flyer to wilderness permits.

7-6Toilet Structures and Areas

Toilets may be necessary in some locations where there is heavy use and no other reasonable alternative exists. If provided, use them, rather than the dispersed cathole method. Decomposition and solar dehydrator toilets cost the least in the long run, but more studies and research must be conducted for these types of toilets at high elevations.

Generally, toilets are not acceptable facilities within wilderness areas. The "cat method" of human waste disposal is the preferred method of human waste disposal, as described in Section 5-8.3.

8 Trails and Signs

Trails have been used by humans for millennia. Native Americans established trails by continual use of routes and game trails. The cavalry was responsible for patrolling trails in the 1800's and early part of the 20th century and, in the 1930's, Civilian Conservation Corps crews constructed many trails that are presently in use. Stockmen used the Mountains in the west for grazing cattle and sheep and constructed many trails along deer trails or routes used by local tribes.

Trails will be constructed and maintained to the standard specifications listed in the Trails Handbook (FSH 2709.12). Differences in ecotypes require the use of different trail construction and maintenance techniques. Check whether there is a Regional supplemental to the Trails Handbook.

A portion of the Wilderness Ranger's time is spent on trail maintenance. The trails management system can be confusing. You should understand fully what is expected of you from your supervisor. There will be differences in the ranger's responsibility related to trails from unit to unit. For a complete picture and full understanding of the maintenance management system, see FSH 7709.12.

8-1Local Standards for Trails

[INSERT REGIONAL/FOREST TRAIL MAINTENANCE STANDARDS]

8-2Training

Differences in methods of maintenance occur due to local conditions as well as resources available. Word-of-mouth descriptions on how to perform maintenance are not enough. Your supervisor must show you how to do it. A great deal of skill and knowledge is required to perform good maintenance and you must learn this from your supervisor and from experience.

Your supervisor will schedule specific trail projects and maintenance. Be sure that safety precautions are an integral part of your training.

8-3Basics of Trail Maintenance.

To avoid confusion, you must become familiar with the terminology of trail maintenance, i.e., trail tread, trail bed and trail way.

8-3.1Loose Rock and Root Removal

Remove loose rocks from the tread that are the size of your fist or greater. These must be cast to the downhill side of the trail below the level of the trail tread, not stacked on the berm. It is common to find deep ditches in trail beds with large rock berms on either side, especially with switchbacks. This piling of rocks channels water down the trail bed and does not permit runoffs. If this occurs on a series of switchbacks, it may be necessary to haul the rock a short distance. Watch out for people coming up slope!!!

Generally, remove rocks and roots that project above the surface of the trail tread 2" or more that can be removed by hand or pried out with a tool. If erosion may be accelerated by removal, it is better to leave it.

8-3.2Slough and Berm Removal

Material that accumulated in the trailbed should be scraped or shoveled to the daylight (fill slope) side of the trail. Dirt berms may be shoveled onto the trail tread to fill the depression in the center. There should be a slight incline or outslope to the daylight side of the trail to permit water runoff.

8-3.3Routine Drainage Maintenance

Clear culverts, waterbars, drainage dips, ditches, stream fords and gully crossings of any debris that may divert water onto the trail instead of across it. There are often low spots in the trail where water collects after rainstorms and during spring runoff. Generally, breaking open several one-foot sections of the berm on the downslope side is sufficient to permit the water to drain.

8-3.4Waterbars Maintenance

Maintaining proper drainage on a trail is the single most important task in preserving it. Waterbars must be cleaned in the spring as the snow recedes, in the fall in preparation for winter, and at other times during the summer as necessary. Clear the drainageway on the upgrade side of the waterbar. Use soil cleared from this area to backfill down grade behind the waterbar and pack in place by stomping. One to two feet of level outslope at the mouth (where the water runs off the trail) is necessary for good water drainage. The end result of maintenance on a waterbar will be a sweeping turn from approximately 6' uphill from the waterbar, out the spillway at the mouth.

8-3.5Logging Out

Logging out involves removing trees, down brush, logs or a section of log or tree fallen on or across the trail, to permit passage. Feeling half-down trees that are hung up or jack-strawed should only be accomplished by experienced sawyers due to additional risks.

Logging out is done with a one- or two- person cross cut saw, bow saws and small folding saws. A crosscut bucking saw is easier to use but a felling saw works too. Carry kerosene to pour over the saw when you're cutting a log with a lot of pitch. This will prevent the saw from binding.

Determine which way you want the section of log to roll, then make the cuts slightly angled away from each other so the log will roll free. Roll the cut section of the log well off the trail and preferably left in as natural appearing position as possible. Use underbrush or soil to screen fresh cut ends where possible. The space left after bucking out a log must extend beyond the trail bed sufficiently to allow for a loaded pack mule to pass through without hitting its load; usually 2' on each side of the trail bed with a minimum total clearance of 8'.

Few people remember the art of sharpening cross cut saws, and it may be difficult to get them sharpened.. The quality tools necessary to sharpen and maintain saws are hard to find. Vintage tools are of supervisory quality to those now being manufactured and sold. Older loggers who may be retired or former trail crew members often used cross cut saws and know how to sharpen them. For more information on cross cut saws and how to sharpen them, refer to the "Cross Cut Saw Manual," from the Missoula Technology Development Center.

8-3.6Brush Cutting

Brushing involves cutting back and pruning plant growth near the trail. Clearing should normally be 8' wide and 10' high to allow safe passage of stock. It is important to cut limbs of trees or brush at the junction to the next largest limb or at the trunk. "Limbing" correctly is esthetically pleasing, safer, and reduces disease infection from trees. Do not leave stubs and use methods to protect tearing bark.

Dispose of this brush out of sight on the downhill side of the trail or use it to block off switchback shortcuts. Don't leave it in the trail.

8-3.7Other Maintenance Activities

Obliterate abandoned trails to a point out of sight of used trail intersections or for at least 100 feet with wood, rocks, dirt, etc. This is called putting a trail "to bed." Transplanting, reseeding, and fertilizing is sometimes necessary to naturalize an abandoned trail if there is no chance for natural revegetation.

Bridge decks that are covered with dirt and debris rot faster. Take a few moments to clean the bridge deck and push dirt out between the planks. Check for structural problems, loose bolts, rotten planks, or unusual movement and report these immediately to your supervisor and the engineering department.

8-4Signs

Wilderness rangers must remember that signs are not provided for the convenience of the visitor. Wilderness visitors should not need or expect much help in finding their way. Along with materials, provide a minimum number of signs for either the routing or located of the traveler or the protection of the wilderness resource.

Warning signs for safety may be necessary. Signs will be used only at confusing trail junctions, wilderness boundaries, trailheads and, locations where special regulations may be in effect (i.e. lakes where special restrictions apply), and for scientific purposes such as enclosed research plots. Wilderness signs should blend into their surroundings, but still be visible. Distances within wilderness will not be used to provide a more primitive experience and eliminate incorrect information. Place name signs will not be used to name lakes, creeks, etc. Any sign, when no longer required for its function, should be removed.

8-4.1Sign Inventory and Specifications

Signs are planned, designed, produced and installed with the assistance of the Engineering Staff, and details found in the engineering sections of the manual (Refer to FSM 7160 and FSH 7109). Signs should be included in the log and prescription survey.

Usually a sign at a confusing intersection will have no more than three lines of writing on it. In all situations (except for extremely rare cases), the direction that the sign faces away from should be listed on the top line. This will indicate the straight ahead direction first. Second should be the direction to the left and thirdly, the direction to the right. If there are two features that are to be indicated in the same direction, the closest one is listed first.

A single sign can be used at a majority of intersections, and an attempt will be made to reduce the number of signs within the wilderness by consolidating old signs. Careful observation at the site is crucial for precise directional signing. It is not possible to select directional signing from a map. Along with the wording of the sign and directional arrows, a simple map describing the site should be drawn describing the site where the sign will be erected. This should indicate the intersection of the trails and the exact location of the sign, which way it will face, and whether it will be mounted on a post or a tree.

When possible, wilderness trail signs should be mounted on a tree, but the tree must be large enough (at least 10' in diameter dbh) so that the screws used for mounting will not affect the tree adversely. Trees must be in exactly the right location to be useful for sign mounting so that it will not be damaged by traffic or bumped by pack stock. The outer layer of bark should be removed, but not to the cambium layer, to permit a flush mounting. The bottom of the sign should be approximately 52" from the ground. The tree should also be pruned if necessary.

8-4.1Post-mounting

If suitable trees are not available, the signs should be mounted on a post made of native materials. Cut post from the most durable species readily available at the site in the following order of priority: larch, Douglas Fir, Ponderosa pine, and lodgepole pine. In areas where these species are not found (i.e. sub-alpine and alpine zones) you will need to choose from what is most readily available.

Choose posts with no visible decay or major defects. Peel posts of all bark and cut to a length of 8' with a diameter of 7-9" at the top of post. Hence, the bottom diameter will be greater. The top of the post should be axe-beveled. Where possible, set the post into the ground to a depth of 2 1/2' with a 2-foot high rock cairn around the base. If solid rock prevents planting the post 2 1/2' deep, plant it as deep as possible with a 3-foot high rock cairn around the base. The objective here is to plant the post so that it will not move or become loose for the life of the post. The post length may need to be cut down so that the sign won't be too tall if it can't be buried in the ground very far. The top of the post should end up 5 1/2 to 6' above ground level.

Dig the post hole to a size sufficient to allow 4" clearance on all sides of the post when placed in the hole. This allows the backfill to be tamped thoroughly into place. Backfill and tamp a little at a time until the post hole is filled just above level with the post.

Rocks used in building stone cairns should be angular, solid and durable. Rocks should be the largest size available near the site that can be handled safely. Place the cairn rocks so that they slope towards the center and rest firmly against the wood post before installing. Make sure the cairn is permanently stabilized post and sign.

8-4.2Sign Attachment

It is easier to attach the sign to the post before setting it in the ground. Trail signs should be attached with four 1/4 x 5-7 inch pole barn nails and washers. Used either method according to your judgement and/or availability.

Signs should be attached 4 inches below the top of the post. On trees, signs should be mounted 5 1/2 to 6 feet above the ground.

8-4.3Wilderness Boundary Signs

These large signs may be attached to trees or posts. Use an 8-foot post with a diameter of 8-10" at the top. Again, the bottom diameter will be greater. The sign should be mounted 4" below the top of the post. Use four 3/8 x 6" lag bolts and washers to attach the sign. On trees, signs should be mounted so the top of the sign is 5 1/2 to 6 feet above the ground. Use the tree mounting instructions discussed in the previous section.

When locating the sign be sure that there is at least 4' from trail center to the near edge of the sign in order to provide clear passage. Choose the best spot close to the wilderness boundary. The sign does not have to be right at the exact location of the boundary. Also, wilderness boundary signs are designated as either right or left side of the trail signs. Most of ours are right side signs. Know the difference.

In some cases, the wilderness boundary and now motorized-use boundary are the same. In such a case, mount the non-motorized sign on the tree or post 2 inches below the wilderness boundary sign.

8-4.4Sign Mounting Procedures

When erecting signs be sure that the direction indicated by the arrows on the signs are correct? There is no point in putting up a sign with misleading information. Keep a record of what signs are installed.

Remove and destroy old signs. Pack out old signs of historic significance or other value. Re-use old bolts and washers if possible, otherwise, pack out.

And remember, the lay of the land along the trail will influence the way the sign standards are applied. Use good judgement.

Minor sign maintenance is part of the wilderness Rangers job. See that posts are straight. To touch up vandalized signs, include stain as part of your equipment. If signs are badly damaged or stolen, make a note so replacements can be scheduled in future trips.

Wilderness entrance signs and their specifications are listed in the Catalog of Posters and Signs FSH 7109.11a.

8-4.5Recording Signs

A sign inventory can be developed that will show the wording on the sign; the exact location; the status of the sign (such as "needs repair", "OK", "reword", etc. cost of the sign and any pertinent information related to that sign. A sign number will be assigned to each one.

Record information from the present sign and its present condition, and also the text for a replacement sign, if needed.

Use the symbols , ^, <, >, for a replacement sign, if needed. Indicate straight ahead, left and right to draw a simple map of the present location of the sign and draw the new sign as it should be if the location will be different.

9 Other Responsibilities

9-1Fire Management

Fire is an integral part of the wilderness ecosystem and should be managed along with other wilderness resources. Allowing fires to function through its natural processes will maintain wilderness areas as we know them. Land Management Plans (LMP) and wilderness implementation plans give direction for planned and unplanned ignition and prescribed fires.

Fire prevention should be part of your visitor contacts. Smoking and campfires start more human- caused fires than any other activity. Encourage visitors to use stoves.

Most Forest Service employees are given a 32 hour basic fire fighting course. After passing a step test, you receive your "red card" and can then work as a fire fighter. For additional information on firefighting, consult FSH 5109.17 - Fireline Handbook.

If you receive a call from the dispatcher directing you to a fire, obtain all pertinent information on the location of the fire. Leave your radio on. If you feel you cannot handle a situation, call for help.

There are some restrictions on fire fighting within wilderness areas. Motorized pumps and chain saws can be used in fire suppression when approved by the Forest Supervisor. Anything that leaves wheel marks or "tracks" requires the Regional Forester's approval.

Contact your dispatcher with the following information:

1. Township/range, section, 1/4 section and nearest named landmark (if you are unfamiliar with figuring this info. from a map, have your supervisor show you how)

2. Size of fire.

3. Type of fuel fire burning (heavy brush, grass, light or heavy timber, etc.).

4. Rate of spread.

5. Potential for spread.

6. Number and type (civilian, volunteer, Forest Service, etc.) of persons assisting in suppression.

9-2 Cultural Resources

Cultural resources are frequently found within wilderness areas. Archaeological and historical sites are not renewable and cannot be replaced. Look, photograph, enjoy. But do not disturb. Climbing in, on or around ruins will speed up destruction of the site. Touching rock art will leave oils from your skill on the rock, these oils hasten the deterioration of the art work. Do not remove artifacts! Respect the time and energy these ancient inhabitants put into their work. It has survived for hundreds of years. Help preserve it for future generations.

Cultural resources are evaluated and assigned to one of the following management categories: long-term preservation, research, interpretation, data recovery, natural deterioration, and removal. The FS program includes protecting cultural resources from human-caused or natural deterioration until a management decision has been made that the property or site is eligible for the National Register of Historic Places and it has been allocated to a specific management category. Scientific research may be approved. Interpretative programs are developed primarily outside wilderness (except for verbal on-site interpretation by wilderness rangers and other staff).

Old cabins are may be a cultural resource that can be a problem. At times these cabins are old and falling down and are a significant safety hazard. Your supervisor should have the archeologist visit these cabins to determine their significance, then they can be torn down or a schedule can be set for their maintenance.

Native American artifacts and sites are also of significance. If you find artifacts, do not remove them. Pinpoint their location on a map and notify the Forest archeologist of what you found and where. You may photograph artifacts in the place they were found.

An archeological clearance must be obtained when construction of trails or significant ground disturbance will occur. An archeological reconnaissance takes little time and may be of interest to the Wilderness Ranger if s/he tags along.

You may not be able to determine if an old garbage dump is worth considering important archeologically and yet you may want to get all that unsightly trash out of the wilderness. If there is any question that the dump site may be near 50 years old, record the site on a map pin pointing the location, and then cover the site with forest litter and dirt. Make sure you notify the archaeologist and have your supervisor arrange to have the site inspected for archaeological significance.

If you have questions regarding cultural resources, consult your Forest archaeologist.

9-3 Training

Wilderness rangers need the skills and knowledge to do the best job possible, and training is one of the best ways to provide these. A wilderness rangers training session should be scheduled at the beginning of each season, to meet the following goals: understand the duties and responsibilities of their job, relate their management responsibilities to the Wilderness Act and all the supporting direction and plans, be certified to do all the required tasks (safety, first aid, law enforcement, fire training, etc.), be able to contact visitors, and be familiar with local geography.

The items included in this wilderness rangers handbook are a good starting point for planning a wilderness rangers training session.

Additional low-cost training can be obtained in the Wilderness Management Correspondence Course prepared by the Forest Service, Bureau of Land Management and National Park Service and offered by Colorado State University. Get further information from Colorado State University, Division of Continuing Education, Ft. Collins, CO 80523, phone 1-800-525-4950.

9-4Additional Handbook Topics

The following is a list of information that some individuals have included in their local "Wilderness Rangers Handbook. Use your creativity and local needs to decide what sections to add!

1. Recreational use patterns

2. Printed ruler on handbook cover and common conversion table

3. Complete Wilderness Act of 1964

4. List of prohibitions from Code of Federal Regulations (36 CFR 261)

5. Maps showing trails and facilities

6. Annual Wilderness Operation and Maintenance Plan

7. Fisheries Record Report

8. Wildlife Sighting Report

9. Stock Feed Charts (weight, nutrition, etc.)

10. Visitor Opinion Survey

11. Blank pages in back for notepad

10 Suggested Readings And References

10-1Laws, Regulations and Policies

A few references on selective topics are included within the text in this Wilderness Rangers Handbook. It is also recommended that a "Wilderness Shelf" be set up in each District and Forest Supervisor's office. Your seasonal employees can easily find and read reference materials, if its all gathered on one shelf. The follow references should be on your "Wilderness Shelf."

Forest Service Manuals:

Wilderness Act of 1964 (PL 88-577)

[INSERT ENABLING LEGISLATION FOR WILDERNESS ON YOUR DISTRICT]

Title 2300 Recreation Management

Title 2320 Wilderness Management.

Title 7700 Transportation System.

Forest Service Handbooks:

Title 2309.19 Wilderness Management.

Title 6109.11 Employee Development.

Title 6709.11 Health and Safety Code.

Title 7109.11 Sign Handbook.

Title 7109.11a Catalogue of Posters and Signs.

Title 7709.12 Trails Handbook.

Code of Federal Regulations, Title 36. Covers laws relating to the Forest Service.

[INSERT STATE FISH AND GAME REGULATIONS.]

10-2 Books and Publications

Cole, David N., 1989. Low-Impact Recreational Practices for Wilderness and Backcountry. USDA For. Serv. Gen. Tech. Rep. INT-265. 131 pp.

Cole, David N., 1989. Wilderness Campsite Monitoring Methods: A Sourcebook. USDA For. Serv. Gen. Tech. Rep. INT-259. 57 pp.

Cole, David N., Margaret E. Petersen, and Robert C. Lucas. 1987. Managing Wilderness Recreation Use: Common Problems and Potential Solutions. USDA For. Serv. Gen. Tech. INT-230. 60 pp.

Fox, D.G., A.M. Bartuska, J.G. Byrne, E. Cowling, R. Fisher, G.E. Likens, S.E. Lindberg, R.A. Linthurst, J. Messer, and D.S. Nichols. 1989. A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas. USDA For. Serv. Gen Tech. Rep. RM-168. 36 pp.

Fox, D.G., J.C. Bernabo, and B. Hood. 1987. Guidelines for Measuring the Physical, Chemical, and Biological Condition of Wilderness Ecosystems. USDA For. Serv. Gen. Tech. Rep. RM-146. 48 pp.

Hallman, Richard R. 1988. Handtools for Trail Work. USDA For. Serv. Missoula Techn. Devel. Ctr. TE02L22. 60 pp.

Hammitt, W. E. and D. N. Cole. 1987. Wildland Recreation: Ecology and Management. Wiley Interscience, New York. 341 pp.

Hampton, Bruce and David Cole. 1988. Soft Paths. Stackpole Books. 173 pp.

Hendee, John C., George H. Stankey, and Robert C. Lucas. 1978. Wilderness Management. USDA For. Serv. Misc. Pub. 1365. 381 pp. (Out of print, has been revised and will be published in early 1991 by International Wilderness Leadership Foundation.)

Leopold, Aldo. 1949. Sand County Almanac. Oxford Univ. Press. 295 pp. (Current edition: 1988, Ballantine Books)

Miller, Warren. 1977. Crosscut Saw Manual. USDA For. Serv. Missoula Techn. Devel. Ctr. 7771-2508. 27 pp.

Mrkich, Dale and Jerry Oltman. 1984. Hand Drilling and Breaking Rock for Wilderness Trail Maintenance. USDA For. Serv. Missoula Techn. Devel. Ctr. 27 pp.

Nash, Roderick. 1982. Wilderness and the American Mind. Yale University Press. 425 pp.

Roth, Dennis M. 1988. The Wilderness Movement and the National Forests. Intaglio Press, College Station, TX. 92 pp. ($12.95, order from the Intaglio Press, Box 9952, College Station, TX 77842.)

Stankey, G.H., D.N. Cole, R.C. Lucas, M.E. Petersen, and S.S. Frissell. 1985. The Limits of Acceptable Change (LAC) System for Wilderness Planning. USDA For. Serv. Gen. Tech. Rep. INT-176. 37 pp.

U.S. Department of Agriculture. 1988. Techniques and Equipment for Wilderness Horse Travel. USDA For. Serv. Missoula Techn. Devel. Ctr. 42 pp.

U.S. Department of Agriculture. 1989. Ideas for Wilderness Information and Education. USDA For. Serv. WO Recreation Staff. 71 pp.

Washburne, Randel F. and David N. Cole. 1983. Problems and Practices in Wilderness Management: A Survey of Managers. USDA For. Serv. Res. Pap. INT-304. 56 pp.

[ADD BOOKS ABOUT LOCAL PLANTS AND ANIMALS, NATURAL HISTORY AND FIELD TECHNIQUES]

10-3 Other Materials

"Visions of the Wild," videotape produced by F.S. Region 5. Available from Diner-Allied Film and Video, 620 Third St., San Francisco, CA 94107, phone 415-777-1700. ($40.00 for 1/2-inch single copy, $22.00 for 2-6 copies; higher costs for 3/4-inch; $197.00 for 26mm film.)(Copies are also available from W0 Recreation Staff.)

[ADD OTHER VIDEOS AND TRAINING MATERIALS]

National Wilderness Preservation System Map, published by Departments of Agriculture and Interior, 1987. Or map published by The Wilderness Society in 1989.

Official map and boundary descriptions for wilderness on your District (or location filed).

Excerpts from Forest Plan addressing management of wilderness.

Wilderness Implementation Schedules written to support the Forest Plan, or wilderness management plan.