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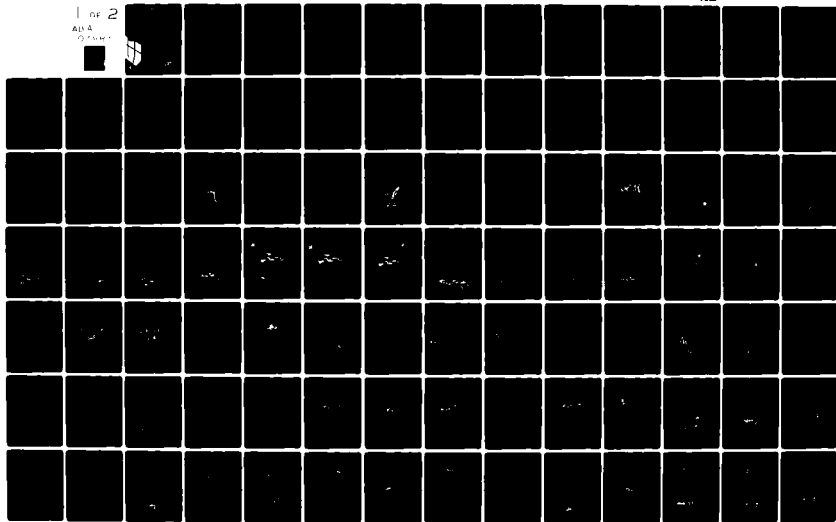
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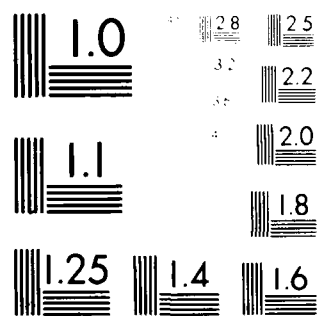
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TECHNICAL REPORT N-104
October 1981

Guidelines for Natural Resources
Management and Land Use Compatibilities

GUIDELINES FOR INSTALLATION NATURAL
RESOURCE PROTECTION DURING TRAINING

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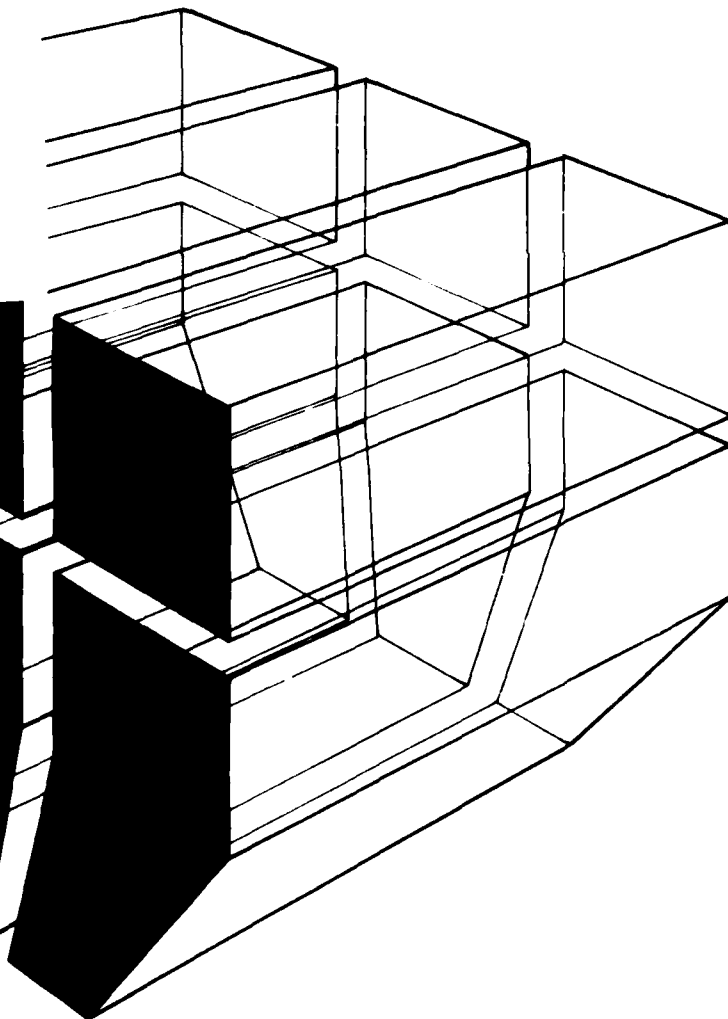
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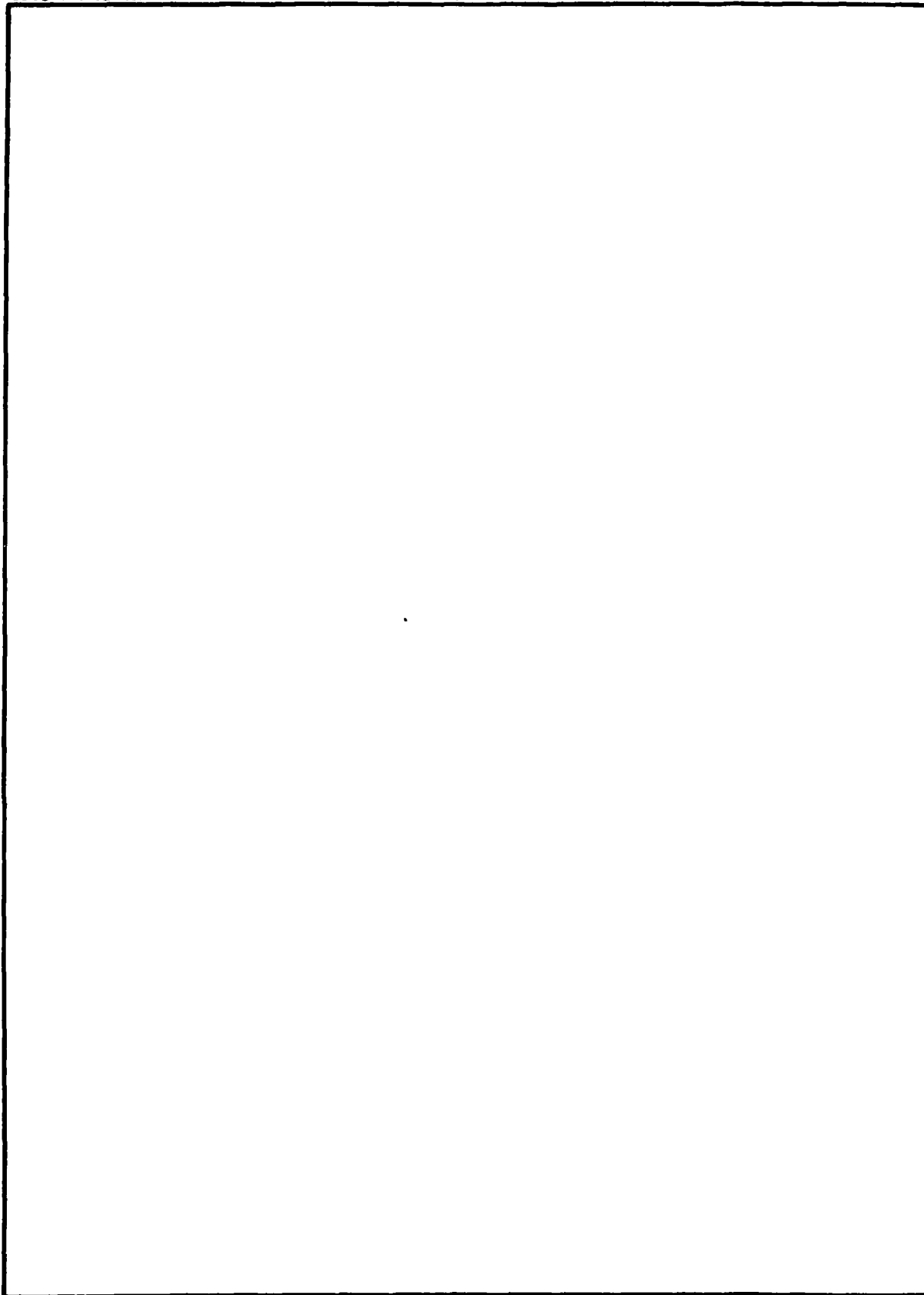
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FOREWORD

This research was performed by the U.S. Army Construction Engineering Research Laboratory (CERL) for the Directorate of Military Construction, Office of the Chief of Engineers (OCE). The work was done under Project No. 4A762720A896, "Environmental Quality Technology"; Technical Area B, "Source Reduction Control and Treatment"; Work Unit 024, "Guidelines for Natural Resources Management and Land Use Compatibilities." The OCE Technical Monitor was Mr. Donald Bandel, DAEN-MPO-B.

The work was performed by CERL's Environmental Division (EN). The assistance of L. L. Radke is gratefully acknowledged; the artwork was done by Diana Webb. Dr. R. K. Jain is Chief of CERL-EN.

COL Louis J. Circeo is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

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GUIDELINES FOR INSTALLATION NATURAL RESOURCE PROTECTION DURING TRAINING

1 INTRODUCTION

Background

The primary purpose of setting lands aside for military training is to enhance the readiness of the armed forces. The Army's need to use these lands to field-train troops in tactics and weapons systems has made other possible uses, such as forest management and outdoor recreation, secondary to this prime mission. In recent years, however, Federal and State mandates have integrated environmental quality considerations with training mission priorities.¹ The National Environmental Policy Act establishes the Federal government's stewardship of property under its control and the obligation to preserve its usefulness and productivity for future generations. The Federal Water Pollution Control Act and the Clean Air Act Amendments of 1977 reiterate the authority of Federal and (authorized) State government controls over all activities on Federal property which could degrade water and air quality.

The land and natural resources on a military installation are usually managed by personnel in the office of the Facility Engineer (FE), who operate under the authority of Army Regulation (AR) 420-74.² To help installation land managers consider environmental quality requirements during training programs, the U.S. Army Construction Engineering Research Laboratory (CERL) has developed guidelines (including text and artwork) that can be used to assemble training materials which explain how installation natural resources can be protected without degrading the quality or scope of an installation's training mission.

Objective

The objective of this study was to develop materials which could be used by land and environmental protection managers to help installation military and civilian personnel protect natural resources during training.

¹ National Environmental Policy Act of 1969 (PL 91-190; 83 Stat 851); Federal Water Pollution Control Act Amendments of 1972 (PL 92-500; 86 Stat 816) and 32 USC 1252(a) (Supplement 1978); and Clean Air Act, 42 USC (Supplement 1977), as amended.

² Natural Resources; Land, Forest, and Wildlife Management, Army Regulation (AR) 420-74 (Department of the Army, 1 July 1977).

Approach

This study had two phases: (1) problem identification, and (2) material development.

During Phase 1, individuals from CERL's Environmental Division received suggestions from the Natural Resources Section of the Facilities Engineering Directorate, Office of the Chief of Engineers (OCE), on what sort of information should be included in material designed to educate military personnel in resource preservation. In addition, persons in the Environmental and Land Management offices at the Training and Doctrine Command (TRADOC) headquarters and the Forces Command (FORSCOM) headquarters were asked, separately and without reference to suspected problem areas, for their suggestions on training-related resource problems which they had observed either on a regular or spot basis. The most commonly recurring problem areas were included in an informal problem identification survey of Army installation land management personnel. Next, the range regulations of several installations were examined to identify which (if any) attempted to control a particular resource-related problem.

During Phase 2, identified problems were compared with known information about the terrain and mission of Army installations in various regions of the continental United States. Educational material was then developed which adapted the basic concept to differing installation terrain, vegetation, and climates. A test version of the proposed material, in the form of a Training Circular, was prepared for the southeastern United States. This original version was tested in the field during an exercise involving mostly reserve components; a final circular, which included revisions suggested after the first test, was evaluated by several installation environmental offices for potential applicability to their installations' problems. Another training circular, developed for a specific training exercise at Fort Irwin, CA, was also field tested.

Mode of Technology Transfer

The information in this report is applicable to DA PAM 420-7 (Natural Resources -- Land, Forest, and Wildlife Management).

2 TRAINING PACKAGE -- DESIGN AND CONTENT

The material for CERL's training package was designed to augment, not repeat, information given in Training Circular 21-22.³ This meant environmental guidance related to garrison living and personal recreation was not considered. Only material which specifically applied to field training exercises was included.

All text was written so it could be read and understood by the average enlisted person. This was done to ensure that the information in the training package would have the best possible chance of being used during field training exercises.

Only those topics considered most important to the protection of an installation's resources were covered. This was done to give readers a manageable list of things to avoid and remember, and to make the job of assembling and reproducing the material in the training package easy and inexpensive.

Appendix B is a page-by-page list of all the material developed in this study. It is set up so installation resource managers can select material applicable to specific training or general information needs. No one training package will use all the material (or include all the topics) in Appendix B. Some or all of the information can be modified to fit special installation circumstances. In fact, resource managers are encouraged to modify the material (for example, by adding mapped information).

Topic Selection

The material in Appendix B is divided into four general categories:

1. Universal problem areas
2. Problem areas which depend on the unique characteristics of an installation's environment and land use
3. Maps and other installation-specific information
4. General introductory and summary sections.

Information in Categories 1 through 4 above is broken down into separate topic areas, each of which receives individual attention (i.e., a separate page of discussion) in Appendix B. A summary of the approach taken for each topic in Categories 1 through 4 is given below.

³ The Soldier and the Environment, Army Training Circular 21-22 (Department of the Army, 31 October 1977).

Universal Problem Areas

The following military and environmental resource concerns will probably cause resource management problems at any installation which supports field training:

1. Waste disposal. All field support activities create solid and liquid waste. The topics included in the discussion of this problem area are C-ration cans and wrappers, MRE meal pouches, field kitchen wastes, cleaning compounds, radiator fluids, POL, human sanitary wastes, and miscellaneous small personal items. Soldiers are reminded that "if you carried it in, you can carry it out" (a commonly accepted rule on most installations and by other Federal agencies such as the Forest Service, National Park Service, and Bureau of Land Management).

2. Concealment. Camouflage and concealment are critical to many exercises. Soldiers are cautioned not to cut limbs or branches for camouflage, especially in arid regions where plants replenish cut growth very slowly. Potential conflicts with wildlife habitat, forestry programs, and aesthetics are also described.

3. Fighting positions. The foxhole is the most familiar example of a fighting position, but trench systems, tank traps, revetments, defilades, and "hull down" positions are becoming more common every year, and their effect on installation resources may be hundreds of times greater than that of the foxhole. The need to build large earthworks only when and where authorized is emphasized, as is the need to repair and restore such sites when leaving the field.

4. Off-road vehicle movement. Tactical vehicles, particularly tracked vehicles, are a common cause of resource degradation on many installations. While it would be impossible to conduct most exercises without moving off designated roads, the need to stay on marked trails when moving to and from the training area is emphasized. Why extensive nonmission off-road movement may make an area permanently unfit for training is explained. The relationship between careful driving practices and resource protection is also described; e.g., why neutral steer turns ("wheelies" or "donuts") should be avoided.

5. Field wire and cable. Soldiers are cautioned to choose routes for stringing heavy power and communication cable carefully and to be especially cautious when pulling cables over and through established trees. They are also reminded that if single-pair commo wire, barbed wire, trip wires, and concertina rolls, etc., are left behind or improperly cleaned up, they may endanger wildlife or other troops.

6. Use of fire. Most installation range regulations prohibit or restrict open fires and smoking in the field. Soldiers are reminded of the dangers of ignoring these regulations; cautions in the use of catalytic-converter, civilian-design vehicles are also given.

7. Crossing streams (and stream beds). Soldiers are reminded that fixed bridges should be used to cross streams or stream beds, except when the purpose of the exercise is to learn stream crossing techniques. Cautions practiced by good combat engineer units are given as examples of reasonable environmental resource precautions. Where appropriate, the special problems of crossing dry stream beds are discussed.

8. Protecting water bodies. Wastes must not be spilled or disposed of in or near water bodies, since this may pollute water downstream (e.g., off the installation). Additive damage which may be caused by many small activities is also described.

9. Protecting animal and plant habitat. Animals and plants which are locally or regionally rare or valuable (including threatened and endangered species managed by the installation) should not be disturbed during training. This is an especially sensitive public issue, so the reasons for protecting animal and plant habitats are carefully detailed.

Location-Dependent Problem Areas

The following problems are common, but do not occur on all installations:

1. Historical and archaeological sites. Soldiers are encouraged to respect and be interested in historical and archaeological sites. This section also explains how to protect new sites uncovered during an exercise. The mandate of Federal law as it applies to archaeological remains and artifacts is explained.

2. Recreation areas. This section gives the minimum precautions which should be taken if the installation has a recreation program which permits training activities near recreation areas. (Stronger guidelines may be desirable in some cases.)

3. Conserving water. Vehicle washing consumes most of the water supplies used during field training. This section cautions against the careless use of water, and should be included wherever water is purchased or is in short supply.

4. Agricultural and grazing leases. Use of Army lands for agriculture and grazing use is secondary to military use. However, agricultural and grazing areas should be avoided because the lessee has paid for the right to use the area without interference for a specific period of time. These leased lands may be used only when approved and directed by the CO. This section should be included if any question about maintaining the integrity of such leaseholds is likely to arise as a result of training exercises.

Mapped and Other Unique Information

A major part of Appendix B is devoted to suggesting ideas which may be included on an installation map. This map designates areas requiring special resource-protection considerations. Accompanying the map are two or more pages of installation-specific information which may amplify the precautions shown on the map.

1. Mapped information. This installation map should pinpoint restricted areas, designated stream crossings, tactical vehicle travel routes, training area boundaries, trash collection points, wildlife protection areas, cemeteries, and any other important resource-related information. Page size and scale limitations may require that only the training area be shown rather than the entire installation, or that the map be divided into two or three parts. (More complete instructions for map preparation are in Appendix A.)

2. Installation-unique information. This section should be one or two pages long and come immediately before and after the map. It should contain resource-protection information and instructions which are completely specific to the installation and not already covered in the general sections supplied. This section can reiterate the restrictions of the map (e.g., point out where, and if, there are local or seasonal restrictions which differ from the general cautions given in the main text) or can further describe and explain the installation's resource management and environmental protection programs. If the centerfold is used for the map (as recommended), then all training material can be selected except for these two sections. Then, if a training package is needed for a specific exercise or group, a single new page (with a map on one side and two pages of specific instructions on the other) can be prepared and inserted.

Introduction and Conclusion

The introduction and conclusion sections given in Appendix B may be used without change, modified, or replaced entirely to increase installation or exercise specificity. The simplest way to create specificity is to substitute a new title, which includes the installation name; for example: "Protecting Natural Resources During Field Training at Fort Lewis." Appendix B includes a reproducible cover which may be used after an installation document designation and date are added.

3 REGIONALIZATION AND USE OF THE TRAINING MATERIAL

The training material given in Appendix B attempts to tailor resource-protection considerations to one or another particular region of the country. The training officer, resource manager, or environmental officer should review this tailored material carefully before selecting those sections most appropriate to his/her installation (or training exercise) needs. For example, while the section on crossing streams is applicable to most installations, it is inappropriate for installations or exercises sited in the semi-arid West, where water courses are only seasonally filled. Fire and open burning regulations may also vary widely from one part of the country to another; e.g., smoking may be no particular problem at any season in some states, but absolutely forbidden for most of the year in others. The terrain and vegetation shown in the artwork accompanying each section may also have to be varied to accurately reflect a particular region.

Regional variations in art, text, wording, and coverage have been prepared for as many regions as were believed to represent different needs for that topic. Appendix B presents all versions of a topic in sequence, but only one version should be used for any single training package. For example, a large installation with a wide variety of vegetation could use one version for one exercise and another for a different exercise.

The material in Appendix B includes alternate discussions of the same (or similar) problem areas based on nine general regions reflecting variations in vegetation, climate, and ecology in the continental United States: (1) Northeast, (2) Southeast, (3) Upper Midwest, (4) Temperate Plains, (5) Steppe, (6) Desert Southwest, (7) Arid Intermountain, (8) Chaparral, and (9) Northwest. These regions are described in the following manner:

Northeast

This region is characterized by Oak-Hickory and Maple-Beech-Birch forests, with pine trees occurring in some areas. The climate is humid with annual precipitation averaging between 30 and 50 in. The terrain can be irregular plains, tablelands, or plateaus.

Southeast

Loblolly - shortleaf pine and oak-pine forests are common in this region. The humid climate of this region yields between 40 and 60 in. of precipitation annually. This region encompasses the Coastal Plains of the South Atlantic, the Gulf States, and the Piedmont area.

Upper Midwest

This region consists of mixed mesophytic forests of Beech-Maple, Basswood, and Oak-Hickory-Pine as well as prairie grasslands. The average annual precipitation is between 40 and 48 in. This region is located on irregular plains and tablelands.

Temperate Plains

Shrubs, prairie grasses, and mid-sized trees typical of the Juniper-Oak Savannah are characteristic of this region. This is a semi-arid region averaging 10 to 25 in. of precipitation annually. The region occupies the western end of the West Gulf Coastal Plain and the southern part of the Great Plains.

Steppe

This region is characterized by mid-length grasses and scattered shrubs (Sagebrush, Yucca, Mesquite, Creosote bush) and small scattered trees. This semidesert area has an annual precipitation of between 10 and 18 in. The terrain consists of gently rolling plains and occurs in middle elevations.

Desert Southwest

Open stands of xeric shrubs such as Creosote bush and Bur Sage predominate in this region. Other plants such as yuccas, cacti, and Joshua trees can also be found in this area. Soil erodes easily, since much of it is unprotected by vegetation. The climate is arid, experiencing only 5 to 10 in. of precipitation annually. This desert region occurs on vast plains and plateaus.

Arid Intermountain

Scrubby pinyon-juniper vegetation is commonly found in this region. Sagebrush and saltbush also occur in this dry area. Average annual precipitation is only about 10 in. This region can be found from the eastern slopes of the Sierras and Cascades across the Great Basin to Wyoming and New Mexico.

Chaparral

This region consists of fairly continuous stands of xeric broad-leaved evergreen bushes, shrubs, or low trees (both deciduous and evergreen species exist), along with grasses in less dense areas. Winter rainfalls and dry summers are characteristic in this region. The average annual precipitation is from 10 to 28 in. The Chaparral region occupies mountain areas up to 3000 ft high in southern California on the slopes of the Sierra Nevada and Southern Rockies.

Northwest

This region is characterized by Cedar-Hemlock and Douglas-Fir forests along with alpine meadows. The climate is humid with 20 to 40 in. of precipitation annually. This region is located in the mountains of western Washington and western Oregon from elevations of 500 ft up into the high mountains.

Application

The training package should be given to all military or civilian personnel who are stationed, work, or otherwise use the installation or its facilities. The two most important factors which determine whether personnel will read and use the information in the package are the timing and manner of its presentation.

1. Timing of Presentation. Four types of people are found on Army installations: (1) military personnel scheduled for either short- or long-term training or duty, (2) civilian personnel or contractors who work on the installation, (3) civilian or military personnel who use recreational or other installation facilities, and (4) civilian or military visitors.

New members of Groups 1 and 2 above should be sent the training package before they actually arrive at the installation, since their natural curiosity about their new assignment will make them especially receptive to the material. Groups 1 and 2 usually will include all military trainees, Civil Service trainees, and new employees. (Contractors who are making scheduled deliveries, etc., generally are not included in these groups.) Groups 3 and 4 should usually be given the material as part of a general information package when they enter the installation.

In general, the material should not be given out as personnel are leaving the cantonment for field duty since they will be concentrating on the new mission or field exercise and will probably be too busy or preoccupied to give the material a careful reading.

2. Manner of Presentation. Supervisors (military and civilian) should make their subordinates aware that they are responsible for reading and acting on the information given in the training package. If this material is presented in a positive way, the intended audience will be encouraged to read it and understand its importance.

4 FIELD TEST RESULTS

A field test of training material similar to that given in Appendix B was conducted at Fort Irwin, CA. Two surveys were conducted which attempted to analyze the effect the material had on participants during field maneuvers.

The first survey was a questionnaire given to personnel who participated in the training exercise. They were asked to read the training package, answer 10 questions about the information they read, and after the exercise, answer several questions about their activities and opinions. The survey questions are given in Tables 1 and 2. Table 3 lists the survey results for the first question session (i.e., after reading the circular but before the exercise). It indicates that most people responded favorably to the training package; i.e., the median and mode are 60 percent correct. This is especially significant considering that most, if not all, participants in this exercise were on temporary assignment to Fort Irwin.

Table 4 lists the after-exercise survey results: when only these 13 questions are considered, there are indications that when persons participating in the training exercise had a choice between natural resource preservation or negative impact, they chose preservation almost 75 percent of the time.

The second survey, conducted at Fort McClellan, AL, examined 44 areas for pre- and post-exercise conditions. The information obtained during this survey (Figures 1 and 2) were classified as long-term effects, short-term effects, and clean-up effects. Long-term effects (L) are those in which damage must be corrected by nature under normal conditions. These types of damage will be visible for a long period of time and are generally a necessary result of training (Figure 1, numbers 9, 10, 11, 12, 14, 15, 16). Short-term effects (S) are those in which damage is corrected by nature, but in which the correction process can be significantly accelerated with human help. These types of damage quickly get repaired and are visible for short periods of time. They are a necessary result of training, but can be easily reduced by human efforts (Figure 1, numbers 1, 2, 3, 13, 19). Clean-up effects (C) are problems that could and should have been solved as part of the exercise (Figure 1, numbers 4, 5, 6, 7, 8, 17, 18). The analysis results (Table 5) showed that items that could be improved by human actions (C) showed a positive change, and problems that required both human and nature's help (S) were slightly negative. Those that required much of nature's effort (L) were quite negative.

The pre- and post-exercise surveys were analyzed for: (1) areas that were initially a problem (Table 6), (2) areas that were still a problem after the exercise (Table 7), (3) areas that improved, (4) areas that still require minor improvement, and (5) areas that still require major improvement (Table 8). Based on average negative rating, the worst of those areas that were initially a problem were graffiti, wildlife disturbances, miscellaneous litter, vehicle maintenance litter, and fighting positions that were not refilled or leveled. Of those areas that remained a problem after the exercise, the worst was vehicles in off-limits areas. Food service litter also still required major improvement.

Table 1

Questions Asked of Participants After Reading Training Circular

1. What are the daytime speed limits on tank trails?
 - a. 30 mph
 - b. 25 mph
 - c. 20 mph
 - d. 10 mph
2. What is the California state reptile?
 - a. Chuckawalla
 - b. Horned Lizard
 - c. Desert Tortoise
 - d. Garter Snake
3. Approved tracked vehicle crossovers are made of:
 - a. Blacktop
 - b. Gravel
 - c. Wood
 - d. Concrete
4. Which of the following are true about smoking in the field?
 - a. You can't smoke around POL areas.
 - b. There is no smoking at ammo areas.
 - c. Hold the butt between your fingers before throwing a cigarette away.
 - d. All of the above.
5. Chaff and spent munitions are allowed to be left in the exercise area.
 - a. True
 - b. False
6. How much dirt is needed to cover a cathole?
 - a. 2 inches
 - b. 6 inches
 - c. 10 inches
 - d. 16 inches
7. Why are desert springs off-limits?
 - a. Wildlife need them.
 - b. They support plant life.
 - c. They are the only year-round water on post.
 - d. All of the above.
8. Which best describes the rules for filling in and restoring fighting positions?
 - a. Fill in tank traps but leave hull-down positions for the next unit to use.
 - b. Use hand tools to fill in fox holes; leave large positions for on-post personnel to fill.
 - c. Engineers will come later to restore all earth works.
 - d. Fill in everything you dig.
9. Critical habitat is:
 - a. Protected by law.
 - b. A place that an endangered animal/plant needs to survive.
 - c. 100% off-limits.
 - d. All of the above.
10. Which lake bed has a road designated for wheeled vehicles?
 - a. Langford Well Lake
 - b. Red Pass Lake
 - c. Bicycle Lake
 - d. Nelson Lake

Table 2

Questions Asked of Participants After Completing Exercise

1. Did you drive your vehicle across any lake beds?
 - a. Yes, I drove on the road across Langford Well Lake.
 - b. Yes, I drove across several lake beds because it was the quickest route.
 - c. Yes, I was required to drive across a lake bed to complete the mission.
 - d. No, I did not drive across any lake beds.
2. Did you run over any plant life?
 - a. No
 - b. Yes

What was the reason for this?

 - a. The plants were so small it didn't matter.
 - b. It was too hard to avoid them because they were scattered all over.
 - c. There is nothing wrong with running over the plants during this exercise.
3. Did you have a campfire?
 - a. Yes
 - b. No
4. Did you see any wildlife (such as rabbits, coyotes, snakes)?
 - a. Yes
 - b. No
5. Did you see any wet areas (streams, ponds, water tanks)?
 - a. No
 - b. Yes

Did you use any wet area for any special purpose?

 - a. Concealment
 - b. Camouflage material
 - c. Water supply
 - d. Other - _____
6. Where did you throw most of your litter?
 - a. In large trash containers
 - b. In trash bags
 - c. In the back of a truck
 - d. On the ground
 - e. In a wet area
7. Did you have any accidental spills in the field (fuel, oil, antifreeze)?
 - a. No
 - b. Yes

Table 2 (Con't)

Did you clean up this spill?

- a. Yes
- b. No

8. Did you use any plant or shrubs for camouflage?

- a. Yes
- b. No

9. Did you leave any wire behind (commo, barbed, trip, etc.)?

- a. Yes
- b. No

10. Did you see any marked historical or archaeological sites?

- a. No
- b. Yes

Did you enter these sites?

- a. Yes, I was ordered to.
- b. Yes, I was curious.
- c. No, I just looked from outside the site.

11. Did you have to dig any trenches or fox holes?

- a. No
- b. Yes

Did you refill them after the exercise?

- a. No, I didn't know I was supposed to.
- b. No, I didn't have time.
- c. Yes, I refilled some.
- d. Yes, I refilled every hole I dug.

12. What is your personal opinion of the concern for Fort Irwin's environment?

- a. I totally support it.
- b. I am kind of in favor of it.
- c. I think it is overdone.
- d. I don't care much one way or the other.

13. Do you think it would be harder to conduct training if you did everything said in the training circular?

- a. No
- b. Yes

Why would it be harder?

- a. Because it takes too much work.
- b. Because it takes extra time.
- c. Because it is not possible to do everything said in the training circular during this kind of exercise.
- d. Other - _____

Table 3
Results of Questionnaires

After Reading Training Circular, Before Exercise

<u>% Correct</u>	<u>Question Number</u>	<u>N</u>
83	4	42
81	7	42
79	8	42
76	9	42
64	3	42
48	2	42
45	10	42
31	6	42
26	1	42
21	5	42

Mean = 53%, Median = 60%, Mode = 60%.

Table 4
Results of Post-Exercise Questionnaire Completed By Participants

<u>Question Number</u>	<u>Followed Training Circular Guidance</u>	<u>Did Not Follow Guidance</u>
1	33	9
2	19	25
3	32	13
4	Not applicable	
5	Not applicable	
6	42	2
7	4	2
8	32	12
9	37	5
10	12	3
11	15	2
12	28	14
13	Not applicable	
Total	254	87
Mean	25.4	8.7
%	74.4	26.6

PRE-EXERCISE FIELD EVALUATION SHEET

Site/Area No.: _____
 Date Inspected: _____
 Inspected by: _____
 Office: _____
 Distribution: _____

Distribution:

Visually Observed Environmental Damage/Problem Areas	Is there any existing sign of this type of Damage/Problem?	Severity of currently existing Damage/Problem	Sketches & Notes
1. Campfires	Y N	-7 -6 -5 -4 -3 -2 -1 0	
2. Wildfires	Y N	-7 -6 -5 -4 -3 -2 -1 0	
3. Trash Burning	Y N	-7 -6 -5 -4 -3 -2 -1 0	
4. Food Service Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0	
5. Vehicle Maintenance Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0	
6. PUL & Coolant Spills	Y N	-7 -6 -5 -4 -3 -2 -1 0	
7. Wire & Associated Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0	
8. Misc. Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0	
9. Vehicle Tracks	Y N	-7 -6 -5 -4 -3 -2 -1 0	
10. Vehicle Turns	Y N	-7 -6 -5 -4 -3 -2 -1 0	
11. Stream & Bank Damage	Y N	-7 -6 -5 -4 -3 -2 -1 0	
12. Vehicles in Off-Limits Area	Y N	-7 -6 -5 -4 -3 -2 -1 0	
13. Vehicle Damage to Structures	Y N	-7 -6 -5 -4 -3 -2 -1 0	
14. Trees & Shrubs Downed	Y N	-7 -6 -5 -4 -3 -2 -1 0	
15. Limbs & Branches Cut or Broken	Y N	-7 -6 -5 -4 -3 -2 -1 0	
16. Wire Damage to Vegetation	Y N	-7 -6 -5 -4 -3 -2 -1 0	
17. Fighting Positions Remaining	Y N	-7 -6 -5 -4 -3 -2 -1 0	
18. Graffiti	Y N	-7 -6 -5 -4 -3 -2 -1 0	
19. Wildlife Disturbances	Y N	-7 -6 -5 -4 -3 -2 -1 0	
20. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0	
21. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0	
22. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0	
23. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0	
24. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0	

Explanation of Responses

Y = Yes -7 = Very Severe Damage/Problem
 N = No -4 = Moderate Damage/Problem
 -1 = Barely Noticeable Damage/Problem
 0 = No Sign of Damage/Problem

Figure 1. Pre-exercise field evaluation sheet.

POST-EXERCISE FIELD EVALUATION SHEET

Site/Area No.: _____ Types of unit(s) that last used site: _____
 Date Inspected: _____ Type of Exercise: _____
 Inspected by: _____ Date(s) of Exercise: _____
 Office: _____
 Distribution: _____

Visually Observed Environmental Damage/Problem Areas	Is there any fresh sign of this type of problem?	Severity of new or additional Damage/Problem (or) conditions improved	Was the damage required to accomplish the training mission?	Severity or extent of problem as compared to other units doing the same exercise.
1. Campfires	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
2. Wildfires	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
3. Trash Burning	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
4. Food Service Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
5. Vehicle Maintenance Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
6. POL & Coolant Spills	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
7. Wire & Associated Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
8. Misc. Litter	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
9. Vehicle Tracks	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
10. Vehicle Turns	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
11. Stream & Bank Damage	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
12. Vehicles in Off-Limits Area	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
13. Vehicle Damage to Structures	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
14. Trees & Shrubs Downed	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
15. Limbs & Branches Cut or Broken	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
16. Wire Damage to Vegetation	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
17. Fighting Positions Remaining	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
18. Graffiti	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
19. Wildlife Disturbances	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
20. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
21. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
22. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
23. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?
24. _____	Y N	-7 -6 -5 -4 -3 -2 -1 0 +	Y N ?	+ + - ?

Explanation of Responses

Y = Yes -7 = Very Severe Damage/Problem + = Better (Less Severe)
 N = No -4 = Moderate Damage/Problem ± = Same
 -1 = Barely Noticeable Damage/Problem - = Worse (More Severe)
 0 = No Sign of Damage/Problem ? = Don't Know
 + = Conditions Improved

Figure 2. Post-exercise field evaluation sheet.

Table 5

Results of Various Level Effects

<u>Type of Effect</u>	<u>Net Effect</u>	<u>Sample Size</u>	<u>Mean</u>
Clean-up (C)	0.77	7	0.11
Short-term (S)	-0.45	4	-0.11
Long-term (L)	-2.18	7	-0.31

Table 6

Items That Were Initially a Problem*

A. In Areas Where Observed

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
18.	Graffiti	(-7.00)**
9.	Vehicle Tracks	(-3.99)
14.	Trees and Shrubs Downed	(-3.76)
10.	Vehicle Turns	(-3.61)
19.	Wildlife Disturbances	(-2.96)**
8.	Miscellaneous Litter	(-2.41)**
15.	Limbs and Branches Cut or Broken	(-2.37)

B. In General Over the Entire Installation

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
9.	Vehicle Tracks	(-3.99)
10.	Vehicle Turns	(-3.44)
14.	Trees and Shrubs Downed	(-3.42)
8.	Miscellaneous Litter	(-2.25)
4.	Food Service Litter	(-1.82)
15.	Limbs and Branches Cut or Broken	(-1.61)
7.	Wire and Associated Litter	(-1.39)
5.	Vehicle Maintenance Litter	(-1.34)**
17.	Fighting Positions Remaining	(-1.34)**

*Values in parentheses are the average rating for that item.

**Problem areas that were not evident after training and training circular distribution.

Table 7

Items Still a Problem After Training*

A. In Areas Where Observed

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
9.	Vehicle Tracks	(-4.32)
12.	Vehicles in Off-Limits Area	(-4.29)**
10.	Vehicle Turns	(-4.26)
14.	Trees and Shrubs Downed	(-3.63)
15.	Limbs and Branches Cut or Broken	(-3.53)

B. In General Over the Entire Installation

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
9.	Vehicle Tracks	(-4.32)
10.	Vehicle Turns	(-4.06)
14.	Trees and Shrubs Downed	(-3.30)
15.	Limbs and Branches Cut or Broken	(-2.41)
4.	Food Service Litter	(-2.30)
8.	Miscellaneous Litter	(-1.68)
7.	Wire and Associated Litter	(-1.55)
19.	Wildlife Disturbances	(-1.48)

*Values in parentheses are the average rating for that item.

**New problem that appeared after training and training circular distribution.

Table 8

Areas of Improvement and Areas Requiring Improvement

Areas of Improvement (Positive B-A/N)*

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
8.	Miscellaneous Litter	(0.57)
17.	Fighting Positions Remaining	(0.41)
5.	Vehicle Maintenance Litter	(0.41)
11.	Stream and Bank Damage	(0.23)
18.	Graffiti	(0.16)
14.	Trees and Shrubs Downed	(0.10)
3.	Trash Burning	(0.07)

Areas Requiring Minor Improvement (B-A/N Less Than $\bar{X}^{**}$ - 0.36)

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
9.	Vehicle Tracks	(-0.33)
2.	Wildfire	(-0.27)
16.	Wire Damage to Vegetation	(-0.20)
13.	Vehicle Damage to Structures	(-0.20)
7.	Wire and Associated Litter	(-0.16)
6.	POL and Coolant Spills	(-0.14)
1.	Campfires	(-0.05)

Areas Requiring Major Improvement (B-A/N Less Than $\bar{X}$ = -0.31)

<u>Item Number</u>	<u>Problem Areas</u>	<u>Score</u>
15.	Limbs and Branches Cut or Broken	(-0.80)
10.	Vehicle Turns	(-0.63)
19.	Wildlife Disturbances	(-0.55)
12.	Vehicles in Off-Limits Areas	(-0.55)
4.	Food Service Litter	(-0.48)
9.	Vehicle Tracks	(-0.33)

*B-A/N = Score before the training exercise minus score after the training exercise divided by the sample size.

** $\bar{X}$ = mean.

5 CONCLUSION

The resource-protection material developed during this study can help installation training officers, resource managers, and environmental officers educate installation personnel in natural resource protection. Managers can select those portions of the material which describe specific regional resource-protection concerns on their installation, and/or tailor the material to specific training situations or exercises.

APPENDIX A: REPRODUCTION INSTRUCTIONS

To create an installation-specific training package, pages from Appendix B should be selected which pertain to an installation's climate, terrain, vegetation, and training activities.*

Assembling Pages Into Booklet Form

Once pages have been selected and developed, they may be assembled in one of two ways. Using the simplest alternative, each page can be removed from this appendix and individually reproduced. They can then be stapled together. The other option consists of printing the pages so they will appear in a booklet format; this second option is recommended because the final product will be compact and easy to carry.

Artwork

An installation can use its own artwork for any page in this appendix; the size of a drawing will depend on the amount of text accompanying it and the amount of emphasis it is to display.

Map Construction Guidelines

An installation map should be especially drawn for the training package so restricted areas and other locations to be emphasized will stand out clearly, e.g., designated stream crossings, refuse collection points, impact areas, or maneuver areas. If the map is being constructed for a JRX or JTX, certain off-limits areas may be more heavily emphasized, particularly if a severe impact is anticipated. For examples of installation-specific maps, see Figures A1 and A2. See page 31 in Appendix B for discussion of the contents of a map.

* The region legend at the bottom of the chosen pages should be cut off before reproduction.

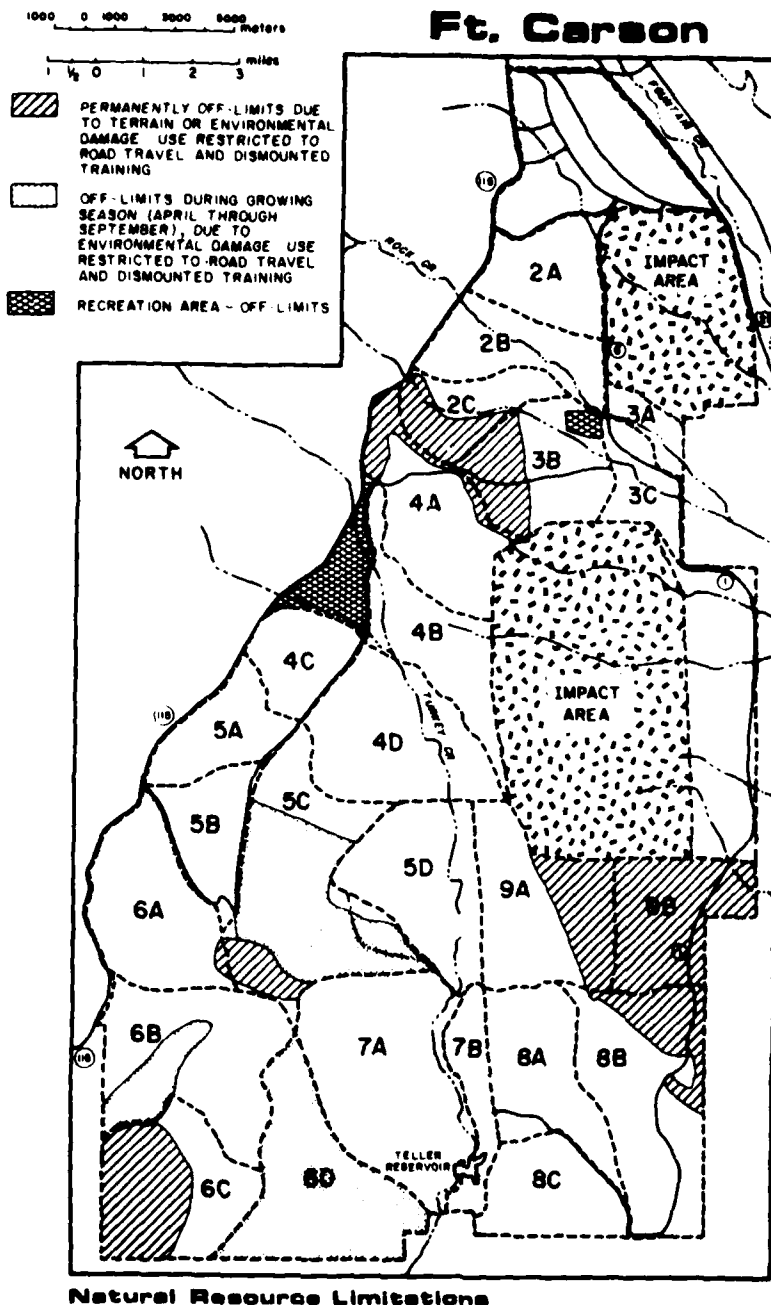


Figure A1. Sample installation map 1.

Ft. McClellan - Pelham Range

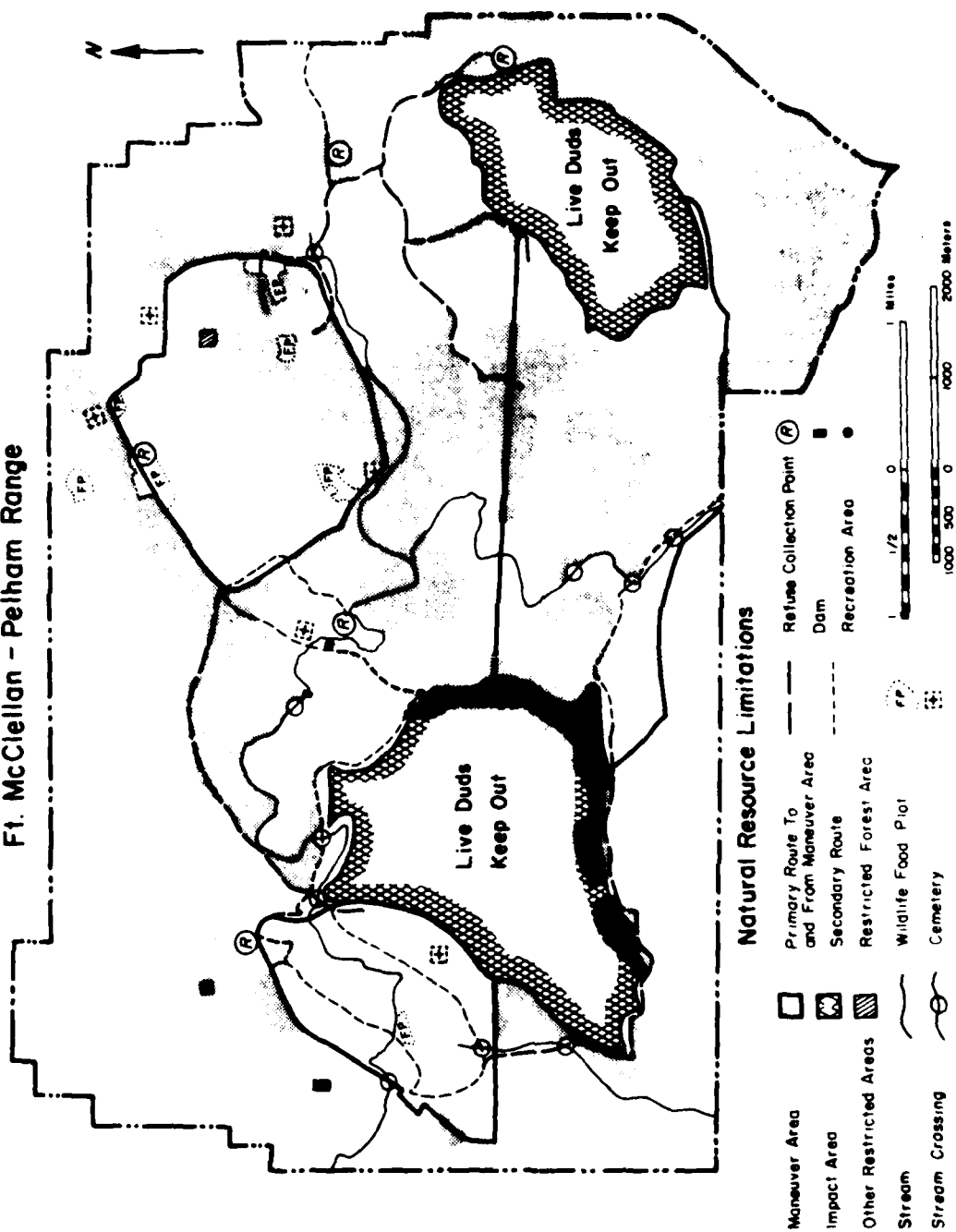


Figure A2. Sample installation map 2.

APPENDIX B: HOW TO ASSEMBLE A REGIONALIZED TRAINING PACKAGE

This appendix includes regional variations of pages which address resource management conflicts commonly occurring during training activities. Selected pages can be copied to form an installation-specific training package.

Regionalized Pages

The installation's natural resource and/or training manager should choose the regional version of the training activity which is most appropriate to his or her installation's vegetation, terrain, and climate.

Installation-Specific Pages

In addition to the pages included in this appendix, the manager may include information specific to the installation. For example:

1. An elaboration of the environmental considerations shown on the map (see Figure B1 for examples).

MAP INFORMATION SPECIFIC TO YOUR INSTALLATION

Here is a brief summary of what you'll find on the map of Pelham Range:

Permitted Areas (For your use)

- o Maneuver Areas
- o Primary Routes to and From Maneuver Areas
- o Major Roads Leading to Stream Crossings and Refuse Collection Areas
- o Designated Stream Crossings
- o Refuse Collection Points

Prohibited Areas (Stay away from these)

- o Impact Areas -- Live Duds
- o Restricted Forest Areas
- o Wildlife Food Plots
- o Other Restricted Areas
- o Cemeteries
- o Recreation Area -- Picnic Area

The official training map has more detailed information on many of these points. It also covers other things on Pelham Range.

Figure B1. Example of installation-specific information.

2. The installation's fish and wildlife program.
3. A discussion of other installation-restricted areas not covered elsewhere in the training package. Tree plantations, recreation areas, and fire-breaks may be included in this section.
4. A list of installation offices and phone numbers which may be consulted if a problem occurs, e.g., for reporting fires, oil spills, or archaeological finds.

Installation Map

This map should pinpoint all areas that are to be avoided by troops/units during training. The map can be divided into two categories of environmental consideration: (1) restricted/off limits areas, e.g., impact areas, food plots, agricultural outleases, outdoor recreation areas, cemeteries, critical habitats of endangered species, and historic structures or designated archaeological sites; and (2) areas specifically designated for military use, e.g., maneuver areas, primary and secondary roads and trails, designated stream crossings, refuse collection points, waste oil collection centers, and other features of value to personnel in the field.

The map should have a legend or key, and a scale of miles/meters. (If an Engineer Topographic Unit is available, they may be able to prepare the map and legend. Instructions for preparing the map are given in Appendix A.)

Cover

The installation may use the generalized cover furnished in this appendix or design one of its own. Additional cover material can include the installation's name and/or Division insignia (Figure B2).

Page Sequence

A recommended page sequence is presented here; it should be noted, however, that it is rare for any one installation to require pages on every topic. In certain cases, some topic areas will not be relevant to an installation. For example, not all installations will need sections on agricultural outleases or water conservation.

This page sequence, then, is to be used solely as a guide and is based on CERL's experience with the tested versions of this material:

- p 1: Protecting Natural Resources in the Field -- Introduction
- pp 2 and 3: Waste Disposal
- p 4: Concealment
- p 5: Fighting Positions
- pp 6 and 7: Off-Road Vehicle Movement
- p 8: Disturbing the Habitat of Special Plants or Animals
- p 9a: Stringing Cable and Field Wire (Forested Areas)
- or
- p 9b: Field Wire (Scrubby Areas)
- p 10: Use of Fire
- p 11: Map Information Specific to Installation
- pp 12 and 13: Map
- p 14: Installation-Specific Information
- pp 15a and 16: Crossing Streams (Humid Regions)
- or
- p 15b: Crossing Stream Beds (Arid Region)
- p 17: Protecting Water Bodies
- p 18: Conserving Water
- p 19: Leased Agricultural Land
- pp 20 and 21: Historical and Archaeological Sites
- p 22: Recreation
- p 23: Summing It All Up

GALLANT EAGLE 80



PROTECTING RESOURCES DURING TRAINING

FI TC-1
MARCH 1980

Figure B2. Sample cover.

Regionalized Pages -- Table of Contents

Following is a list of the regionalized pages contained in this appendix.

- I. PROTECTING NATURAL RESOURCES IN THE FIELD
 - Southeast, Northeast, Upper Midwest
 - Temperate Plains
 - Northwest
 - Arid Intermountain
 - Steppe
 - Chaparral
 - Desert Southwest
- IIA. WASTE DISPOSAL
 - Southeast, Northeast, Upper Midwest, Temperate Plains
 - Northwest, Chaparral
 - Arid Intermountain, Steppe, Desert Southwest
- IIB. WASTE DISPOSAL (Cont'd)
 - Southeast, Northwest
 - Northeast, Upper Midwest
 - Temperate Plains, Arid Intermountain, Steppe, Chaparral
 - Desert Southwest
- III. CONCEALMENT
 - Southeast, Northeast, Upper Midwest
 - Temperate Plains
 - Northwest
 - Arid Intermountain
 - Steppe
 - Chaparral
- IV. FIGHTING POSITIONS
 - Southeast, Upper Midwest, Temperate Plains
 - Northeast, Northwest
 - Arid Intermountain, Steppe, Chaparral
 - Desert Southwest
- VA. OFF-ROAD VEHICLE MOVEMENT
 - Northeast, Upper Midwest, Northwest
 - Arid Intermountain, Chapparal, Temperate Plains, Southeast
 - Steppe
 - Desert Southwest
- VB. OFF-ROAD VEHICLE MOVEMENT (Cont'd)
 - Northeast, Upper Midwest, Northwest
 - Arid Intermountain, Temperate Plains, Southeast
 - Steppe, Chaparral
 - Desert Southwest
- VIA. DISTURBING THE HABITAT OF SPECIAL PLANTS OR ANIMALS
 - Southeast, Northeast, Upper Midwest, Northwest
 - Temperate Plains, Arid Intermountain, Steppe, Chaparral
 - Desert Southwest

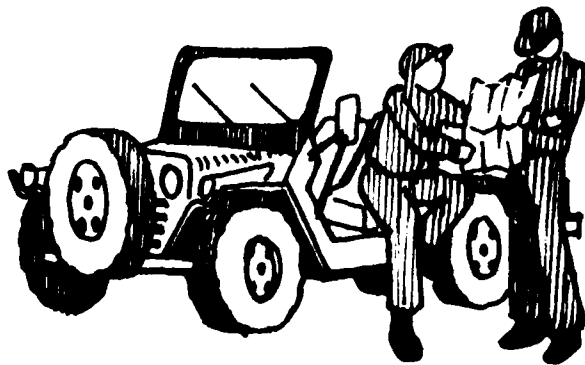
- VIB. DISTURBING THE HABITAT OF SPECIAL PLANTS OR ANIMALS (Cont'd)
Desert Southwest
- VIIA. STRINGING CABLE AND FIELD WIRE
Southeast, Northwest
Northeast
Upper Midwest, Steppe
Temperate Plains
Arid Intermountain
Chaparral
- VIIB. FIELD WIRE
Temperate Plains, Chaparral
Arid Intermountain, Steppe
Desert Southwest
- VIII. USE OF FIRE
Southeast, Northeast, Upper Midwest, Northwest
Arid Intermountain, Temperate Plains, Steppe, Chaparral
Desert Southwest
- IXA. CROSSING STREAMS
Southeast, Northeast, Upper Midwest
Temperate Plains
Northwest
- IXB. CROSSING STREAMS (Cont'd)
Southeast, Northeast, Upper Midwest, Temperate Plains, Northwest
- IXC. CROSSING STREAM BEDS
Arid Intermountain, Steppe, Chaparral
Desert Southwest
- IXD. CROSSING STREAM BEDS (Cont'd)
Arid Intermountain, Steppe, Chaparral, Desert Southwest
- X. PROTECTING WATER BODIES
All Regions
- XI. CONSERVING WATER
All Regions
- XII. LEASED AGRICULTURAL LAND
All Regions
- XIII. LEASED GRAZING LAND
All Regions
- XIV. LEASED CROPLAND
All Regions
- XVA. HISTORICAL AND ARCHAEOLOGICAL SITES
All Regions

XVB. HISTORICAL AND ARCHAEOLOGICAL SITES (Cont'd)
All Regions

XVI. RECREATION AREAS
All Regions

XVII. SUMMING IT ALL UP
Southeast
Northwest
Northeast, Upper Midwest, Temperate Plains
Arid Intermountain, Steppe, Chaparral
Desert Southwest

PROTECTING RESOURCES



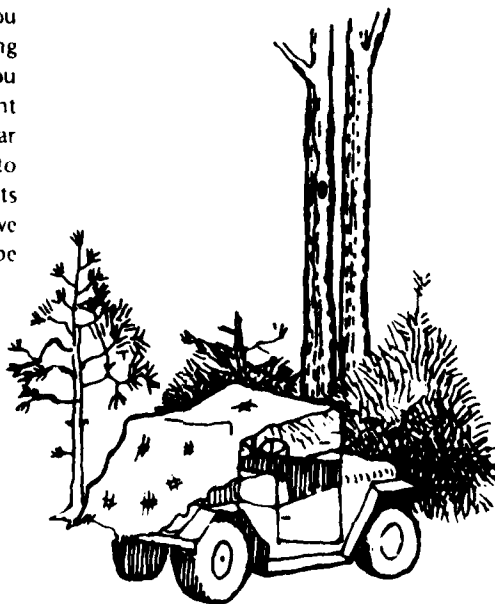
DURING TRAINING

PROTECTING NATURAL RESOURCES IN THE FIELD

This booklet is designed to fill you in on some of the installation's environmental "ground rules." This installation is used by a lot of Army units every year, and this use can easily destroy a training area if it is not protected. So, ground rules were developed for the benefit of all these units, including yours.

This post must be treated with "tender loving care." If we damage the land so much that it no longer provides a good training location, it will be almost impossible to find another place. These ground rules were made so the Army can make the best use of this installation for many years to come. By following the guidelines, we can help meet both Army training and environmental goals.

In the center of this booklet you will find a map of the major training areas on post. The map gives you information which is important to remember. Please become familiar with this map. It will help you get to know the installation and its ground rules. With your help we can keep this post in the best shape possible.

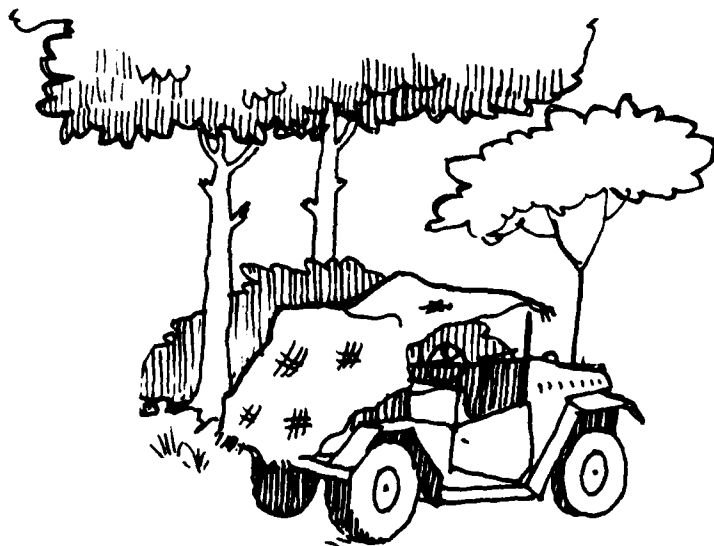


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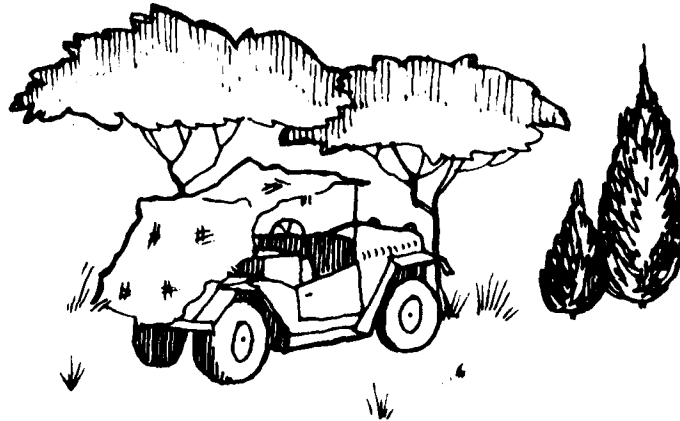


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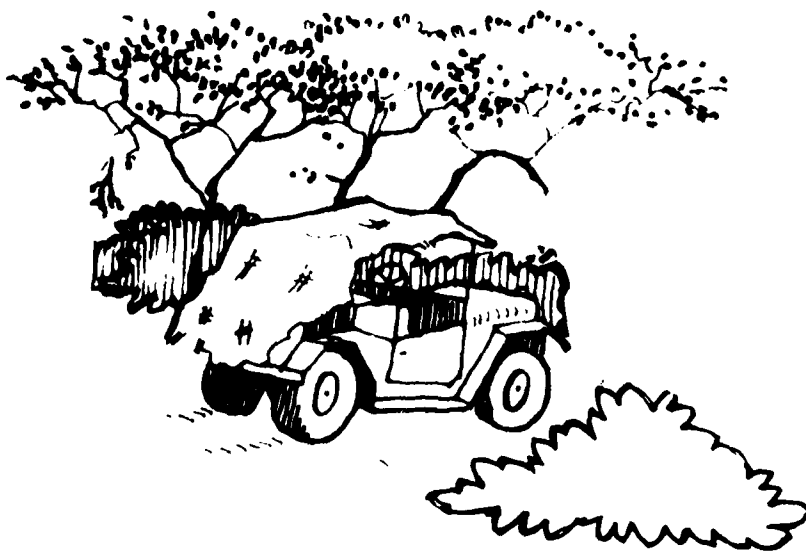


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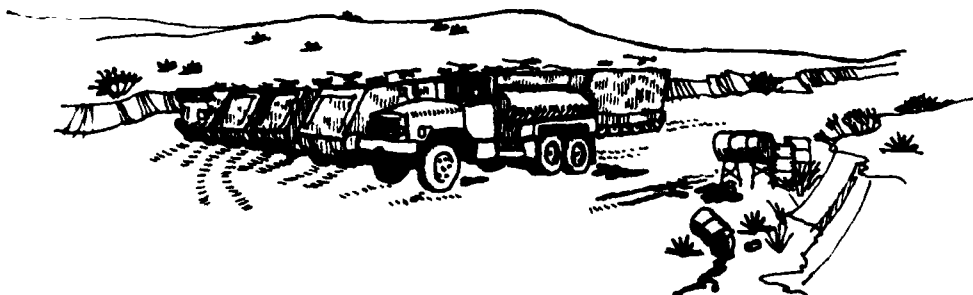


PROTECTING NATURAL RESOURCES IN THE FIELD

This booklet is designed to fill you in on some of the installation's environmental "ground rules." This installation is used by a lot of Army units every year, and this use can easily destroy a training area if it is not protected. So, ground rules were developed for the benefit of all these units, including yours.

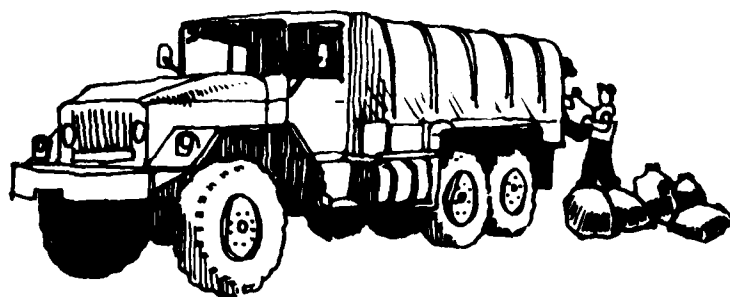
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WASTE DISPOSAL

You've probably heard the saying "Don't be a litterbug" so often you're tired of it, but it's very meaningful at this installation. All trash must be put in bags or cans. Your NCOIC has told you exactly when and how to collect empty ration cans, leftover food, paper plates, bottles, etc. Kitchen wastes, such as greasy water, must be poured in a sump pit never on the ground surface. Make sure you collect all your garbage and rubbish so it can be hauled to the sanitary fill. Remember, you should never burn or bury wastes in field positions. A can of cleaning oil, which you might think is empty when you toss it out, may have just enough poisonous material in it to kill an animal who gets a taste of it. It's easy to pitch something you don't want on the ground, but don't do it.



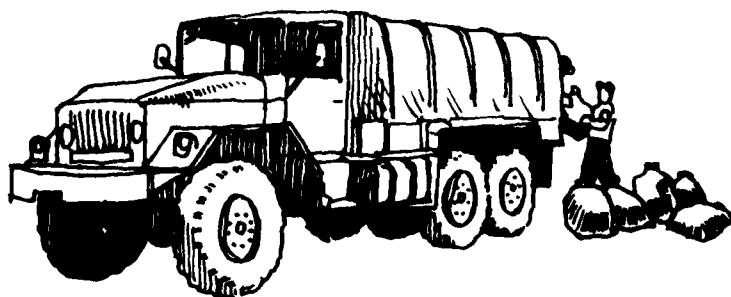
Used cans and boxes from C-rations seem to last forever. MRE meal pouches are worse than cans very tempting to animals because they may still have some food stuck in them. Many creatures can choke on plastic pouches or foil wrappers. Have you ever carried a can of something to drink into the field with you? Remember that the animals can cut themselves on cans or swallow metal tabs if you carelessly throw them away. Everything you carry in should be carried out! And if you put empty containers in a trash can at the exercise site, you won't have to carry them out; the carrying out will be done for you!



Small hardware like nuts, bolts, screws, and nails are another type of pain in the neck, or really, pain in the throat. If they are thrown on the ground, birds and other small animals may eat them and choke or become very ill. Always put trash in its proper place!

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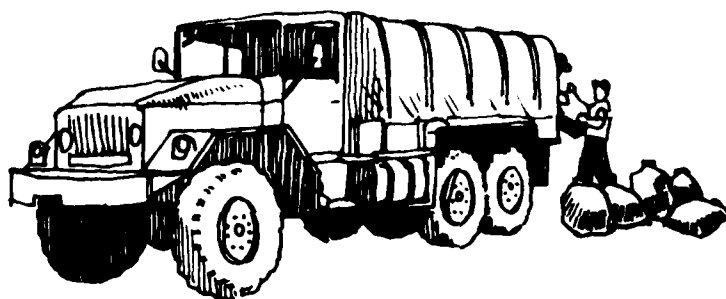
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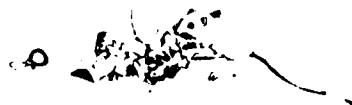
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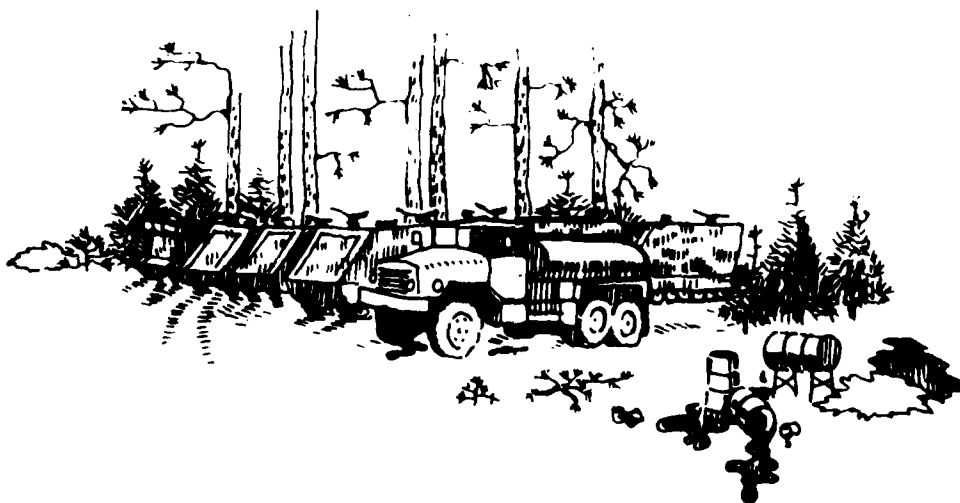
WASTE DISPOSAL (Cont'd)

Human waste can be another problem. Your unit might need to dig pits and straddle trenches because there aren't any portable johns in your training area. Don't forget that once you are ready to leave the area, those pits and trenches must be filled in, according to instructions given by your CO. Individual "cat holes" can be used when you're on the move, but they also need to be covered with at least 6 inches of dirt.



There are also a lot of other things that most of us don't give much thought to. Even draining a radiator can be harmful. Did you know that radiator compounds are poisonous to both plants and animals? If dumped on the ground, brake and hydraulic fluid can enter the soil and be absorbed into a plant's root system, and kill it.

When draining oil, anti-freeze and coolant, or other automotive fluids from your vehicle, dispose of them properly and only at specified areas. Don't drain or discard them where they can get into a stream bed or water source or remain as a puddle on the ground. The oil that spills on the ground from an oil change or engine work may not be in the stream now, but it will get washed into it during the next rain. Animals and plants can be poisoned if they drink such fluids.



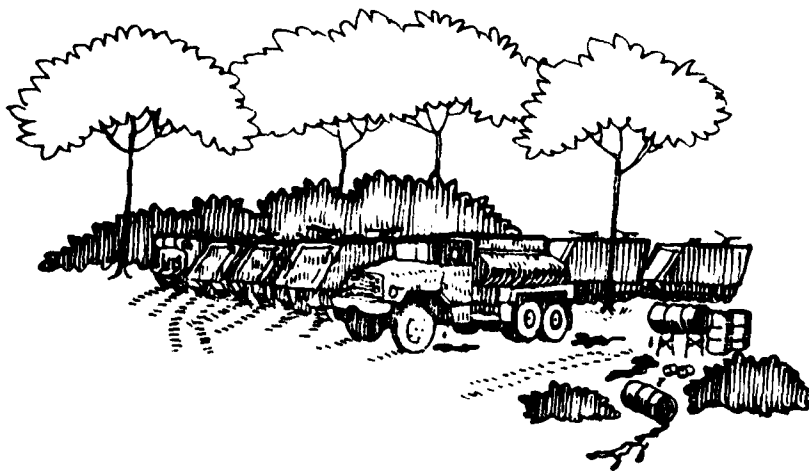
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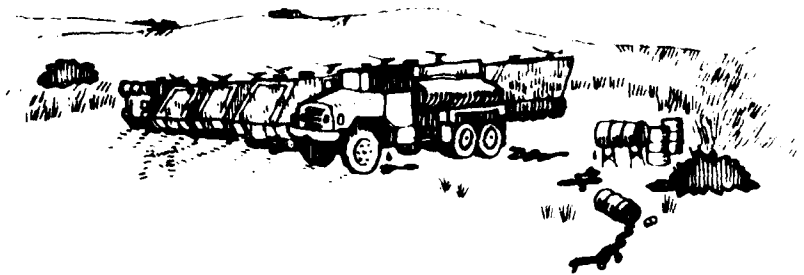
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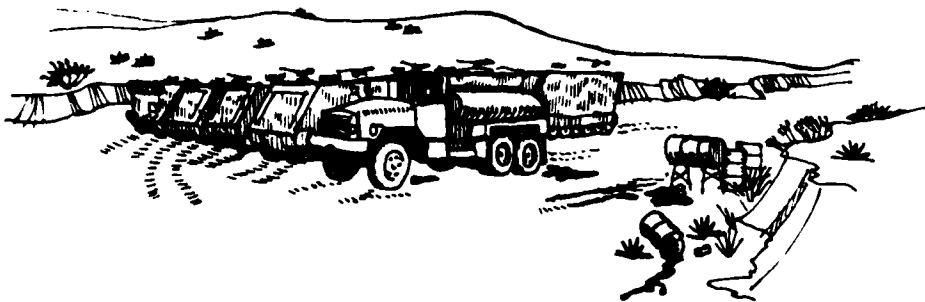
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CONCEALMENT

Forested areas on this installation are extremely important. You use them in training exercises for concealment, practice in camouflage, making defensive positions, and so forth. But why damage the trees unnecessarily while you do these things?



When you do need to cut trees (at the orders of your CO), you are permitted to cut **ONLY** the ones that are dead or fallen or just the lower branches of living pine trees. If you must cut hardwoods, use only those with a diameter no larger than your arm. Why can't you use just any live tree? Well, there are lots of reasons. For example, removing tree branches or parts of large shrubs may let insects or diseases get into these plants and kill them. Or the installation may want to save a record size tree, a tree which serves as a nesting spot for birds, or a seed tree to be used for the forest improvement program.

If this installation has restrictions about which trees should be cut, your NCOIC will indicate places where branches or small trees may be removed for camouflage. If the post has lots of trees, you may wonder, why are we using only those? The main reason is that the Army, as a whole, just doesn't have *that* many trees. Also, timber sold to local people brings in funds for the forestry and related natural resource programs. Finally, trees make good places for wildlife to live, besides, they're also just plain nice to look at.

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If this installation has restrictions about which trees should be cut, your NCOIC will indicate places where branches or small trees may be removed for camouflage. Since this post doesn't have lots of trees, you can understand why we're using only those. The Army, as a whole, just doesn't have *that* many trees. Also, timber sold to local people brings in funds for the forestry and other related natural resource programs. Finally, trees make good places for wildlife to live; besides, they're also just plain nice to look at.

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CONCEALMENT

Bushy areas on this installation are extremely important. You use them in training exercises for concealment, practice in camouflage, making defensive positions, and so forth. But why damage these shrubs unnecessarily while you do these things?



When you need to cut bushes or small trees (at the orders of your CO), you are permitted to cut only a very few. Why can't you cut more? Well, woody plants, trees, and shrubs take a long time to grow in this area. To grow only a few inches in diameter might take more than one hundred years! Also, many of these bushes are homes or nest sites for small animals living here.

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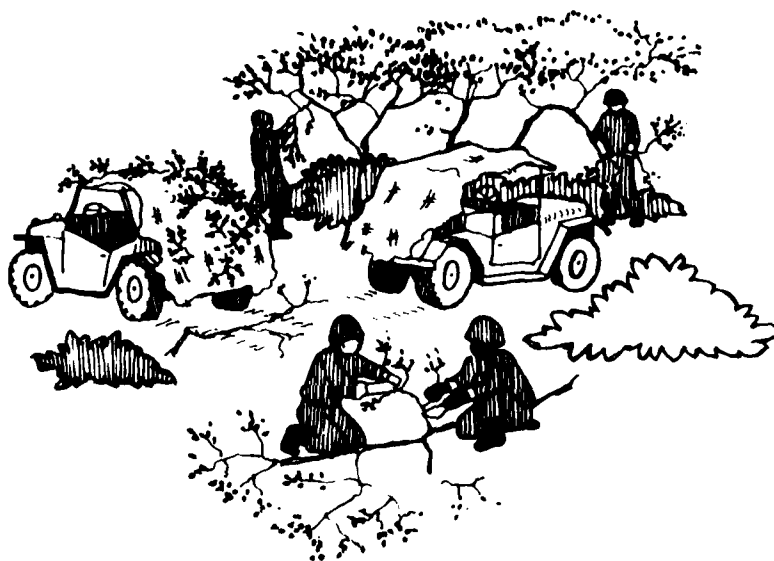


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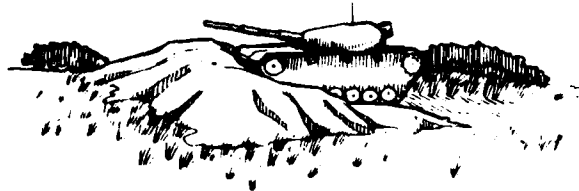
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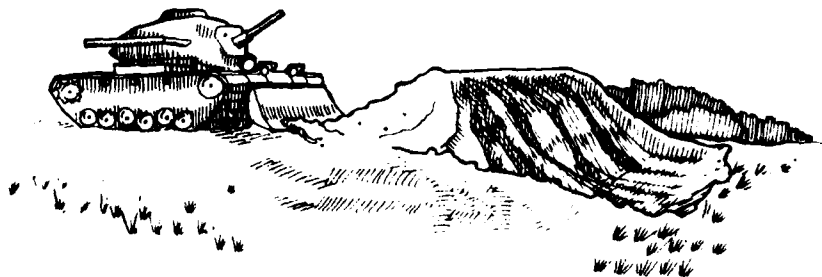
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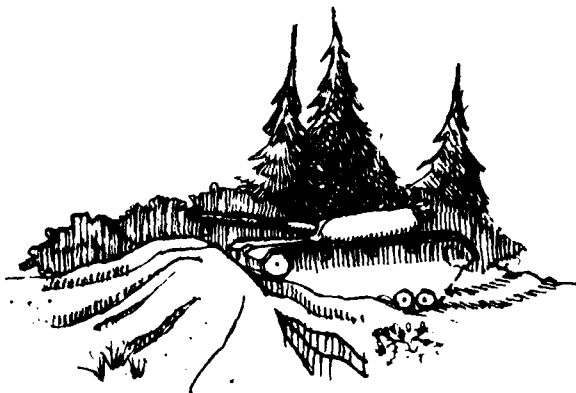
FIGHTING POSITIONS



You know that foxholes, trench systems, tank traps, hull-down positions for tanks and artillery, and other fighting positions are important and necessary parts of a training exercise. But, do you know that everything you dig should be refilled and leveled after you've finished that exercise? If you forget to do this, there will be lots of erosion, and the area will look horrible. Another good reason for filling in these holes and trenches is so other people can use this area for their operations and maneuvers later on.



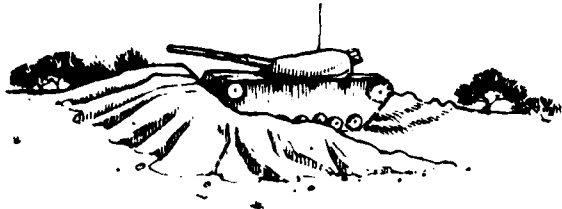
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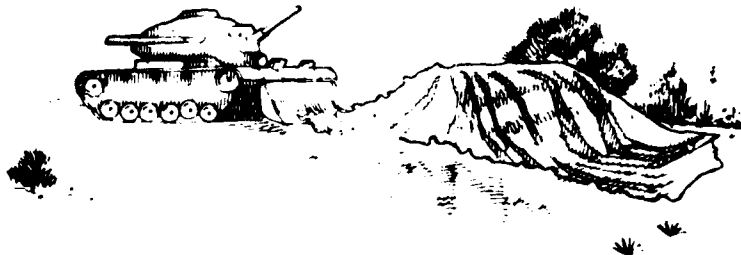
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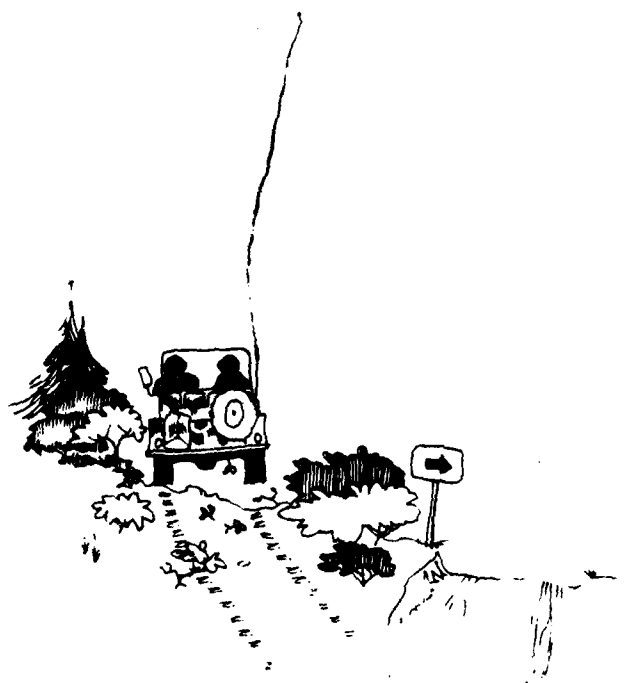
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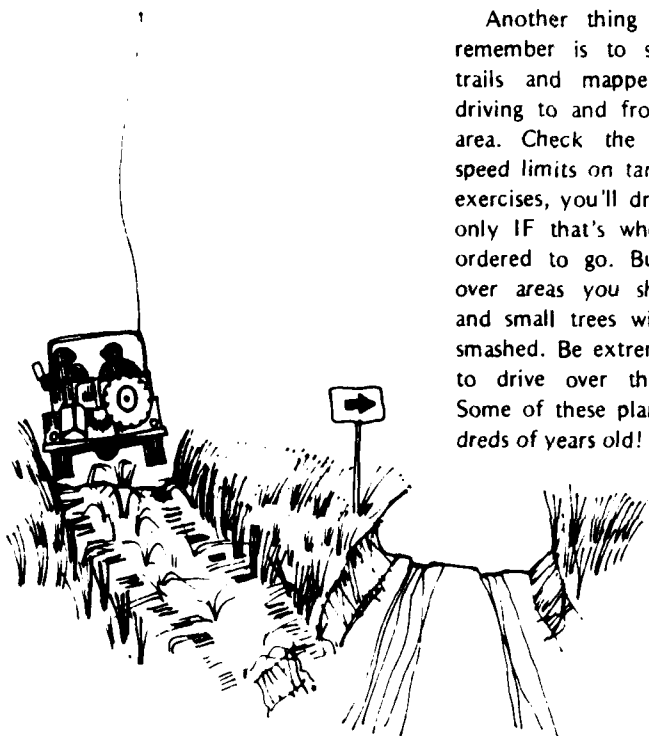
OFF-ROAD VEHICLE MOVEMENT



Another thing to remember is to stay on marked trails and mapped routes when driving to and from your training area. Check the range regs for speed limits on tank trails. Many times you will have to drive off a road IF that's where you have been ordered to go. But if you drive over areas you shouldn't, plants will be needlessly smashed. When the grasses and shrubs are damaged or removed, the bare soil under them is exposed. Wind and rain will probably blow and wash away much of the soil next time there is a storm. Soil blown away by the wind can form clouds of dust that make it hard to see and is irritating to the eyes or throat. Actually, a lot more is happening than you might think. Over time, all the soil could be blown away from a spot, leaving only rock behind where nothing can grow. In some places, the clouds of dust can get so bad that people will sue the Army, but it's too late then to do much about it.

Erosion by rain and water flowing on the bare soil is usually worse than wind erosion. It causes the streams to be muddy after a rainstorm and may plug the stream channel and cause flooding. Roads and foot trails may be washed out especially where they go through hilly areas. The gullies this erosion causes may get so big that even tracked vehicles can't cross them. Sure, many normal installation training exercises can also cause erosion, but the area can usually recover before the next year if it's left alone. Some of the worst damage is caused by neutral steer turns which harm plants and topsoil terribly. A good driver will almost NEVER make this kind of turn.

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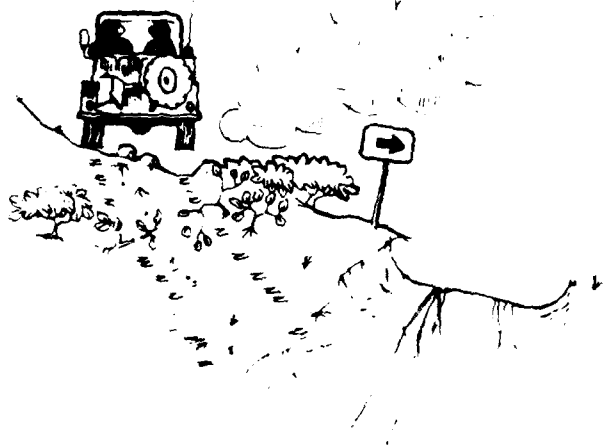


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When the grasses, shrubs, and trees are harmed or surface soil is removed, the land under them is exposed. Wind and rain will probably blow and wash away much of this loose soil the next time there's a storm. Because the soil here is so thin, it just makes erosion problems worse.

When this soil is blown away by the wind, it can form clouds of dust that make it hard to see and is irritating to the eyes or throat. Actually a lot more is happening than you might think. Over time, all the soil could be blown away from a spot, leaving only rock behind where nothing can grow. In some places, the clouds of dust can get so bad that people many miles away will complain, but it's too late then to do much about it.

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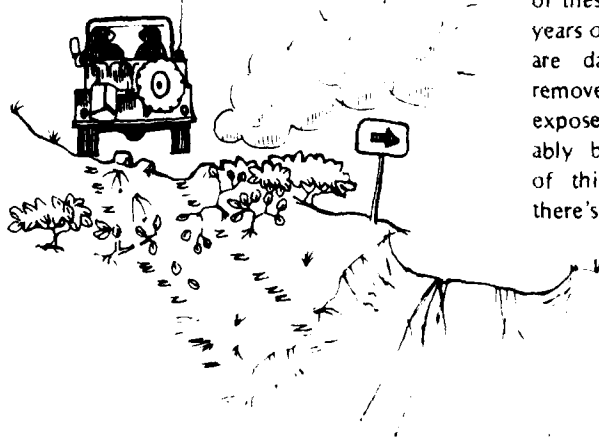


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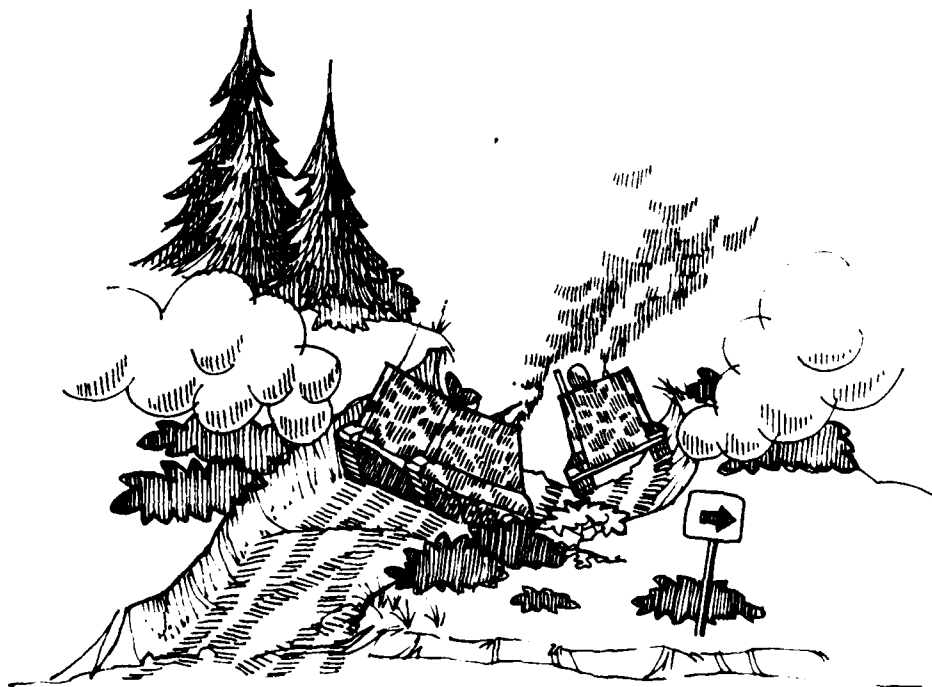
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OFF-ROAD VEHICLE MOVEMENT (Cont'd)

So what can we do to prevent this erosion before it happens? The easiest way is to stay on designated trails when driving a vehicle (unless you're ordered otherwise). The installation has set down regulations that tell which areas you can never go into and the areas where you can't drive off the marked roads and trails. You'll notice that most trails show a lot of erosion because they are constantly churned up. We're trying to keep the whole place from looking like this.

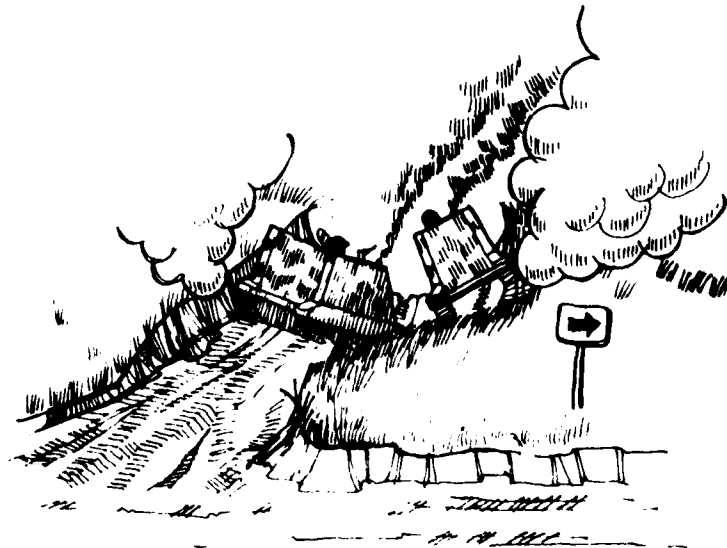


OFF-ROAD VEHICLE MOVEMENT (Cont'd)

Erosion caused by rain and water flowing on the soil is often worse than wind erosion. Roads and foot trails may be washed out in flash floods. And the gullies this erosion causes may get so big that even tracked vehicles can't cross them. Sure, all training exercises cause some erosion, but the area can eventually recover if it's left alone. Damage caused by neutral steer turns will take twice as long to be repaired because it harms plants and soil terribly. A good driver will almost NEVER make this kind of turn.

So what can we do to prevent this erosion before it happens? The easiest way is to stay on designated trails when driving a vehicle (unless you have orders to do otherwise). Remember to use only approved crossovers when your tracked vehicle is crossing paved roads. The installation has regulations that tell which areas you can never go into, and the areas where you can't drive off the marked roads and trails.

You'll notice that the land near the trails is mostly bare soil, with no plants, because it's constantly churned up. We're trying to keep the whole place from looking like this.

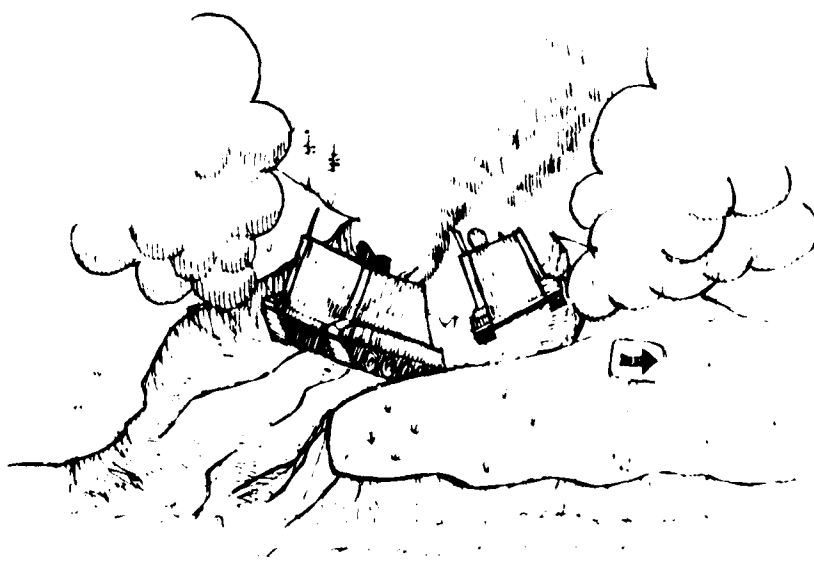


OFF-ROAD VEHICLE MOVEMENT (Cont'd)

Erosion caused by rain and water flowing on the soil is often worse than wind erosion. Roads and foot trails may be washed out in flash floods. And the gullies this erosion causes may get so big that even tracked vehicles can't cross them. Sure, all training exercises cause some erosion, but the area can eventually recover if it's left alone. Damage caused by neutral steer turns will take twice as long to be repaired because it harms plants and soil terribly. A good driver will almost NEVER make this kind of turn.

So what can we do to prevent this erosion before it happens? The easiest way is to stay on designated trails when driving a vehicle (unless you have orders to do otherwise). Remember to use only approved crossovers when your tracked vehicle is crossing paved roads. The installation has regulations that tell which areas you can never go into, and the areas where you can't drive off the marked roads and trails.

You'll notice that the land near the trails is mostly bare soil, with no plants, because it's constantly churned up. We're trying to keep the whole place from looking like this.



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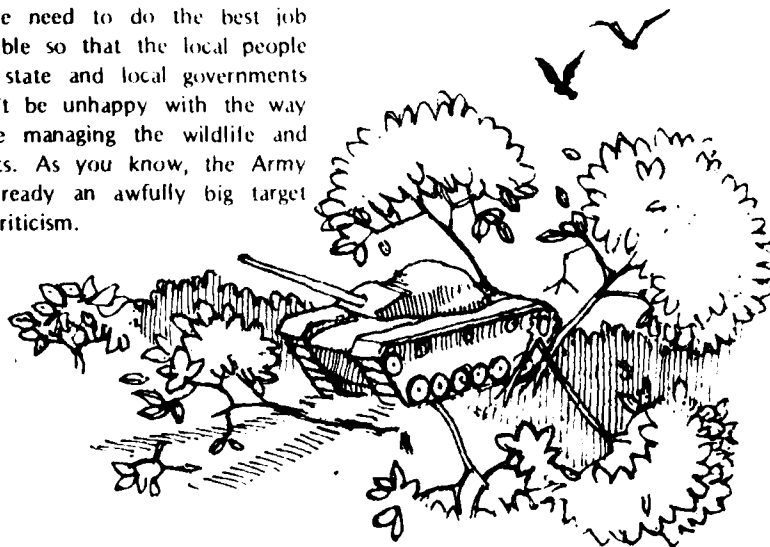
DISTURBING THE HABITAT OF SPECIAL PLANTS OR ANIMALS

Many installations have areas that contain critical habitat. They are 100 percent OFF LIMITS! If there are any OFF LIMITS areas on your installation, they will usually be marked with signs in the field or with symbols on your map. Critical habitat is the area that an endangered animal or plant needs to survive. These are almost the only places in this area or even the world that this special wildlife or vegetation is found. For some of these species, the loss of only a few trees might be enough to destroy a home and kill them off.

What good are these species? Well, a threatened or endangered species is a little like an antique weapon, such as a flintlock rifle. Flintlocks would be useless in combat, and only a few people would even try to go hunting with them now, but they still played an important part in our history. The ones that are left are important collector's items, and are expensive. Rare and endangered species are a lot like that. The very fact that they are interesting and hard to find makes them important. Also, we may discover, some day, that they're really valuable.

The law is another good reason why they're off-limits. Congress requires all Government agencies (including the Army) to protect the critical habitat of threatened and endangered species. Congress has also said that all installations must be managed with the same care as any other publicly owned land. The Army is trying to obey the law, but we need your help because YOU are the Army, too.

We need to do the best job possible so that the local people and state and local governments won't be unhappy with the way we're managing the wildlife and plants. As you know, the Army is already an awfully big target for criticism.

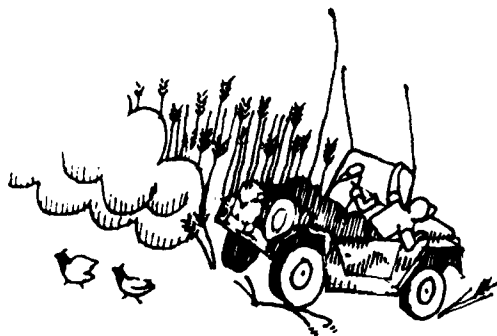


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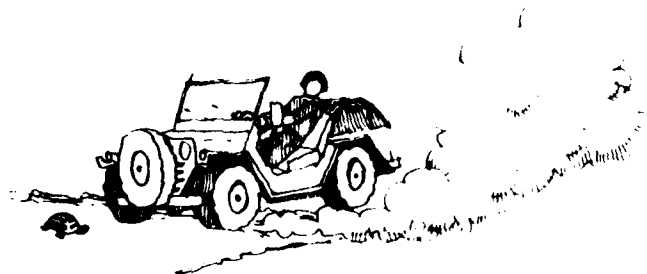
On this post, many of the animals spend a lot of time in underground tunnels called "burrows." If you are driving in places that are not authorized, you may be destroying the home of a lizard, kangaroo rat, or a snake. Now you're probably thinking, "Why should I care what happens to lizards, snakes, and other animals like that?" Well, for one thing, lizards are helpful, friendly, and harmless animals. Take care not to bother these little creatures, because people who live in this state are especially fond of them.

Snakes are another animal that you shouldn't mess with. First of all, most of the snakes here are nice guys—they aren't poisonous at all, and wouldn't bother anybody. Don't confuse the brightly colored, banded snakes found in this area with the poisonous coral snake. But, if you do see a rattlesnake, leave it alone and stay away! Bothering these snakes could be dangerous, and besides, they're important to other desert life.

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DISTURBING THE HABITAT OF SPECIAL PLANTS OR ANIMALS (Cont'd)



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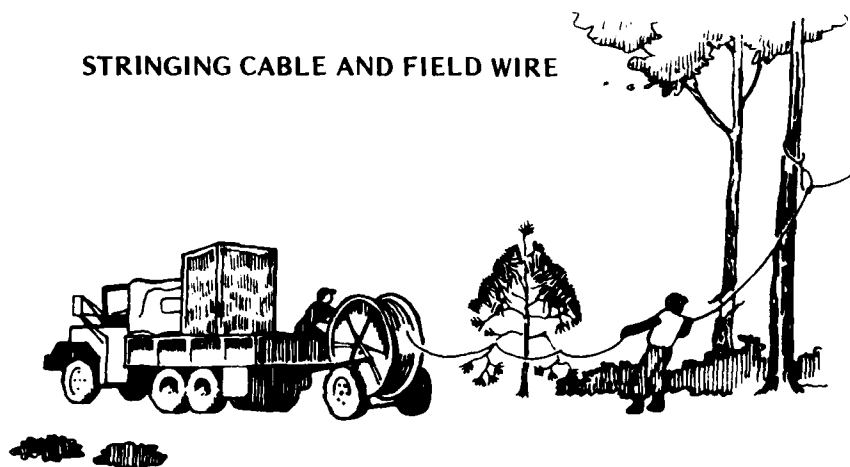
STRINGING CABLE AND FIELD WIRE



When stringing heavy communication or power cable, you already know that it should be hung off the ground. Run this cable along the edge of cleared areas instead of cutting a whole new path. Be careful how you do it in any case. Insects and fungus may get into trees where bark and branches have been broken and cause diseases, especially when large branches have been broken. If you use wire loops to help string the cable, remove them afterwards. They can "strangle" trees as they grow. Strong winds can cause these weakened trees to fall. The unplanned loss of many trees can make the area unusable for planned activities.

Commo wire left in training areas may get in the way of forestry, wildlife, and land management operations. It's dangerous for people, too—they just might trip over wire you carelessly leave behind. Pick it up! You get credit if you return it to supply! Make sure that every piece of barbed and concertina wire that you used in making defensive positions is collected when cleaning up. Double check to see if you've picked up all trip wires.

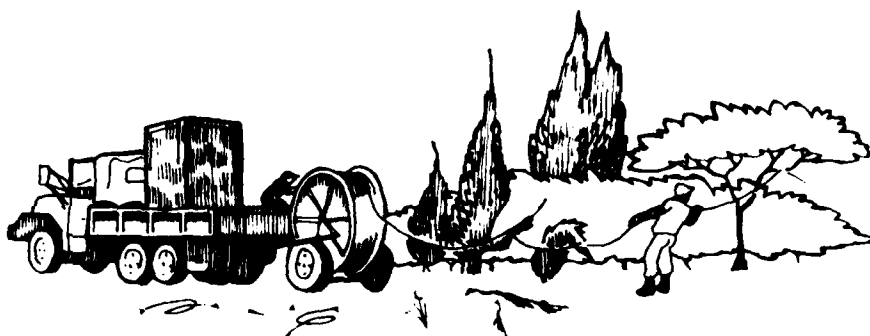
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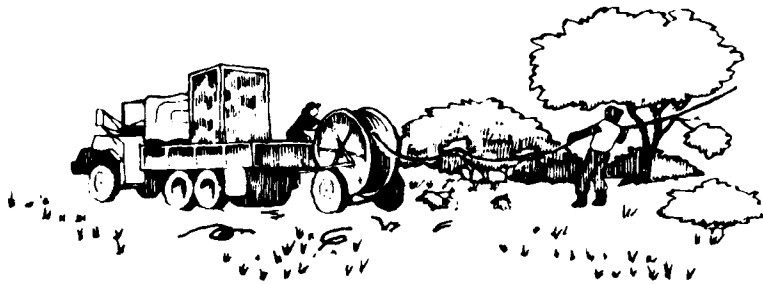
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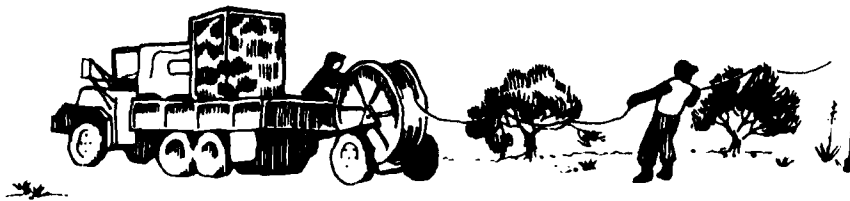
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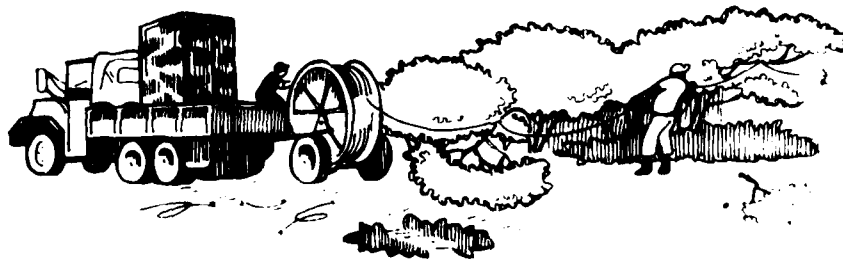
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USE OF FIRE

Use of open fire on the installation during training exercises can cause many problems. Big campfires may have been fun when you were a kid, but the Army doesn't need them. There's just too much chance for a mistake. Obviously, fire can destroy valuable landscape and buildings, as well as living places for animals. It can also destroy the vegetation which prevents erosion. Erosion by wind and rain in areas damaged by a forest fire is always very bad. If you do see a fire, report it right away to Range Control.



Catalytic converters and vehicle exhausts on cars and pickups can get very hot—so hot that nearby groundcover can catch fire during dry periods. So, make sure your vehicle is not sitting still with the engine running. But, if you must let it idle, be sure that there's only bare soil or rock under the exhaust system.

Burning trash and garbage in the field is against installation regulations. Ask your NCOIC to tell you where *fixed trash collection points* are. It is amazing how quickly a fire can spread to the surrounding forest or private property from just a small pile of burning litter or a smoldering cigarette. The destruction can be tremendous. If danger of fires is very high at the time of your training exercise, fires in the field may be restricted. Your CO will have issued instructions if the danger is so high that smoking is prohibited. Of course, there is absolutely no smoking in or around ammo or POL areas. In any case, every butt and match should be cool enough to hold between your fingers before you even think of throwing it away.



USE OF FIRE

Open fire on ranges or in impact areas during training exercises is not allowed unless you are given specific orders to do so. Big campfires may have been fun when you were a kid, but the Army doesn't need them. There is just too much chance for a mistake. Fires spreading through grasses and shrubs here can cause terrific damage.



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Burning trash and garbage in the field is against installation regulations. Ask your NCOIC to tell you where fixed trash collection points are. It is amazing how quickly a fire can spread to the surrounding growth from just a small pile of burning litter or a smoldering cigarette. The destruction can be tremendous, since many animals including man depend on plants for food and shelter. If danger of fires is very high at the time of your training exercise, fires in the field may be restricted. Your CO will have issued instructions if the danger is so high that smoking is prohibited. Of course, there is absolutely no smoking in or around ammo or POL areas. In any case, every butt and match should be cool enough to hold between your fingers before you even think of throwing it away.



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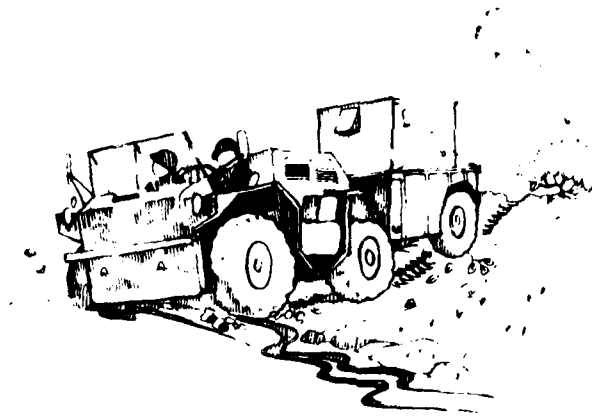
CROSSING STREAMS



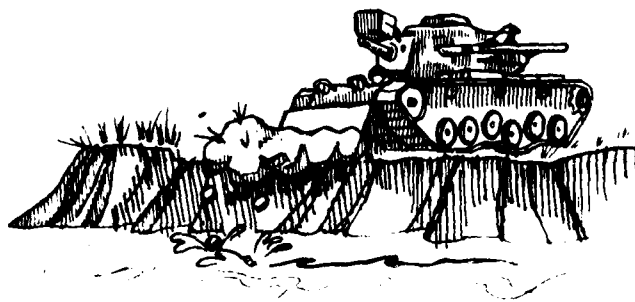
Crossing streams with heavy vehicles (tracked and wheeled) is very costly to a stream because of the damage done to the water and the life in it. A lot of soil erosion takes place on the banks where you cross. Oil on the engine or chassis may be washed off while you are crossing. Fish and other living things in the stream are often killed by this sediment and oil in the water.



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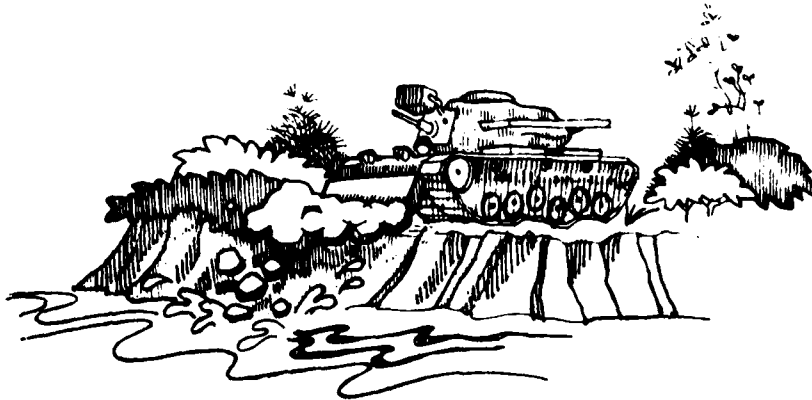
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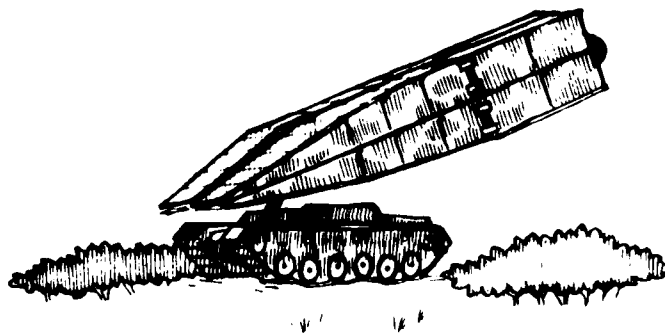


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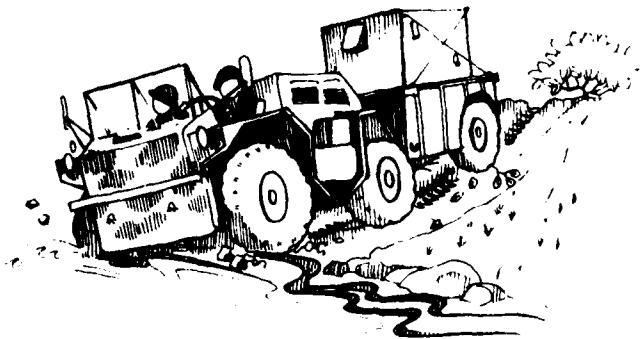
What about when you have to cross a stream during an exercise? Well, you should use bridges whenever possible, but first make sure they are strong enough for your vehicles. If you're an engineer or armor unit, the guidelines for placing a bridge are also pretty good for the environment. You already choose places where the banks are strong and close together, where the height of both banks is low and as even as possible, and where the access road to the bridge site is well drained and has very few trees to cut down.



The staging area should be as far away from the streamside vegetation as possible. Never cut trees or shrubs to clear an area for this activity unless ordered by your NCOIC. Following these guidelines will also mean less damage to the stream.

If there aren't any bridges in the area, use designated crossings, and cross only when absolutely necessary, even if you're on foot. See the installation regs for the location of bridges and designated stream crossing points. Also, don't drive your vehicle in the stream either to clean it off or just for the fun of it. This damages the stream more than you might think plus, that kind of goofing off is against installation regulations. The best guide is to cross in the water only when required by the mission, and then only at points where your CO says it's ok.

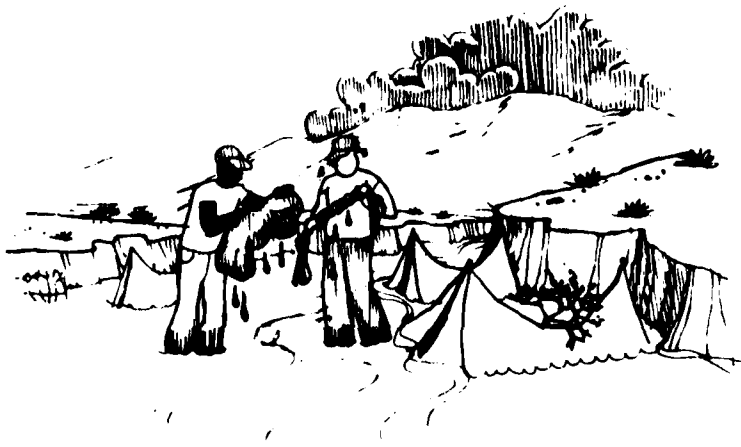
CROSSING STREAM BEDS



This post has many dry stream beds. They have a little more moisture in them than other places on the installation, so you will see many more plants there than in the drier areas. And because there are plants on the sides of these dry stream beds, the animals stick around there to get their food. If you can, try to avoid driving or walking across these areas. It's important that the animals and the food they need be left alone for survival.

Crossing stream beds with heavy vehicles (both tracked and wheeled) is very costly because of the damage done to stream banks. A lot of soil erosion takes place on the banks where you cross. The best guide is to cross these washes only when required by the mission.

These stream beds also make poor places to bivouac or set up headquarters, since a quick thunderstorm can happen any time of the year. This makes it downright dangerous to camp, because when it does rain, flash floods will come rushing down here from the hills.



CROSSING STREAM BEDS

This post has hundreds of dry sandy stream beds. They have a little more moisture in them than other places on the installation, so you will see many more plants there than in the drier areas. And because there are plants on the sides of these dry stream beds, the animals stick around there to get their food. If you can avoid driving or walking across these areas, try to. It's important that the animals and the food they need be left alone for survival.

Crossing stream beds with heavy vehicles (both tracked and wheeled) is very costly because of the damage done to stream banks. A lot of soil erosion takes place on the banks where you cross. The best guide is to cross these sandy washes only when required by the mission. Also, remember never to use dry stream beds as travel routes—use only designated trails.

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CROSSING STREAM BEDS (Cont'd)

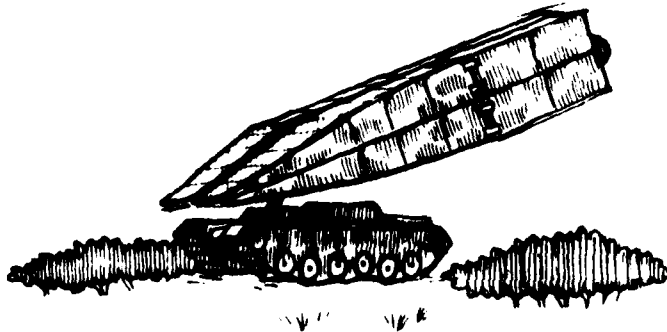


What about when you have to cross a stream channel during an exercise? Well, you should use bridges whenever possible but first make sure they are strong enough for your vehicles. If you're an engineer or armor unit, the guidelines for placing a bridge are also pretty good for the environment. You already choose places where the banks are strong and close together, where the height of both banks is as low and even as possible, and where the access road to the bridge site is well drained and damages the fewest trees. Following these guidelines will mean less damage showing up in the next wet season.

The staging area should be as far away from the streamside vegetation as possible. Never cut any trees or shrubs to clear an area for this activity--unless ordered by your NCOIC.

If there aren't any bridges in the area, use designated crossings, and cross only when absolutely necessary, even if the streambed is dry. Check the installation regs to see if there are bridges or designated stream crossing points. If there is water, don't drive your vehicle in the stream or in standing pools to clean it off or just for the fun of it. This damages the stream more than you might think plus that kind of goofing off is against installation regulations.

The best guide is to cross in the water only when required by the mission, and then only at established crossings. Also remember never to use dry stream beds as travel routes use only designated trails.



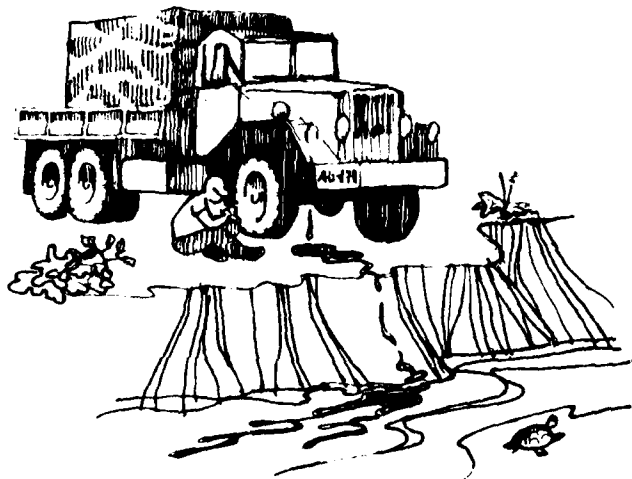
Arid Intermountain,

Steppe, Chaparral, and Desert Southwest

PROTECTING WATER BODIES

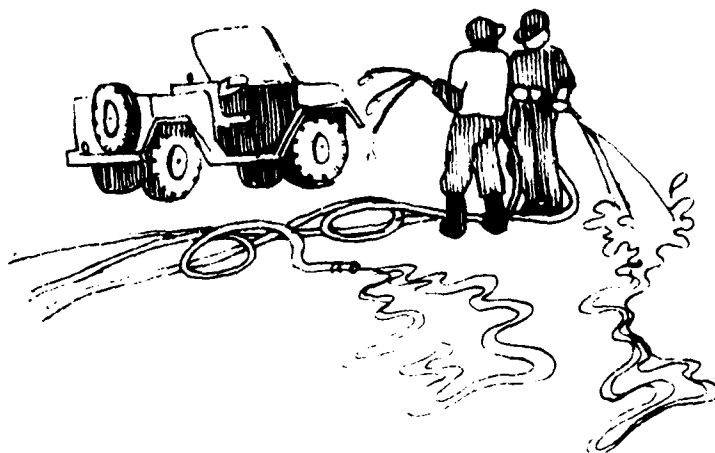
Water pollution starts in many different ways. Sometimes we don't notice how it starts because there is such a small amount of it. You might think that if your section dumps a little leftover food into a stream, no harm will be done. Maybe not, but if 20 more units do it during the next month and 100 units do it before the year is out, you've got a problem everyone can see.

Polluted water isn't safe to drink or swim in because the harmful chemicals or bacteria may get into your body. For this same reason, fish become contaminated or may die in severely polluted water. People or other animals may eat fish which have been poisoned by this water pollution.



You might wonder why we should care where these wastes are dumped, especially if WE don't have to drink the water. Well, it's true that you may not have to drink this water, but there may be other people downstream who do. Farmers or ranchers may be using this water for irrigation. If this water becomes unfit for them to use, it will cause health problems and plenty of other troubles. Then this ends up costing all of us money. Remember, the installation has to spend a lot of money to clean up this water, and all taxpayers, including YOU, are paying for it.

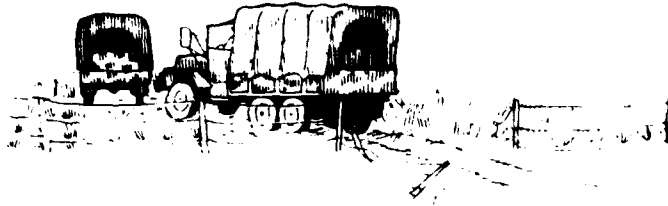
CONSERVING WATER



This installation has a policy of conserving water because the supply of water is much lower here than in other parts of the country. During very dry times of the year, when water is harder to come by, it is in your best interest to watch carefully how much water you use. So try and make every attempt not to run water unless it is absolutely necessary. This advice even applies when you're using water for a training-related task. By saving water, you are helping the installation keep its water supply high enough so everyone can use it. After all, without water, you can be put out of action in just a few days.



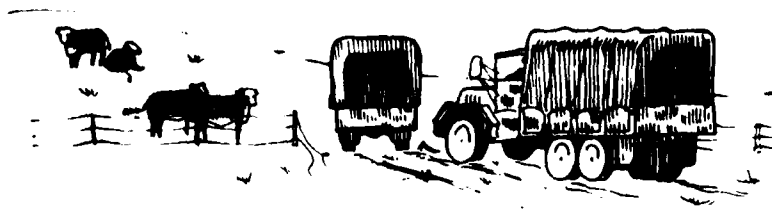
LEASED AGRICULTURAL LAND



There is still another reason why you must know where you're going before driving off a marked road or trail. The Army often leases land to local people for crops or grazing. This land is leased only when its use is compatible with military use. If you drive across these lands, you will destroy the crops or disturb the grazing animals. Don't forget, the farmer or rancher paid the Army to use that land. These areas are marked on the map, and are off limits to training, unless approved by your CO.

Grazing animals need clean drinking water to live. By tracking over their water holes or tipping over water tanks, you are endangering their health.

If the grazing area is fenced, keep it that way. By destroying fences and cattle guards, you are helping to let the animals get out. They may damage crops or cause road accidents, hurting both themselves and people. The damaged crops and injured animals will cost the Army in damage payments and will hurt its relations with the public.

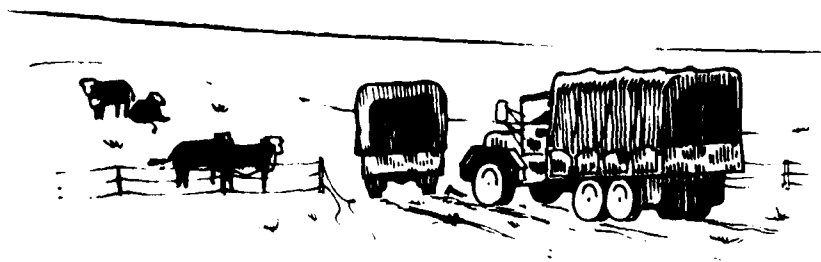


LEASED GRAZING LAND

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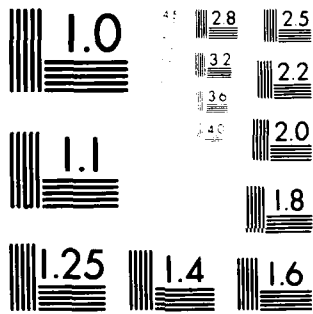
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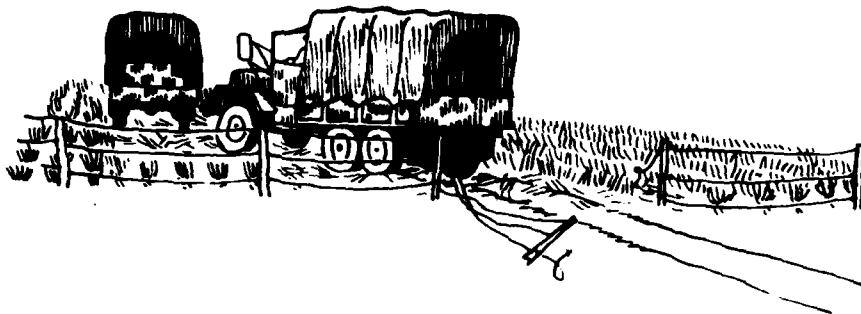
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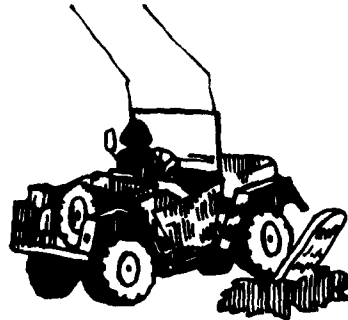
LEASED CROPLAND

There is still another reason why you must know where you're going before driving off a marked road or trail. The Army often leases land to local people for crops. This land is leased only when its use is compatible with military use. If you drive across these lands, you will destroy the crops. Don't forget, the farmer paid the Army to use that land. These areas are marked on the map, and are off limits to training, unless approved by your CO.



HISTORICAL AND ARCHAEOLOGICAL SITES

Almost everyone is interested in the past. The older something is, the more interesting it is. It's a sort of built-in respect we have for history. The post has tried to save a few of its oldest buildings. Some of them are important to the Army; however, many date from before the Army bought the land and are more important to local people.



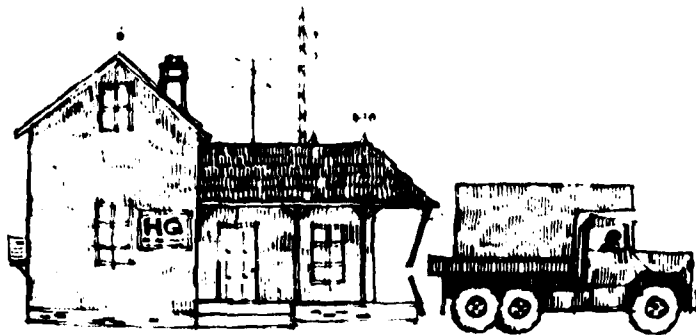
Sometimes all that's left are the foundations, or maybe a few old gravestones. If you come across any of these places, take it easy on them! They might not look important, but we are required to take care of them. Pioneer cemeteries, especially, are protected by law.



What if the remains are even older? In many places, Indian tools are pretty common. Maybe you have even hunted for them. Don't do it on post! There is a Federal law—with teeth in it—which forbids even picking up one arrowhead on post. You're supposed to report it, through your CO, to the installation environmental office. This is especially important if human bones are uncovered.

HISTORICAL AND ARCHAEOLOGICAL SITES (Cont'd)

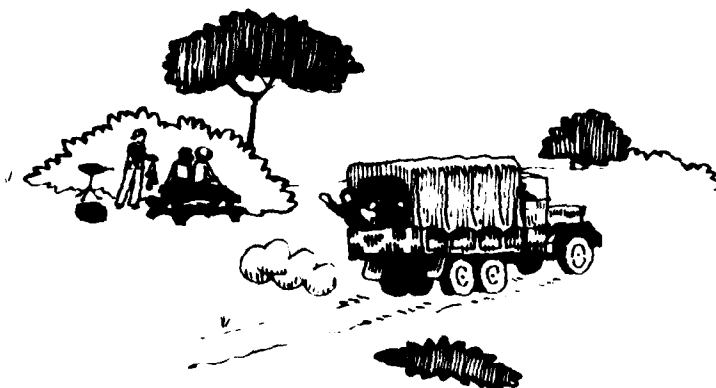
Any really big project—especially if it means a big excavation—needs to be cleared by your CO, with Range Control and the Facility Engineer. Any big earthmoving job—a bridge approach, for example—can really cause problems if you dig into one of these archaeological sites.



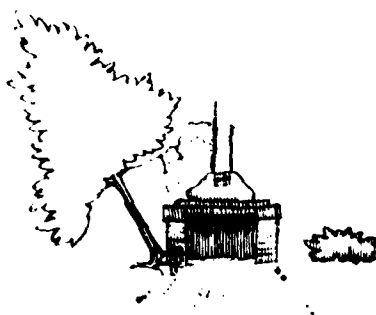
Why all this excitement about relics? Mostly it's what we said earlier—respect for our "roots." But partly it's because the Army is trying to keep its act clean. One sure way to cause a lot of local heartburn is to destroy an old "shack" that happens to be 120 years old, or to run a tank over great-grandma's grave. Help us keep everyone happy and impressed with the way we care for our past!

RECREATION AREAS

Here and there on post are places set aside for family recreation. Many of these campsites and picnic areas may be in use today. But the ones in your assigned training area should be empty. If they are in use, stay clear of the people there. Never leave your assigned area. Be especially careful if you must drive past a camp area which is in use - children are often hard to see.



SUMMING IT ALL UP



We hope that you now understand how everyone in this exercise can help protect the plants, animals, and other resources on this installation. When you do some damage, like knocking over a tree or crushing plants, you might say, "IT'S SO SMALL, WHO COULD CARE?" But this will often turn into a problem that has people saying, "WHY DID THAT EVER HAPPEN?!"

Caring for the natural resources isn't something that takes a lot of time and work—it only takes a little thought. If everyone thinks about the problems mentioned here—and then does a job the right way—we will keep this installation in tip-top shape and ready to meet future Army needs.



SUMMING IT ALL UP

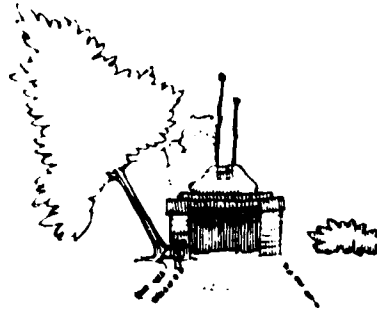


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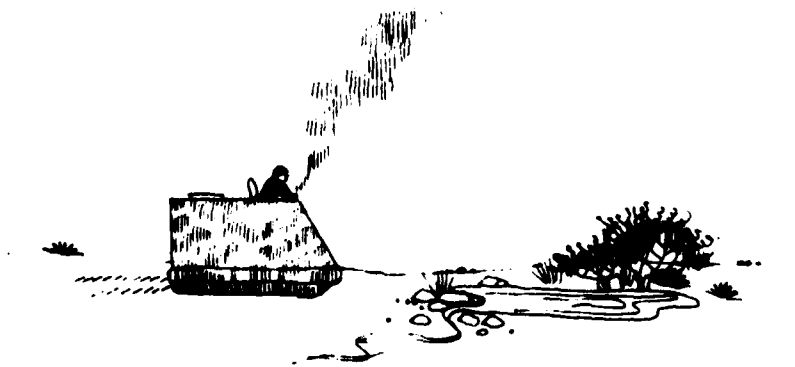


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