4-H FORESTRY PROGRAM—Unit C-2

FOREST RECREATION

member's manual
and
leader's guide

Acknowledgments

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The 4-H Forestry Program

Educational aids in the National 4-H Forestry Program consist of three parts, Unit A—Trees—explains what trees are, how they grow, why they are important and what characteristics identify them. Unit B—Forests —is about trees as part of the forest ecosystem, what values people hold for them, and how they are managed. Unit C—Forestry—discusses how people manage the forest resources which provide forest products, recreation, water supplies, wildlife shelter, jobs and other needs.

The most logical way to use this program is to start with Unit A and take the sections in order through Unit B. Then select those sub-units of Unit C in which you have the most interest. More advanced members may start with Unit B and refer to Unit A as necessary.

This sub-unit is only part of a much broader presentation of forestry interests contained in Unit C. In all there are eight publications in Unit C designed to give you an overview of various aspects of the forest industry. You will be advancing from the general concepts presented in Unit B to more specific topics, such as

*C—1 The Tasks of Tree Farming

*C—2 Forest Recreation

*C—3 Managing the Forest for Water, Wildlife and Forage

*C—4 Urban Forests

*C—5 Careers in Forestry

*C—6 The Dollar Value of Forestry

*C—7 Timber Harvesting

*C—8 Great Plains Forestry

Note: The small numbers featured at the end of some sentences are references to publications found on page 12.

Member's Section

Introduction

Forest surroundings provide a setting that is widely desired for many recreational activities. Hiking, camping, picnicking, sightseeing and bird watching are only a few of the recreational activities that are more possible and more fun in forests than in barren surroundings.

Within the past 25 years, changes in our socio-economic patterns, such as population increases, higher incomes, increased leisure time and greater mobility have led to an increased demand for forest recreation facilities. These changes have also allowed more of us to take part in forest recreation activities.

We can expect this demand to continue to increase. As our urban areas expand, more of our forest lands are being developed into business and residential areas.

This manual will help you see why each of us needs to be concerned with good land use planning if we are to meet the increased demands placed on our forest land.

Forest Recreation

Forest recreation consists of outdoor activities that are somehow related to our renewable resources. These activities usually are held in or around the forest, but are not limited only to this setting. Some of the more popular activities include driving, camping, fishing, hiking, hunting, nature study, picnicking, sightseeing, skiing, snowmobiling and swimminq.

Forest recreation activities allow visitors to spend time in an outdoor environment amidst some of our natural resources. The extent of personal satisfaction gained depends more on how valuable the activity is and how long it lasts than how often it is done. For most people, forest recreation involves more travel time and greater expense than other recreational activities. The *total* time spent pursuing forest recreational activities may not be as great as that spent on other activities, but the time spent *per experience* or outing is usually greater.

Therefore, people expect a higher degree of personal satisfaction resulting from their limited recreational outings.

Why Visit a Forest?

The forest is a priceless resource for people seeking to renew or heighten physical, mental and spiritual feelings. Many seek the forest for recreation because it is primarily a change of environment—a sharp contrast from day to day urban living. Visiting a forest area can be relaxing, educational and healthy. Further, the forest can offer physical and mental challenges to those who venture into undeveloped forest areas. Finally, the forest provides many people their only opportunity to experience how many of our forefathers lived and worked in the outdoors.

The Demand for Forest Recreation Land

Resource-based recreation is dependent on natural resources which are owned or managed by government (federal, state and local) or the private sector. Historically, forests have been used for food, shelter and clothing. Our ancestors managed our forests primarily for timber, watershed areas, wildlife and forage. People hiked, hunted, camped and fished in forest areas, but more for survival than for leisurely activities. There was little time to use forest land for recreation purposes.

But in the last two decades the demand for more outdoor recreation opportunities has surged. The public has pressured the owners and operators of forest land to include recreation as a further use of their resource. What factors account for this sudden increase in demand? Some of the more important ones are:[2]

Urban Living Since the early 1960's, people have shown an increased desire to be more active outdoors. But the steady trend toward urban living reduces the opportunity for daily outdoor recreation. The demand placed on existing recreational areas is therefore increasing and some areas are already overcrowded.

Leisure Time Automation and industrialization have generally *increased* each individual's amount of leisure or spare time. Mobility Outdoor recreation usually necessitates the freedom to travel, or mobility. More cars and better public transportation give people higher mobility, which increases demand. However, the future uncertainty about the availability of gasoline and the rising prices will have a strong impact on people's mobility.

Income The increase in *per capita* income means people have more money to use in outdoor recreational pursuits.

Communication Mass media stimulates interest in and increases awareness of available outdoor resource-based recreational pursuits.

Supply of Resources On one hand, overcrowding in recreational areas can deflate people's interest. On the other hand, people have shown that they are willing to travel further to less congested areas to have a more rewarding time.

New Recreational Products Such products as trail bikes, snowmobiles and light weight camping equipment also may create new demands for outdoor recreation.

The Supply of Forest Recreation Land

Will we be able to meet this increasing demand for resource-based activities and the sites that must accompany them? The first step in answering this question is to raise another. What is good forest recreation land? There are at least seven requirements for good recreation areas: [2]

I. GENERAL REQUIREMENTS

A. Space: The acreage needed must be large enough to be used by a number of people. The projected use plan must consider the overall limitation of space as well as the physical limitations of the individual site, or its *carrying capacity.* Many recreation areas are quite fragile and low in natural productivity. Such areas must restrict the number of people who can use them.

B. Suitable Climate: Certain weather conditions must prevail in the area to support specific forest recreational activities. For example, you would not expect forest land to be developed for cross-country skiing or snowmobiling in most areas of the South.

C. Accessibility: People should be able to reach the recreational land they wish to use. Sites with limited access prevent people from using the site. They need a good road or some other transportation system to arrive quickly and safely.

II. SPECIFIC REQUIREMENTS

A. Attraction and Setting: The site must possess features which complement the activity. For example, a site may possess fantastic features for hiking but may be located in a heavily eroded area, which would lessen the satisfaction of the hikers.

B. Water: Bodies of water such as lakes and rivers attract people; but to maintain health and safety standards, certain limitations must be made on its use. For instance, swimming cannot be allowed where boat traffic is heavy or where the water is polluted.

C. Public Acceptance: The success or failure of forest recreation development depends on how much the public enjoys it. Facilities for specific activities should be developed only in areas where the public will potentially support them.

D. Land Use: The alternative uses of forest lands must be considered. If recreation is to fit into an area's use pattern, the management plan must include it. Multiple use of our forests is possible, provided the uses do not conflict with one another.

Location and Ownership

Besides the physical limitations of outdoor recreation land and the level of use specific sites can support, two other factors greatly affect how much land can be used for recreation: (1) the location of the land, and (2) ownership patterns.

Reaching a balance between the supply of outdoor recreation land and the demand for its use is a problem. The majority of our population still lives in the eastern half of the United States, while much of our non-urban recreational land lies in the West and Alaska. Nevertheless, there are still great tracts of suitable recreation lands in all regions of the country.

Regarding land ownership, our forest resources total 754 million acres (roughly one third of our total land area). These lands fall into two distinct categories, commercial and non-commercial forest land. References here to the percentage of forest land ownership and its use for recreation will reflect only commercial forest lands. While non-commercial forest land is considered valuable for certain uses (watershed, wildlife habitat, forage, recreation, timber and aesthetics) other than timber production, statistical information on its use specifically for recreation is vague. Forest land ownership patterns are separated into three categories (1) public, (2) industrial private and (3) non-industrial-private. Land held in public ownership is administered by federal, state and local governments. The federal government is the largest forest recreation operator in the United States. 2 Some 10.1 million acres, or 22 percent of the total commercial forest acreage, is managed by various federal agencies, including the Forest Service, Park Service, Bureau of Land Management, Bureau of Sport Fisheries and Wildlife, the Corps of Engineers and others.

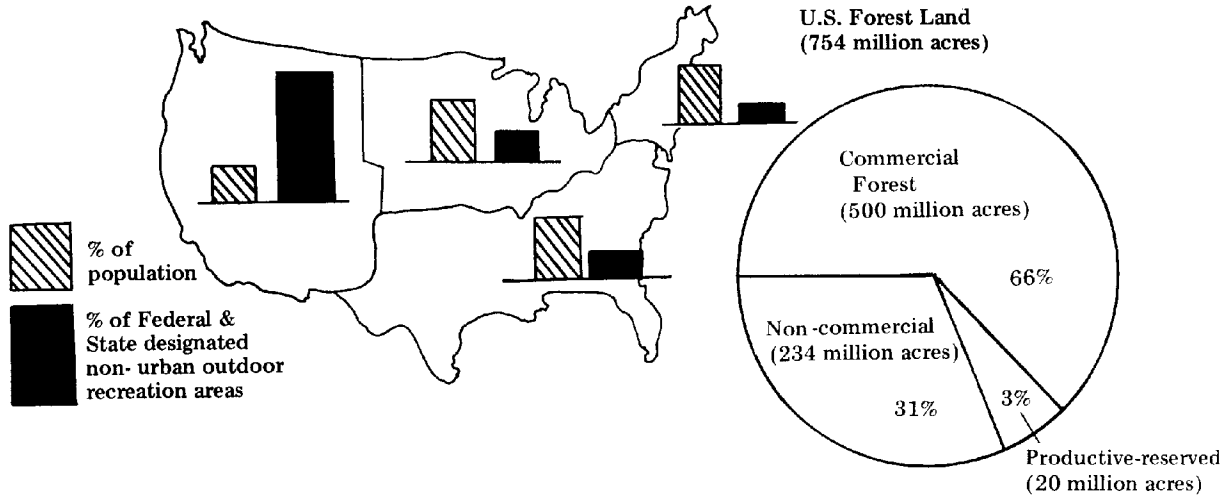
The Forest Service administers over 180 million acres of land on 154 National Forest areas. The Forest Service tries to protect, manage and develop national forest resources for timber, outdoor recreation, water, wildlife, and forage through a plan of multiple use and "sustained yield," meaning the amount of timber that the forest can continue producing over a period of time. 1 Millions of acres of national forest land have been set aside especially for recreational use. Of this amount less than 1% has been developed for camping and picnicking, and the remainder has been designated for roadless and wilderness activities. 4 Additional acreage of unroaded National Forest land is being considered for inclusion in the Wilderness System.

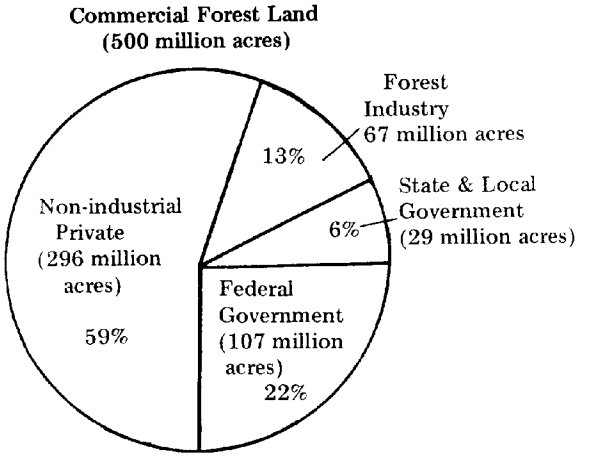
The National Park Service administers approximately 29 million acres of land, of which roughly one-half is contained within our 35 national parks. The remainder is contained within various national monuments, historical sites and scenic recreational areas of special importance. While much of the Park Service lands are used for recreation, the prime objectives are education and inspiration.[1] Our National Park Service lands are acquired for their uniqueness and are managed as living museums for present and future generations to enjoy. Therefore, only certain types of recreation are permitted on these lands.

The Bureau of Land Management controls over 452 million acres of land, including grazing and desert land, mineral deposit land and land for homesteading. All B.L.M. lands are managed on a multiple use, sustained yield basis. (See "Forest Service" above.) A majority of this agency's land, while open to recreation, is not easy to reach.

The Bureau of Sport Fisheries and Wiidlife administers roughly 28.5 million acres known as the National Wildlife Refuge System. The refuges are managed on a multiple-use basis, and approved recreational activities include observation and study of flora and fauna, general sightseeing, fishing, picnicking, limited camping, swimming, boating and controlled hunting.'

The Corps of Engineers manages overeight mil lion acres of water and land for the purpose of improved navigation, flood control and hydroelectric power. Wherever suitable, their lands are open to public use for all forms of water-related activities. These include boating,. swimming, waterskiing, fishing, hunting, picnicking and camping.[1]





State and local governments manage 29 million acres of commercial forest land, or six percent of the total. State parks, forests and local forest preserve districts help to meet the recreational demand placed on our natural resources. Use of these areas, especially in large urban concentrations, is extremely high. They are visited more frequently than are the larger federal lands which generally are located further away.

Private industry owns 13 percent of our commercial forest land. Ninety-two percent of this land is open to some form of public forest recreation.[2] Industry has taken a leadership role in developing this land, which can profit companies both economically and in terms of public relations.

Fifty-nine percent of our commercial forest land is non-industrial private ownership. In comparison to the publicly owned forest land, non-industrial private forest land has played only a minor role in meeting the demand for recreational sites. In order to meet our resource-based recreation needs in the future, private owners may have to be given incentives to develop some of these lands as well. I n some situations, private owners cannot provide the developments needed.

Forest Recreation Decisions

Effective planning is the key to success in providing recreational opportunities. Planning involves setting goals and objectives and establishing standards and criteria to achieve them. Planning, which must be present through all levels of government and private enterprise, is the first step in making decisions about recreational lands. It may be either *short-range, long-range,* or both.

It is easy to say that the forest recreation planner must balance *demand* with *supply* to provide a recreational experience which will satisfy the public now and assure an acceptable site quality for future generations. But there are many factors which complicate recreation planning. Among them are: socioeconomic characteristics of the users, demographic considerations (such as how many people live in what areas), ability to provide different types of recreation and physical site limitations. The planner must confront these and other factors in order to project the future supply of and demand for

forest recreational land. The surplus or deficit of forest recreational land and facilities is simply the future projected demand minus the current inventory (that is, the supply of existing land and facilities).[3]

SITE PLANNING

Upon learning the projected recreational land needs for a specific population, the planner must now suggest areas which will be suitable to meeting this need. The land must be able to support certain recreational activities, and its development must be convenient and satisfying to the user.[2] Outstanding recreational developments will get little use if people cannot reach them and if they have few of the facilities that people desire.

Whenever people begin using an area for recreation, the site is usually altered somehow. However, most sites and areas can tolerate a certain level of use before the resource base is harmed beyond repair. This level of use which an area can support or tolerate is known as its carry*ing capacity.* The amount of money and other resources allocated for the management and maintenance of a site also help determine its *carrying capacity. A* site's tolerance refers not only to the expected changes in environmental factors (such as soil compaction, nutrient exchange and microclimates), but to the visual, mental and economic impact on the user as well.[5] *A* ski slope that looks bare and eroded or that is littered with garbage will begin to loose popularity with the public.

The attractiveness of a site or area is dependent on such factors as where it is located, what facilities are available, what the quality of the natural environment is like and how much it costs to acquire the land. In order that a site may continue to be used, the quality of the area must be kept from falling below a certain minimum standard. One responsibility of the recreation manager is to know what keeps people from using a location more than they do. He should understand how much of which uses detracts from the quality of the area, and then limit how often such uses occur.

COMMON PROBLEMS
IN RECREATION MANAGEMENT

The benefits of good planning can be offset by poor management. Since recreation involves people, problems arise. Knowing that no two people are exactly the same, we must assume that attitudes and behavior of the users must also be quite different.

When many people use a recreational area, a number of problems arise:

1. site deterioration — erosion, soil compaction, loss of vegetation

2. safety and health hazards — broken bottles, tin cans, broken tree limbs, clogged toilets, not enough garbage facilities

3. fire hazards — careless smokers, illegal campfires, unattended campfires

4. vandalism — malicious destruction of property, facilities and vegetation

Many of these problems can be eliminated, or at least reduced, through proper planning when the site is first developed and through constant maintenance. People can be encouraged by the management staff to help maintain a useful, healthy recreation area. Proper educational efforts will help the public develop an appreciation of the beauty of nature and its vulnerability to abuse.

Things To Do

1. Make a list of at least 20 outdoor recreation activities. Analyze these activities and indicate which ones require a forest or otherwise natural environment for maximum enjoyment. Find pictures from magazines or recreation brochures and make an illustrated notebook on forest recreation.

What activities have you participated in before? Write a brief statement about an activity you have already participated in, describing the outdoor or forest environment that made the site suitable for such recreation. Include what you enjoyed most and least about the activity. Limit the statement to less than one page. (NOTE: If you have not participated in a forest-based recreational activity, write about one that you would like to do.)

2. What are the most significant factors that create demand for outdoor recreation in your area? Explain why. Interview a local recreational administrator to support your answer.

3. Inventory your city, county and state to locate various outdoor recreational activity sites. Use a chart or form similar to the one below to complete the inventory. After completing the inventory, visit a site for each if possible. Prepare a written report on each site visited, including pictures.

Confer with the manager of each site about the problems. See what he or she thinks you could do that would reduce or help control the problem. With the manger's consent and assistance, prepare a plan of action that will change the behavior of the recreational site users, such as encouraging people to do less littering, to use only the designated roadways or trails, to build fires only in the places provided, or to respect facilities (tables, fireplaces, fountains, restrooms, trees and other natural vegetation).

Put your plan into action for a reasonable period of time and evaluate your results.

Prepare a written report that describes the area, presents your plan and tells how you carried out the plan and what results you obtained. You may want to team up with some other members of your club for this activity.

4. Study the history of outdoor recreation in your state. Become acquainted with present and proposed legislation, the state recreation department and long range objectives for outdoor recreation in your state. What income does it generate? What is the cost of meeting the demand?

5. Interview and/or arrange a field visit with a practicing outdoor recreation professional. Discuss and observe planning, management and resource development activities. Question the professional on supervision, public relations, maintenance and operation activities, carrying capacity, cultural practices used to enhance recreation and so forth. Give a concise written account to the 4-H group or your leader on what you learned. Take pictures on a field visit and use them to supplement Your narrative.

6. Identify a local natural resource area. Imagine you are an outdoor recreation professional, and prepare a plan for developing the site or area. Include what factors must be considered before development can start. Show how your plan meets a public need for outdoor recreation in your area.

7. If you have access to the area for which you prepared a recreational development plan in No. 6, implement some or all of your plan. Keep accurate records on amount of labor, costs of materials, facilities provided and anticipated use.

8. Observe two to six outdoor recreational sites in your locality. Make particular note of user-caused problems, such as litter, defaced or damaged facilities, illegal fire spots, defaced trees and nonobservance of trail or road signs.

INVENTORY OF OUTDOOR RECREATION AREAS

Ownership or Management	Name of site or area	H_20 acreage	Land acreage	Available Facilities and Features	Major Highways or other access	Round Trip Mileage from home
1. Federal						
2. State						
3. County						
4. City						
5. Private						

9. Make a survey of a randomly selected sample of families in your community or locality to find out people's attitudes about outdoor recreation. Develop a questionnaire to help you find out such facts as:

Where do people in your area go for forest-based recreation?
How often do they go?
How long do they stay?
What kinds of outdoor recreation do they participate in?
Do they desire additional outdoor recreation opportunities closer to home? (If so, what kind?)

Try to obtain the help of an outdoor recreation specialist in planning your survey method and developing your questionnaire.

Summarize and interpret the results of your survey. If your sample is valid, you might have information that could be used in a news story, radio program, or on television. You probably should make this a joint activity with several other club members.

10. Participate in some outdoor recreation activity that you have never done before. Report to your club on:

- Why you chose the activity you did.
- What special training (if any) it required.
- After you became skilled enough in your new outdoor recreational activity to enjoy it, how many times did you do it? Where did you go to carry out this activity?
- How much has participation in this new activity cost you in training fees? In equipment? Other?
- How do you feel about it at present? Has it been worth the effort?

11. Cooperate with one or more of your fellow club members in preparing a code of ethics for forest recreationists. Make it broad enough to apply to every person who pursues any kind of recreational activity on any area of forest land. Present your finished code to the entire club. After the other club members have had an opportunity to study the code, move that the club adopt it as a guide for the members in all their outdoor forest recreation activities.

12. Plan and conduct an educational program on forest recreation in your community or county. Let the program encourage people to have greater appreciation for outdoor recreational opportunities and deeper respect for trees and other forms of nature in recreational sites, as well as to care for the man-made conveniences. Inspire people to help clean up recreational areas. Use any and all educational methods that could help your purpose and that are feasible. After your educational effort has been completed, evaluate your success. Your county extension agent, a communication specialist and an outdoor recreation specialist are all people who can give you helpful advice on this activity.

Outdoor Recreation Activities

1. Walking for pleasure — Organize a walkathon through a forest area to benefit some charitable organization.

2. Swimming — Hold a "water olympics" in a forest recreation area, including water skiing.

3. Driving for pleasure — Map out a circular route to be taken by all, then have a "wildlife identification contest" to spot and identify species within that area.

4. Outdoor games and sports — Try traditional favorites I ike "Capture the Flag" and "Kick the Can", or learn about "Snake-in-the-Grass" and other inventive games from the New Games Foundation, P.O. Box 7901, San Francisco CA 94120.

5. Bicycling — Try an overnight bicycle tour, where you actually camp in the woods; or, conduct the wildlife identification contest as mentioned above.

6. Sightseeing — Do some research on how a tourist spot became popular, or how a natural wonder formed geologically; prepare an information sheet describing the history of the site and pass it out to visitors.

7 Picnicking — Prepare an outdoor dish suggested by the 4-H Food Conservation and Safety Program, and hold a Backwoods Potluck.

8. Fishing — Take an inventory of the various species of fish in your forest recreation area; with the help of a wildiife specialist, prepare a sheet on where to go to catch what kind of fish; or, have a fishing contest and hold a fish-fry afterwards.

9. Boating — Instead of using a power-driven boat, rent a sailboat, raft or canoes and havea group expedition promoting the energy conservation issue.

10. Nature walk — Combine this activity with a 4-H Wildlife Project activity and cou nt the nu mber of birds of prey that you see; or, build a nature trail.

11. Camping — Try camping in a wilderness area with only the bare necessities—no radios, prepared foods, and so on. (Be sure to check with local authorities about permits and equipment needed.)

12. Horseback riding — If there is a trail, take your horses up to the timber line and observe the noticeable change in vegetation at greater elevations.

13. Hiking — Find a rocky area and include some basic rock climbing in your hike, or try mountain climbing with some experienced people.

14. Bird Watching — Locate well-used migratory rest stops in your region and observe the spot in two or more seasons to note the change in species.

15. Outdoor Photography — Take pictures in various forest recreation locations to promote all of the above activities for your club.

References

1. Brockman, C. F., et. al. 1973. Recreational Use of Wildlands. 2nd edition. New York:McGraw-Hill Book Company.

2. Douglass, R. W 1969. Forest Recreation. New York. Pergamon Press.

3. Jensen, C. R. 1970. Outdoor Recreation in America. 3rd Printing. Minneapolis:Burgess Publishing Company.

4. Jubenville, Alan. 1976. Outdoor Recreation Planninq. Philadelphia. W. B. Saunders Company.

5. Wagar, J. A. 1964. "The Carrying Capacity of Wild Lands for Recreation." Forest Science Monograph, No. 7. Washington, D.C.: Society of American Foresters.

Leader's Section

UNIT OBJECTIVES

Some objectives that you should hope to accomplish with this unit are to encourage youth to:

1. Increase their awareness and appreciation of forest recreation.
2. Recognize the importance of forest recreation and its contribution to the local community.
3. Develop an understanding of the social and economic factors that cause increases in recreation demand.
4. Identify major suppliers of recreation opportunities from the public and private sector.
5. Understand major principles of recreation management and development.
6. Identify, classify and inventory potential recreational sites in the area.

A club member who is working on the Forest Recreation lesson should complete at least four of the 11 recommended "Things to Do" in his manual to complete the requirements of this lesson.

The following outline contains suggestions for meeting programs.

MEETING PLAN

A. Recreational opportunities are another product of a well-managed forest. This unit may be initiated with a group discussion of members' individual or family outdoor recreational interests or activities and the kinds of forest sites where families or individuals may participate in these activities.

1. Have club members individually list three or four outdoor recreational activities. Ask members to bring items of outdoor recreation equipment as a basis for discussion on forest activities. Have members relate where they participate in the activity.

2. Select one member to record the information on a chalkboard. or on a larqe piece of paper. Individual discussion should summarize the activity, listing necessary equipment and location, and describing the forest environment, frequency of participation, and characteristics of other users.

B. Use the list of socio-economic demand factors on page 5 of the members' section to assign individual or two-member team reports. Reports may be presented in a local park or outdoor setting.

1. Have club members select at least one demand factor and identify the importance of this factor in their community.

2. Members may wish to role-play the selected demand factor. For example, someone may represent "population increase," another, "leisure time," and so forth.

3. Have members research and prepare an exhibit on the role and responsibility of the public sector in providing outdoor recreation opportunities. The exhibit may cover either federal and/or state and local agencies.

4. Identify local private businesses that are in the forest or outdoor recreation field. A good source of information may be the parks, recreation or travel and promotion divisions of state government or the local Chamber of Commerce.

C. Identify several forest or outdoor recreation management areas and schedule a field trip. (1) Club members should prepare questions prior to the visit on management topics such as objectives and goals, management controls, decision-making and organization. (2) A second field trip may focus on development factors such as objectives, general services, public relations, design, maintenance and operations; (3) members should prepare work sheets to record observations.

SUGGESTIONS FOR LEADERS

1. Weather permitting, conduct as many of the meetings as possible in outdoor settings.

2. Invite resource people to demonstrate new and unusual outdoor recreation activities.

3. When obtaining resource people, consider such diverse sources as outdoor recreation specialists, foresters, conservation clubs and environmental action groups.

4. Consider visiting one session of the state recreation and park society annual conference or the annual conference of another similar organization.

5. Visit the local library to identify all available publications on outdoor forest-based recreation.

6. Study lives of pioneers in the forest recreation field, people such as Aldo Leopold or William O. Porglor.

7. Study state and national legislation honorinq recent influences in outdoor recreation.

EDUCATIONAL AIDS

A. Recreational Opportunities

1. Secure travel and promotional films, slides, publications, posters and other available materials from the Chamber of Commerce, state travel and promotion departments and industry in the outdoor recreation field.

2. Invite a local Chamber of Commerce representative or a local business representative to discuss the economic impact of outdoor recreation on the community.

3. Contact local clubs (e.g., hunting, sportsmen, backpacking, trailer camping) for resource people.

4. Compile a complete list of outdoor recreation activities.

B. Socio-Economic Demand Factors

1. Contact a local recreation professional or sociologist and discuss with him or her the socio-economic demand factors in outdoor recreation. Many university extension departments and state departments of parks and recreation have specialists in outdoor recreation or leisure education.

C. Forest or Outdoor Recreation Management Areas

1. Obtain brochures, maps and other promotional literature from local, state, regional and national agencies and/or industry.

2. Contact local professionals to discuss resource management and development. Write the professional and educational organizations contributing to outdoor recreation that are listed at the back of the manual.

EQUIPMENT NEEDS

Recreational Opportunities

A. 1. Paper and pencils
   2. Chalkboard
   3. Slide and film projectors
   4. Various items of outdoor recreation equipment (see list of outdoor recreation activities).

B. Socio-economic Demand Factors
   1. Writing materials

C. Forest or Outdoor Recreation Management Areas
   1. Worksheets
   2. Accessible areas to visit

RESOURCES

Federal Resource Management Agencies

National Park Service

U .S. Forest Service

Corps of Engineers

Bureau of Reclamation

Bureau of Land Management

Tennessee Valley Authority

Bureau of Sport Fisheries and Wildlife

Bureau of Indian Affairs

Federal Agencies Providing Technical and / or Financial Aid

Heritage Conservation Recreation Service

Agricultural Stabilization and Conservation Service

Soil Conservation Service

SEA-Extension

Department of Commerce

Department of Defense

Department of Health, Education & Welfare

Department of Housing and Urban Development

Department of Transportation

Professional, Service and Educational Organizations

American Association for Health, Physical Education and Recreation
1201 - 16th Street, N.W.
Washington, D.C.

American Camping Association
Bradford Woods
Martinsville, Indiana 46151

American Forestry Association
919 - 17th Street, N.W.
Washington, D.C. 20006

American Forest Institute
1619 Massachusetts Avenue, N.W.
Washington, D.C. 20036

American Power Boat Association
20 West 17th Street
New York, New York 10011

Appalachian Mountain Club
5 Joy Street
Boston, Massachusetts 02108

Appalachian Trail Conference, Inc.
1718 N. Street, N.W.
Washington, D.C. 20036

Athletic Institute
51 Clifford Avenue
Pelham, New York 10803

Federation of Professional Organizations for Recreation
20 North Wacker Drive
Chicago, Illinois 60606

Izaak Walton League of America
1326 Waukegan Road
Glenview. Illinois 60025

National Audubon Society
1130 Fifth Avenue
New York, New York 10028

National Campers and Hikers Association
7172 Transit Road
Buffalo, New York 14221

National Golf Foundation
804 Merchandise Mart
Chicago. Illinois 60654

National Industrial Recreation Association
20 North Wacker Drive
Chicago, Illinois 60606

National Recreation and Park Association
1601 North Kent Street
Arlington, Virginia 22209

National Rifle Association
1600 Rhode Island Avenue, N.W.
Washington, D.C. 20036

National Wildlife Federation
1412 - 16th Street, N.W.
Washington, D.C. 20036

Nature Conservancy
1522 K Street, N.W.
Washington. D.C. 20005

Outboard Boating Club of America
333 North Michigan Avenue
Chicago, Illinois 60601

Sierra Club
530 Bush Street
San Francisco, California 94108

Sports Fishing Institute
Suite 503
719 - 13th Street, N.W.
Washington, D.C. 20005

Sporting Arms and Ammunition
Manufacturer's Institute
420 Lexington Avenue
New York, New York 10017

Sports Foundation, Inc.
717 North Michigan Avenue
Chicago, Illinois 60611

Forest Recreation Resource Publications for 4-H Members and Leaders

Planning, Managing and Development

Douglass, Robert W., Forest Recreation.

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Hines, Thomas I., Recreation and Park Finance. Raleigh, N C.:North Carolina State University, School of Forest Resources, Department of Recreation Resources Administration, 1969.

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4-H FORESTRY PROGRAM Unit C-3

Managing the Forest for

WATER, WILDLIFE AND FORAGE

member's manual
and
leader's guide

Contents

The 4-H Forestry Program

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Acknowledgments

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Managing Water Resources

The hydrologic cycle

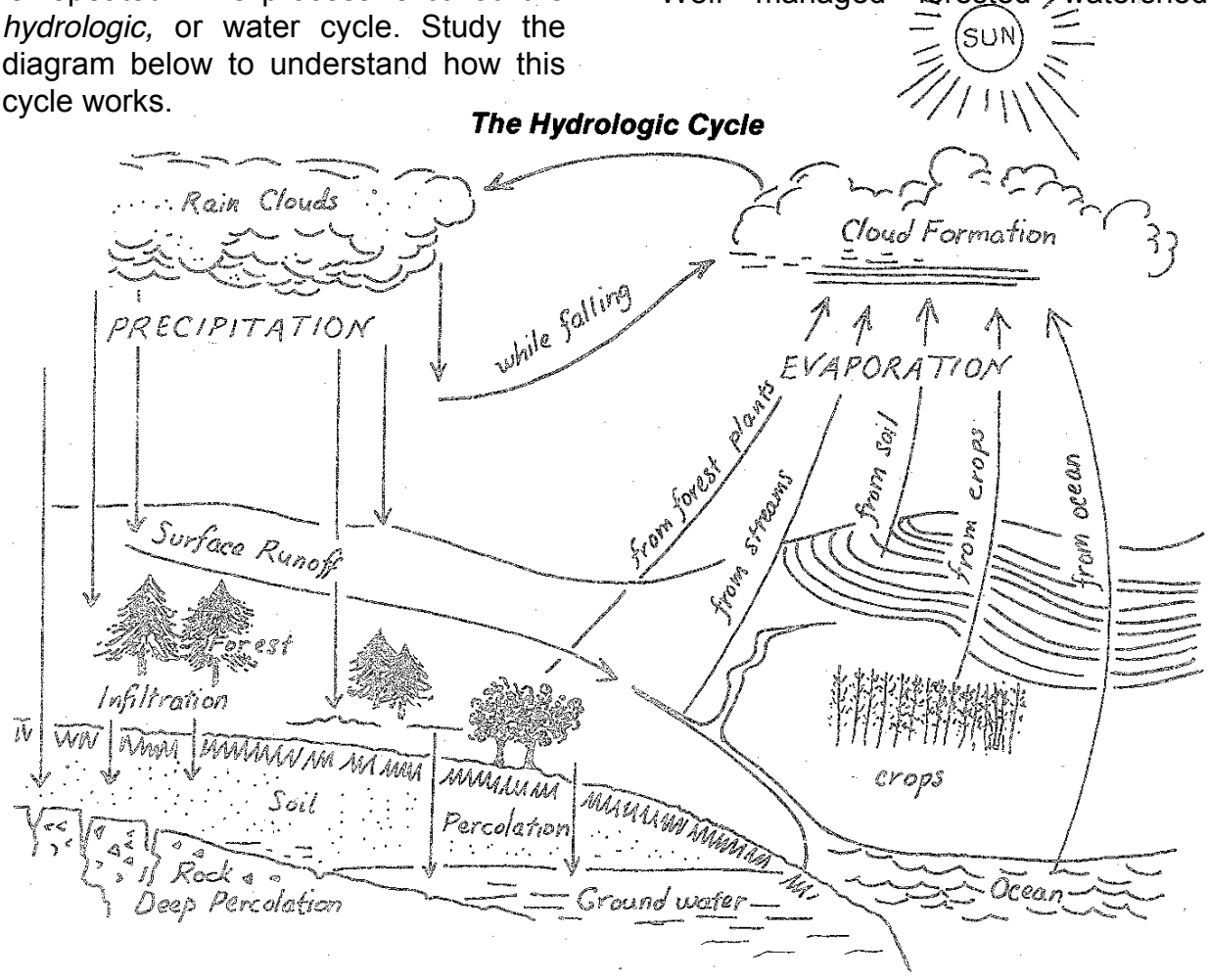
Water is one essential natural resource needed by almost every living thing on earth. A continuing supply of water is made available to us in an amazing way. Water evaporates from solar-heated oceans, lakes, rivers, ponds and other water surfaces in the form of water vapor. Water vapor is small droplets of water suspended in air and carried inland by air currents to higher and colder air. When the air has cooled to the point where it can hold no more water vapor, it condenses to form fog, rain or snow. This precipitation, upon reaching the ground, either directly evaporates or becomes runoff that flows to large bodies of water, where the cycle is repeated. This process is called the *hydrologic,* or water cycle. Study the diagram below to understand how this cycle works.

Watershed Protection

A watershed is an area of land that is drained by a body of water, usually a stream. The watershed stores some of the water, while more water either evaporates into the atmosphere or is released into streams. Soil conditions and plant cover in forests affect how much water reaches a stream, how pure it is and how regularly it flows over a year's time. Most watersheds contain roads, buildings, cultivated land, range and pasture and other non-forest cover.

Forest lands greatly influence natural flood barriers and sub-surface water flow. Forest soils retain moisture and store water. Runoff or flooding will occur when the soil becomes filled with water. Well managed forested watersheds

The Hydrologic Cycle



have less soil erosion and so contribute very little silt to streams, reservoirs and harbors. "Spongy" forest soil soaks up much of the water, while some water *percolates* deep into underground supplies.

The forest protects watersheds naturally by intercepting the rainfall on its way to the ground. The forest floor is protected by the various levels of vegetation, including tree crowns of different heights, shrubs and herbaceous plants. The plant cover breaks up large drops into smaller ones. Fallen leaves on the forest floor act further to break up large raindrops, which can then filter down into the porous forest soil. The action of bacteria, earthworms, fungi, insect larvae and other minute forms of plant and animal life keeps the soil porous and spongy—ideal for holding, storing and filtering large quantities of water. The forest conserves more water than would a plowed field, for example, where much of the water runs off the surface.

Underneath the organic layers of litter, duff and humus (see Unit B, page 14) is mineral soil. The upper layer of topsoil contains much organic material. Plant roots and channels created by microorganisms and burrowing animals keep the soil porous and give it a crumb-like structure that can hold and percolate much water. Below the topsoil layers lies the **subsoil**. This layer is more compact than topsoil. But it is still filled with many holes and channels made by decayed roots and animal burrows that allow water to flow deeper into the earth. If the soil here is too compact, however, it absorbs water more slowly and may limit the amount of water that reaches groundwater reservoirs.

When rain falls in the forest, part of it clings to the leaves or needles of trees and other plants. Some rain evaporates, and some trickles down the plant stems. In a hard rain, much water falls directly on the forest floor. It infiltrates gradually into the soil and fills its pores. Some of this water is pulled up into the stems and leaves of plants to be transpired into the air. Some forest soils can absorb 50 percent of their volume in water before they become saturated. When the surface soil cannot absorb all of the water that reaches it, some runs over the ground and flooding begins.

Forests are also important in protecting the watersheds in areas of high snowfall. Although the total snow accumulation will be less in a coniferous forest than on a treeless plain, the snow may remain up to a month longer in the forest. The tree cover successfully shades the snow from the sun and blocks the wind. This delay in snowmelt usually reduces high streamflow in the early spring and releases water later when it is needed most. While the soil of open fields commonly stays frozen, the soil under the snow and duff layers in the forest remains unfrozen and allows snow melt to filter deeper into the earth.

Over-grazing, careless logging and *forest wildfires* are the sources of greatest damage to watersheds. Over-grazing destroys ground cover and compacts the soil, causing water to run off rather than soak into the ground. Improper skidding rips up the soil and can start erosion which carries silt into streams. Improperly constructed logging roads and exposed areas of soil may contribute to muddy water in streams.

Wildfires usually occur when the duff is dry, the soil moisture low, and the wind brisk. The wildfire consumes leaves, twigs, shrubs and small trees and may erode the soil wherever the duff is dry enough to be burned. Further, the ashes that dissolve in the floodwater pollute many streams with high concentrations of potash (lye), which can be dangerous to aquatic plants and animals.

Controlled burning in strategic locations can help reduce the fuel level in

a forest area, thereby reducing the potential for serious damage by a natural fire. However, this practice is only done when the soil is moist and other conditions make it unlikely for the fire to spread out of control.

Flash flooding is a problem in both dry mountainous areas and in urban areas during periods of heavy rainfall. The dry mountains have little plant life covering the shallow rocky soil. Many mountain tops are made of solid rock. The water cannot go into the soil, so it runs above ground toward sea level, sometimes in great amounts. In urban areas most forested sections have been replaced by paved roads, parking lots, tennis courts, concrete sidewalks, homes and other buildings.

There is no water absorption on these areas and rain water can cause floods in storm sewers, ditches and small streams.

Good watershed management tries to insure that soils stay in place and are not eroded away into stream channels. Proper management prevents the destruction of forest or grass cover by wildfires or unwise logging or grazing. Such a program also:

1. Attempts to restore plant cover promptly on already denuded areas.
2. Heals or stabilizes eroding gullies and stream banks.
3. Locates roads and logging skid trails where they will not start gullies or release soil into streams.
4. Regulates recreation uses to preserve plant cover and maintain water quality.

In some cases managers may replace deep-rooted trees (which consume great amounts of water) with shallow-rooted plants such as grass to increase the outflow to streams that supply water to communities. Good watershed management seeks to adjust the various uses of natural resources in order to conserve those resources, to hold the soil in place, and to make water available to meet human requirements in the best way possible. Good management can produce water, timber and wildlife all at the same time in the same forest watershed.

Things you can do

1. Go outside in the rain and locate flowing muddy water. Trace the water back to the area where the mud occurred and list the cause of soil erosion. Do this several times in different locations. Recommend some practices to stop the soil erosion.

2. Locate the smallest watershed you can find near your home or school and make a map of the boundaries of this area. Find out which river, lake or ocean receives the runoff water from this area.

3. Build a demonstration plot or an exhibit for showing the difference in surface runoff between a sloping area with bare soil (from cultivation, overgrazing, wildfire or heavy recreational use) and an area with protective forest litter.

Wildlife Management and Protection

Forests provide a home or "habitat" for many kinds of wildlife — **game animals** such as deer, elk, bear, moose, squirrel, turkey, quail, grouse, wood duck, woodcock and raccoon and **non-game animals** such as songbirds, hawks, owls,

mice, shrews, moles, chip-munks, snakes, turtles and lizards — as well as many forms of tiny insects and animals that live in the soil. The important elements of wildlife habitat are *food, cover* and *water.* The interaction between these factors determines the kinds of wildlife to be found in any forested area. For example, most game fish such as trout, small mouth bass and pickerel prefer clear, cool streams in forested areas.

The greater the diversity of forest habitats, the greater the variety of animals that can be found. Wildlife managers recommend clear-cutting small acreages in irregular shapes to produce browse for deer, turkey, elk and moose. Some areas of the forest are maintained in grasses and low, seed-bearing annuals for rabbits, quail, songbirds, turkey, deer and squirrels. As older clear-cut areas grow up into young trees and shrubs, different kinds of animal species will occupy the area. Thus new clear-cuts are made at specific time intervals so that new browse will be available to wildlife.

Wildlife managers can strengthen habitats by:

a. Leaving den trees.

b. Building nest boxes for squirrels, wood ducks, and songbirds.

c. Planting shrubs that produce food around fields, forest edges or clear-cuttings, ponds and roads.

d. Constructing watering devices in dry country. Planting coniferous trees in or around hardwood forests will help produce good winter escape cover and protection from enemies and snowstorms.

Since there are so many species with different needs and uses, in some cases it may be necessary to feature only a few species at a time on a given tract, then manage the tract specifically for that species. The selection of what species to feature should be based on three factors:

1. **Habitat capability** How much food and cover can the land produce within the home range requirement of the species, either naturally or with intensified management?

2. **Compatibility with other forest resources** How will this choice affect other resources, such as water quality? How will it affect costs, benefits, management zones and unique factors such as the presence of a threatened or endangered species?

3. **Public Interests** What impact do the side effects of habitat management (such as smoke from a prescribed burning that helps produce annual plants for quail to feed on, or the unattractive appearance of some clear-cut areas, or mosquitoes that result from planned brood areas for ducks) have on the public? What input will people who use or live in the area have in making these decisions?

Water is essential to all forms of wildlife, and its scarcity or abundance influences their numbers and distribution. Beavers, ducks and fish require it for their homes, while most other animals and birds need water for at least drinking and bathing. Building small ponds in areas that lack a year-round water supply will attract many animals that otherwise would not come to those areas.

Things you can do

1. Take an inventory of all the animals, birds, reptiles and insects of a selected area such as your backyard, a small park, five acres (2 hectares) of forest land, a cemetery or your school yard. Many animals are active in the daytime, but others only come out at night. Select a moonlit night and use binoculars to observe nocturnal animals.

2. Select an animal and compile as many facts as you can on its requirements for food, cover and water. Also, give information about its breeding habits and how it rears its young.

3. Build nest boxes for squirrels, birds and wood ducks. Erect the boxes in the appropriate locations where each species would normally find a nesting site. Keep records for each box on the kind of animals that first used the box and note if they raised their young in the box. List any other observations you make on these

4. Plant shrubs that produce berries or other edible fruits that birds and small animals will eat. Observe the different species which feed on the fruit of the shrubs. (The nest box activity and shrub planting project could be combined into one project.)

5. Visit a forest area (preferably with a wildlife biologist) and note all wildlife use you see. Ask a wildlife specialist to explain methods of increasing game and non-game animals in your region.

6. Make an exhibit of the natural foods produced in the forest areas of your general locality for one or more wildlife species, such as black bear, elk, whitetail deer, quail, cottontail rabbits, wild turkey, grey squirrels and muskrats.

7. Find out if there is a 4-H Wildlife Project in your area. Consult with the leader and members to see how you might participate in a joint project.

Forest and Range Management

Range management is the science of planning and directing the use of the range to obtain maximum production of forage for livestock and wildlife without damage to forest and watershed areas.

To the forest owner, grazing can be a source of extra income. Mature trees are harvested and tree seedlings planted in the scattered clumps of forested areas on vast rangelands in the West. Ponderosa pine is the most common tree managed on western rangeland.

Grazing domestic livestock in the deciduous forests of the East is a poor cattle and forestry investment. There are several reasons for this:

1. Livestock may eat poisonous plants growing in the woodlands.
2. Eastern forests do not allow nutritious plants to grow in the shade of the trees.
3. Livestock use more time and energy searching in woodlands for edible plants that are actually less nutritious.
4. Livestock compact the soil on hills, which causes increased run-off during the peak periods of rainfall. This robs trees of needed moisture and causes soil erosion and injury to roots.
5. The loss of mulch (duff) exposes the soil to drying winds.

If grazing on forest lands is not controlled, it can do much harm to the basic resource. This has happened in the hardwood forest areas in the East and in the Central States where dairy cattle have caused soil erosion by their extensive overgrazing. When livestock or other grazing animals are left too long on farm woodlands, they destroy tree seedlings and compact the soil. Forest experiment station studies have clearly shown that yields of forage in farm woods are low, and its nutrient content minimal. Overgrazing compacts the soil so that the water cannot soak in easily and quickly. As a result, the runoff is much greater.

Sometimes light grazing for very short periods may occasionally be beneficial. For instance, during drought emergencies, when pastures dry up, farm woodlands can be a useful source of forage. However, most of the time farmers must choose between pasture and timber. Steeper slopes should be kept in trees. On level lands grazing is probably more economical.

Western forest ranges, which are usually located in the mountains, ordinarily do not support a large number of livestock for a given area. The small amount of annual rainfall there greatly lowers forage production. Therefore, great care must be taken to prevent overgrazing, because damaged range grasses take a long time to grow back. Most of the forest range land in the West is under public control (within national forest areas and federal grazing districts) where grazing is closely regulated. Range management specialists check grazing progress so they can prevent over-grazing on the land.

Western cattle grazing is an important secondary use in open ponderosa pine forests. Open forested lands can produce a moderate amount of forage, clean water and healthy wildlife species only if the amount of grazing is kept in line with the amount of forage growth. This practice is called "sustained yield" grass management.

Practical range management

One of the most difficult jobs in range management is to have all parts of the range grazed uniformly. On most ranges livestock concentrate on some areas and avoid others. Many factors — including topography, the nature and habitats of livestock, inadequate water facilities, and inadequate grazing management – contribute to this poor distribution. Handled properly, the following practices can lessen this problem:

1. **Salting** Mature cattle require from one to two pounds of salt each per month, and mature sheep require one-third to two-thirds pounds. Salt should not be placed near watering facilities because this would stimulate overuse of a small area. Salt blocks should be rotated in areas that are normally avoided by livestock to entice the animals to feed on the grasses and forbes.

2. **Water** A supply of water can be developed where needed, or even removed by fencing off springs or reservoirs where herbage has been well grazed. If natural watering places cannot be developed, water can be hauled in for short periods of time.

3. **Fencing** Strategic fencing can allow more uniform grazing on the range. It must be used with caution, since livestock tend to concentrate near fences that cross natural travel routes. Fences can be used to isolate particular vegetation types — meadows that remain soft and wet late in the season, or other choice grazing areas — until they can be used to the best advantages of the vegetation and livestock.

4. **Range riding or herding** Physical structures can never take the place of good riders and herders for distributing livestock and protecting both the animals and

the range. The herder must know the country and the grazing habits of the livestock. He must also be able to recognize signs of over-grazing. Livestock tend to congregate at water holes or on one favorite hillside if they are left unattended. Good herders keep the animals moving and make them cover the whole range.

If a range is overgrazed or otherwise damaged, fence out livestock until the grasses have grown back. Special grass seed and fertilizer may be necessary in order to reestablish a good sod. The soil must become porous again on the heavily compacted areas before the range can be grazed again. While the soil is rehabilitating, poisonous plants caused by over-grazing should be removed to protect the cattle.

A sound grazing system will promote the most efficient use of the range that is practical. It should strive to at least maintain, and hopefully improve, the condition of the range, while atthe same time allowing a high level of livestock production.

Things You can do

1. Visit a farm with grazing animals. Examine the pastured areas for signs of over-grazing: short grass, bare soil, trampled-down banks, browse line in forest area. Note any poisonous plants in the grazed area. How could you improve the pasture and livestock food?
2. Invite the local Cooperative Extension agent in Agriculture or Range Management to give a talk to your club on local forage for livestock.
3. Obtain seeds from three or four different species of forage grass and alfalfa. Cultivate a small parcel of land, sow the seeds and observe the different growth habits of the various species of forage. Record the length of time it takes for the seed to germinate, and measure the height of the plants at the end of the growing season.
4. Carefully examine an eight-inch layer of topsoil in an ungrazed forest and compare its condition with the soil in an over-grazed area.
5. Visit a woodland and list all of the plant species that are being grazed.

Leader's Section

The meeting plan

The following outline suggests a format that can be used for each meeting.

A. **Water** is an important element in the lives of most plants and animals, yet relatively little attention is given to its study. A lively group discussion could stimulate ideas for further study of the origins of clean water.

1. Water pollution is a potential threat to people everywhere. Discuss what pollution is, what factors influence it, and the difference between "point" and "non-point" sources of pollution.
2. Have members make a list of water sources for home use, citing the origin (well, river, lake, rainwater) and the effects of human activities (farming, road building, construction, timber harvesting) on the quantity and quality of water.
3. Have members document the uses and needs for water by various animals in the forest through personal observation. For example, members could pick out a watering hole to observe the drinking habits of different species.

B. **Wildlife habitat management** is important because only when the proper habitat is available can wildlife abound. Have members participate in an inventory study of birds and animals near their homes, in open fields and in meadows, and in woodlands. Then they should compare their lists.

1. Discuss why some animals are seen only in the woods and others only in open fields.
2. Discuss sources of food that each bird or animal might use, and how the species might be beneficial to humans.

C. **Grazing livestock** on partially wooded areas is most prevalent in the western United States. Livestock grazing in the eastern United States is discouraged because of damage to forest trees and the soil's water holding capacity and non-nutritious forage. Group discussion with club members can be held on the principles involved in range management.

1. Have club members identify areas with soil compaction (places where people walk on the grass, i.e., church yards, school lawns, college campus lawns, home lawns, pastures, parks). Discuss the reasons for lack of grass or other vegetation on these areas and how could these areas be revegetated.
2. Have members collect as many different kinds of grass as they can find and bring them to a meeting. Have members display their grass on tables or on the floor. They should combine those grasses that are alike and record the plant shape characteristics of each group of grasses and where they were found.
3. Members may wish to observe the eating and drinking habits of grazing animals. Have members record the facts on each animal and discuss the effect these facts have on grassland management.

Suggestions for leaders

1. Weather permitting, conduct as many of the meetings as possible in outdoor settings.

2. Invite resource people to demonstrate wildlife habitat management and range management (where applicable). Consider such diverse sources as livestock farmers, foresters, rangeland managers, extension rangeland specialists, cattlemen's groups, environmental action groups, wildlife specialists and water resource people.
3. Visit the local offices of the Water Resources Department and Soil Conservation Service and obtain their free publications on water, soil erosion, water pollution and related water material.

Educational aids

1. Films and slide sets may be available from state forest services, Cooperative Extension County Agents, U. S. D. A. - Forest Service, Soil Conservation Service, state wildlife services, state water resources services and wildlife refuges.
2. Visit libraries and compile a list of publications on water/watershed management, wildlife and range management.
3. Contact the Chamber of Commerce for promotional materials relating to the three subjects.
4. Contact local professionals to discuss resource management and development. Write to professional and educational organizations contributing to water, wildlife and forage that are listed on this page.

Resources

FEDERAL RESOURCE MANAGEMENT AGENCIES

National Park Service
U. S. Forest Service
Corps of Engineers
Bureau of Reclamation
Bureau of Land Management
Tennessee Valley Authority
Bureau of Sport Fisheries and Wildlife
Bureau of Indian Affairs

FEDERAL AGENCIES PROVIDING TECHNICAL AND/OR FINANCIAL AID

Agricultural Stabilization and Conservation Service
Soil Conservation Service
SEA-Extension
Department of Commerce
Department of Defense

PROFESSIONAL, SERVICE AND EDUCATIONAL ORGANIZATIONS CONTRIBUTING TO WILDLIFE, WATER AND RANGE MANAGEMENT

Water Pollution Control Federation
3900 Wisconsin Avenue, N.W.
Washington, D. C. 20005

Water Resource Council
2120 L Street, N.W.
Washington, D. C. 20037

American Forest Institute
Educational Materials
1619 Massachusetts Avenue, N.W.
Washington, D. C. 20036

National Rifle Association
1600 Rhode Island Avenue, N.W.
Washington, D. C. 20036

National Wildlife Federation
1412 16th Street, N.W.
Washinaton. D. C. 20036

Nature Conservancy
1522 K Street, N.W.
Washington, D. C. 20005

Izaak Walton League of America
1326 Waukegan Road
Glenview, Illinois 60025

National Audubon Society
1130 Fifth Avenue
New York, N. Y.10028

American Forestry Association
919 17th Street, N.W.
Washington, D. C. 20006

Sierra Club
530 Bush Street
San Francisco, California 94108

4-H FORESTRY PROGRAM Unit C-4

Urban Forestry

member's manual
and
leader's guide

Contents

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*C–6 The Dollar Value of Forestry
*C–7 Timber Harvesting
*C–8 Great Plains Forestry

The Value of Urban Trees

Trees are an essential part of the landscape in almost every American city. Trees not only beautify their surroundings, but also improve the quality of life for urban dwellers in many other ways, too. You can plainly see the value of urban trees just by comparing a boulevard lined with well-groomed trees to a windswept highway or street that is barren of any vegetation.

Urban trees have many of the same values as forest trees, which you learned about in Unit B. For example, park and greenbelt trees prevent rapid runoff of rain and resulting erosion, and also play a vital role in the urban water cycle. Other tree values that become even more important in an urban setting include pollution control, wind reduction, temperature moderation, snow barriers, highway safety aids and wildlife cover, all of which are needed for a decent quality of life in our cities. Following is a discussion of these crucial urban tree values and ways in which they can be enhanced.

1. **Beautification** Trees can soften the hard and straight lines of office and residential buildings. They help arrangement from the mixture of natural and artificial environments. Ugly dumps and junkyards can be hidden by strategic tree plantings. Trees with exceptionally attractive flowers, fruit, fall color or form are often placed in a prominent location to become a focal point in the landscape. Private property owners can use trees for the same purpose.

2. **Pollution control** Noise pollution has recently been increasing in urban and industrialized areas. Construction, traffic, industrial activities, home and garden equipment and many other sources contribute to this increase. However, by planting trees and shrubs in the right places, we can reduce the total noise by six to eight decibels, which is a significant amount. Park ways produced by plantings along highways have reduced noise by as much as 50 percent. Parks, playgrounds and other recreational areas, and rail lines can all benefit from this strategy.

   Trees further aid infighting pollution by collecting dust and other particles from the air. As dust-laden air blows through the crowns (upper parts) of the trees, many particles are dropped as wind speed is reduced. Particles with moisture or hairy leaf surfaces stick to the leaves. Trees also act as a filter by mixing their own pleasant fragrances with many disagreeable odors from the urban environment. Studies are now underway to determine which trees are most effective in removing pollutants from the air.

3. **Temperature moderation** To understand the effect of trees on temperature, walk from a paved parking lot into a wooded park on a summer afternoon. You will find an astounding difference in temperature! The temperature difference between a hot open area and a cooler wooded area could be as high as eight degrees (Fahrenheit) on a warm summer day. At night the woods would be about six degrees warmer than the open area. This moderating effect becomes more obvious in comparing a wooded area with a treeless desert, which is scorching during the day and freezing at night.

4. **Windbreaks** The powerful force of the wind is a problem in many parts of the United States. To combat the wind, people plant windbreaks to protect homes, orchards, playgrounds, industrial sites and other valuable property. A dense planting of trees and shrubs can reduce 25 mile-per-hour winds by about 75 percent on the other side of the windbreak. Even at an altitude 20 times the height of the windbreak itself, the wind may be reduced by as much as 20 percent.

With better planning for city expansion or renovation, larger areas can be designated for multi-purpose "city windbreaks".

5. **Snow fences** Trees may serve as living snow fences. A single row of trees and shrubs planted parallel to a drive or highway will hold snowdrifts on fields rather than blocking highways, thus reducing the problem of snow removal.

6. **Highway safety** Tree plantings that divide highway traffic lanes have proved quite helpful to highway safety. Not only do they add to the beauty of the highway environment, but also reduce headlight glare of oncoming traffic and serve as a barrier to cars accidently crossing over the median. Studies have shown that both driver fatigue and the total number of accidents are reduced in areas with highway plantings.

7. **Wildlife cover** There is an amazing number of wildlife species that live in urban areas. Trees provide these animals and insects with food and shelter. Among those species helped most by trees are squirrels and a variety of birds who use trees both as their homes and as their major source of food. In some parks and greenbelts you may find rabbits, raccoons, opossums, chipmunks, muskrats and other small animals. The most important tree fruits to these urban wildlife species are acorns, nuts and fleshy fruits. Also, some creatures will use hollow trees for dens. From these examples alone it is easy to see how wildlife depends on wooded areas or even individual trees for many or most of their environmental needs.

Urban Tree Problems

Trees not only have additional values in the urban environment, but also face unique problems not found in a forest setting. Urban tree management is made more complex by higher values placed on individual trees and by increased difficulty in growing healthy trees. Urban trees in general have less growing space above and below ground and may be shaded out by tall buildings so that the total amount of sunlight received is much less than that of trees in the forest. Urban trees also must face increased air and water pollution from automobiles and factories, mechanical injuries, wind velocity and their inability to enrich their own soil with fallen leaves, which are often swept away.

Many trees are quite sensitive to certain air pollutants, and should not be planted in hazardous areas. On the other hand, some trees may be used as natural indicators of air pollution problems. Sensitive trees may be planted in potential trouble spots, such as industrial areas, to act as monitors. Should air pollution problems grow worse, their leaf discoloration would be a reliable indicator, thus saving the cost of more expensive monitoring equipment.

Another problem for urban trees during the summer months can be heat. Trees receive direct sun rays as well as reflected heat from buildings and paved areas. As a result, trees can develop scorched foliage. Those tree species that are more tolerant of heat should be planted where intense heat could prove a problem.

Perhaps the greatest threat to street and shade trees is the reduction of a tree's root system. Roots are lost in many ways. Ditching, grading and electrical wiring are common causes of mechanical loss. Aeration and absorption of moisture are reduced by injury to root systems, which are often paved-over. Compaction of the soil by pedestrian or vehicle traffic will have a similar effect. Root loss, regardless of cause, upsets the delicate balance between the crown and the roots. Healthy trees can withstand small root losses, but weakened trees may lose some branches or perhaps even die.

The addition of fill soil over existing root systems is another cause of urban tree death. While constructing roads,

buildings and homes, leveling machines will often push soil over existing tree roots. This limits their ability to find the water and air they need to grow. Soil that is moved by heavy rains from a construction site may be deposited over roots, causing the same problem. To prevent this type of damage, a dry-well drain tile system should be constructed prior to filling. Construction site managers should plan to plant grass on exposed soil to further protect the roots.

Tree wounds are much more common in urban areas than in forests, simply because there are more people around to damage trees. When trees are not protected by fences or barriers around construction sites, they are often bruised or scraped by tractors, trucks and other types of equipment. The greatest threat to young trees in a lawn area is the lawn mower. After a bump or two on all sides, the bark is bruised and the circulation of water nutrients can be cut off. If other attacks follow, the tree cannot adequately mount its defenses to cure itself. Similar damage can occur to trees near uncurbed parking areas or driveways. Initial-carving, nail-driving or knife-throwing all cause problems that can shorten a tree's life.

Despite these disadvantages, trees living in an urban environment have some distinct advantages as well. They receive less competition from other trees for light and space, fewer animals to feed on their bark and leaves, richer soil and climate (if the city is typically located in a fertile area) and more care given by thoughtful people. Some cities have enacted ordinances, or local laws, that prevent mistreatment of trees by developers, utility workers and even private property owners. Some ordinances include regulation, testing and licensing of tree service companies that operate in the area to assure that quality work will be done on trees throughout the city.

Managing Urban Trees

The science of forest management is not restricted to large expanses of rural wooded areas, but applies to urban trees, too. In fact, unique urban tree problems and values can make management decisions much more complex than on a thousand-acre forest tract.

Which trees should be encouraged for urban areas? This is a complex question, and has no set answer. Among the many considerations to be made are the size of the area, soil conditions, size of the trees when mature and resistance of trees to diseases, insects and pollution.

Existing native trees are usually preferred because they have already proven their ability to live under local climatic and soil conditions. Existing trees, which usually range in age between 50 and 100 years old, have an advantage over potential replacements, especially given the time needed to reproduce a specimen such as a large shade tree. Further, native trees normally have built up some resistance to local insect pests and disease.

On the other hand, people are often attracted to unusual or exotic plants, and urban trees are no exception. The problem is that trees which grow well in their native habitat often find it difficult to adapt to different soils, climates, elevations and pests. Foreign trees and trees from other regions should go through a trial period to prove how well they can adapt to local conditions. In general, if plantings were limited to native or proven species, we would have fewer problems with newly planted trees.

As we all know, trees vary in stature. A dogwood, for instance, will never reach the size of a redwood. But when people first plant trees they may fail to consider how large the tree can actually grow. Buckled streets and sidewalks, cracked retaining walls and tree-damaged buildings are all evidences of this fact. For example, oaks have been planted in spaces that will hardly accommodate a dogwood or other small tree. The lesson to be learned here is that the size of a tree at planting is no indication of its full growth potential.

Some trees become less desirable because of their fruit or flowers. A tree such as the *ginkgo* has fruit with an undesirable odor. Trees with fleshy or otherwise abundant fruit create messy

situations when the fruit falls on streets and sidewalks. Even the flowers of some lovely trees, such as the *ailanthus* (or tree-of-heaven) impart very unpleasant odors. Although we may not appreciate these features, they often contribute to the tree's ability to survive in an urban environment without special human care.

Other trees are discouraged for various reasons. The elm, for instance, would be discouraged in those areas where Dutch elm disease is present. Any tree shown to have chronic insect problems would not be recommended, either. Trees that are wind-pollinated instead of insect-pollinated sometimes produce allergies or other respiratory ailments. People with such ailments would prefer trees like basswood, tulip-poplar or other insect-pollinated trees around their home. Lastly, short-lived trees or those with brittle branches normally are not planted around homes or in urban areas.

Common Planting Problems

There are many potential problems that could occur with any tree planting. One very common urban tree problem in this regard is *monoculture,* or planting an entire area in only one species. Monocultural species are more susceptible to widespread destruction caused by disease or insect attack. For instance, in recent years many city streets with most of their trees in elm became almost treeless after Dutch elm disease attacked. Trees in other cities have been struck by chestnut blight, oak wilt or southern pine beetles. This danger is minimized if a wide variety of trees are maintained so that specific insects or diseases will not destroy all of them at once.

Lone trees are more likely to be damaged by lightning, wind, reflected heat, cold and air pollution. Whenever possible, trees should be planted in groups. This is not to say that such trees should remain there forever, for urban trees may begin crowding each other as they grow larger, just like forest trees. The practice of thinning those trees with overlapping or intermingling branches will relieve the surrounding trees of some of their competition for sunlight, moisture and soil nutrients.

When planning for new tree plantings, keep walkways and vehicle traffic as far away as possible from tree trunks. Most feeder roots are near the soil's surface and can be easily damaged by compaction if nearby this traffic. Granted, unsightly or diseased trees presenting a threat to buildings, traffic or pedestrians should be removed. On the other hand, some tree cavities are used by wildlife species as homes, so retain as many "den," trees as you can.

On the subject of wildlife, sometimes bird life is lacking in our park and wooded areas in the city, due to the lack not of trees themselves but of open and brush areas nearby. These habitats are essential to certain phases of the life cycle of some birds. If these areas are separated from city parks by broad expanses of streets and buildings, these birds will rarely visit the city park areas, even if the areas are wooded. If city planners provide for rows of trees and shrubs extending from the inner city to the, open areas by means of greenbelts and parkways, this problem could be eliminated.

Things To Do

1. **Tree root activities**

    a. Most people do not realize how extensive a tree's root system actually is. To see for yourself, select a tree in a large open area or on the edge of an open space. Walk away from the tree trunk and stop at the crown spread's outer edge (the end of the outer branches). Upon obtaining prior permission from authorities, dig a shallow hole or two, which you will fill again, replacing the sod when you finish. Look for tree roots as you dig. If you use a shovel, face the bough of the tree as you insert it so you can easily detect the roots as the soil is removed. If you find extensive roots, back up a few steps and check again. If you do

not find any, move closer to the trunk of the tree and dig another hole. Once you discover the radius of the root system, you might consider the harmful consequences of digging a ditch under the canopy of a tree.

b. Another commonly misunderstood concept is how deep tree roots extend. If you think that a tree's root system is formed like its crown spread in reverse, you are mistaken. Even taking into account the fact that root systems do vary according to tree species and soil conditions, most "feeder roots" are actually near the soil surface, where there is more fertility, moisture and aeration. Roots used for anchoring the tree are larger and deeper, but not nearly as massive as the feeder root system.

Visit a freshly-cut ditch near a tree. Observe the level of the roots. With some nails for anchor points and some string, stretch a line every six inches of depth and count all of the roots at each level. Find out what percentage of the roots are in the first six inches, the first foot, and so on.

2. **Soil compaction** When soil particles are crushed together, the soil becomes more dense and loses its ability to allow air and water to pass through. To test the extent of soil compaction on your street or in a nearby park or wooded area, you will need the following equipment: a dowel rod about 10 inches (25 cm.) long, sharpened at one end; a #5 juice can with the top and bottom removed and the lip cut off on one end, then dulled with sandpaper; a one-quart (or liter) measuring container; and a watch with a second hand.

Find at least two areas where you suspect soil compaction around trees, such as a well-traveled footpath or a construction site. Push the sharpened end of the dowel into the ground, exerting a force with the flat palm of your hand. Measure the depth the dowel rod can be pushed in at each site you visit. Next, twist the can, sharp end down, into the soil until it extends below the surface. Pour one quart (liter) of water into the can. Record how much time it takes for the water to sink into the soil in each instance.

Which types of soil allow the fastest and slowest infiltrations? Think about what could be done to minimize soil compaction around trees near well-traveled footpaths or around construction sites featuring heavy equipment. Contact your local forest and park recreation officials to learn what remedies are now being used.

3. **Environmental contributions activities**

Some of the environmental contributions of trees mentioned in the text may be confirmed by simple field tests.

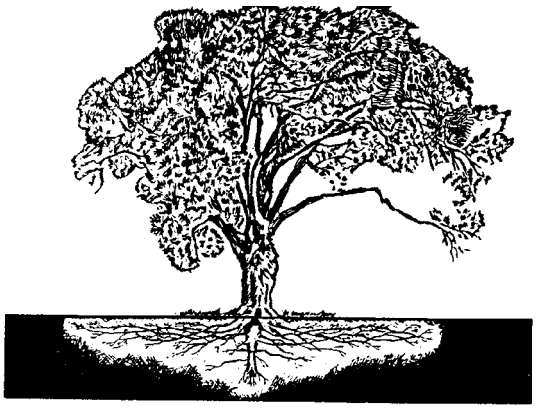

Fig. 1. Tree root system

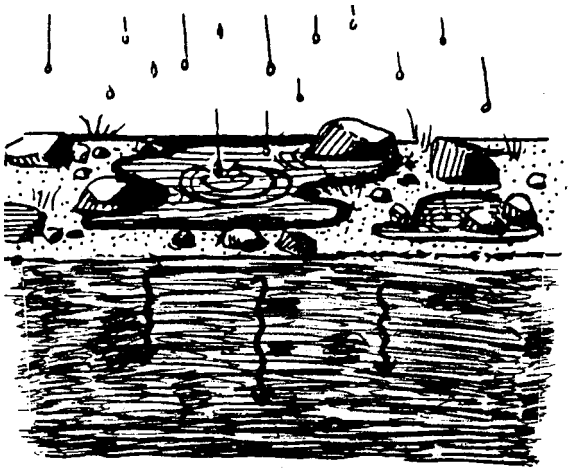

Fig. 2. Compact soil allows little air and water to filter through

a. **Trees and temperature** differences in open and wooded areas in the warmer months can be compared easily. The greatest contrast in temperature between the two areas should be around noon or in the afternoon. Take your temperature readings with a thermometer that is attached to an umbrella's handle (to keep it out of direct sunlight). Take further readings at these same locations several hours after sundown to see how they compare then.

b. **Noise absorption** can be measured with a sound meter or with a tape recorder. (Your leader might check with an industrial or safety inspector to borrow a sound meter.) Record the relative volume of noise along heavily traveled roads, both where there is little or no vegetation and where a row of trees or shrubs is growing along the roadside, at some given distance that is the same for both locations. Be sure to take into account the type of traffic, your distance from the road's edge, the wind direction and velocity and the type of vegetation.

   If you identify a location suffering from noise pollution that could be improved by a vegetational noise screen, take action! Report your findings to local officials, presenting them with the data from your experiment along with an expert's recommendation of vegetation to be planted and the value it will have for the community.

c. **Natural air conditioners,** that's what trees are! They successfully evaporate much of the moisture in the air, which makes our weather a bit cooler. To calculate how much, tie a plastic bag around a leaf or tree. Weight the bag with a small, clean pebble so that it hangs down, thus allowing moisture to collect. Secure the bag tightly on the stem of the twig and leave the bag there for a 24-hour span. The next day remove the bag carefully so that none of the water spills out. Measure the water by volume and weight. Then estimate how much water was evaporated on the entire tree by counting its leaves and multiplying your volume by that number.

4. **Ailanthus experiment** Learn how the plant stem of an urban tree carries water to the leaves to help this tree grow rapidly. Place the end of an ailanthus branch in a container of water. The branch should be green, not brown, and should therefore feature at least one compound leaf. Make sure you have cut the end cleanly and at an angle. Next, add some food coloring, preferably red or black, to the water. After a few hours cut off the top of the branch and see how much of the colored water has been carried up the stem by the pith (the styrofoam-like material in the center of the stem).

5. **Neighborhood tree survey** Select an area of at least 10 blocks or a park that you can survey. Determine the total number of trees according to species, noting which trees are native and which are exotic. Make a leaf, twig and fruit collection of all your trees. Next, present a survey report to your group, including what values the different species have in their urban environment.

   You may want to expand this report into a Cassette Tour by writing and then tape-recording a script that can be used as a tour narrative by younger members or others in the community. Such tours could provide a needed community service and might also serve as a fund-raiser for other student projects.

   If you need help in identifying any of the tree species, either obtain an identification guide or ask your 4-H leader to help you locate an arborist or other tree expert.

6. **Tree wildlife inventory** Make an inventory of the different kinds of

animals that live in trees in your neighborhood. This inventory will help you appreciate the value of urban trees to wildlife. Many of the animals will be easy to identify, but you may need binoculars and a good field guide to identify some of the birds. As you identify different species, note what kind of tree they interact with and what activity they are doing, such as eating tree fruit, or building a nest. If possible, repeat your inventory during each of the four seasons, since many of the birds seen in urban areas are migratory.

Some members may want to use this information either to make a slide presentation on the interaction between trees and urban wildlife or to build birdhouses or feeders appropriate to the species that are present.

7. **Urban tree problems survey** Prepare a checklist of potential tree problems you may encounter in your neighborhood or park. Then survey an area at least 10 blocks long and check off each tree problem you observed, all the while adding to the list any new problems you have not thought of previously. Here is a sample checklist showing some of the problems you may observe:

   - wounds on trunk (how was it injured?)
   - restricted root system (what was the cause?)
   - broken or drying branches (not including lower branches)
   - soil compaction over tree roots resulting from human activity
   - fill-dirt areas over existing roots
   - signs of insects (holes in trunk, gum patch, sawdust-like material present) signs of disease (conks, wet area on bark, deformed leaves) signs of pollution (discoloration around leaf margins or on needle tips that is not due to moisture stress or other foliage disease)
   - root loss due to ditching
   - exposed roots

Upon completing your survey, share the results with your group, then take the combined results to a tree surgeon *and* to a city parks tree specialist to see how you might correct any of the problems cited on your list.

Leader's Section

To work with members on this unit you are not expected to be a professional tree expert. Through some of the publications from local and state Extension offices and other sources you should have enough background information to handle the subject well. Further, there are usually foresters, arborists or other tree experts available to assist you in any city. Check under city, county or state government or under arborist, forester or street and parks departments in the phone directory. These professionals present talks or slide lectures on such subjects as selecting trees for city use and common urban tree problems. They may conduct tours, assist with tree identification or help with other planned activities.

To conduct many of the activities in this unit, you should be able to recognize tree species. Tree identification should be the first subject covered in the initial meetings. Have members collect, dry, mount and label leaf specimens for each tree species in the area. Some authority on tree identification could check the labeled leaf collection for accuracy. It could then serve as a reference to assist in identifying other trees. The local or state Extension office should have some identification booklet or guide which you could obtain for your members. In case a guide is not available locally, suggest that members purchase a field guide at a book store or news stand. One caution: most field guides include only native species. Do not be surprised if you encounter a strange species that is not mentioned in the book. Local urban foresters or arborists should be helpful in identifying exotic or otherwise unusual trees.

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4-H FORESTRY PROGRAM Unit C-5

FORESTRY CAREERS

member's manual
and
leader's guide

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Contents

Careers in Forest Management and Production

While on one hand trees are considered to be a crop, just like corn or cotton, on the other hand their rotation is much longer than that of annual crops. Many factors influence the length of this rotation in tree production. The eventual product of a tree crop is timber, and proper management of our forest lands can substantially increase the amount and kind of timber products.

Our nation depends upon an adequate supply of wood for a variety of uses. Today's forester must face the challenges of helping assure this supply, along with protecting forest resources for proper watershed conditions, wildlife habitats and aesthetic enjoyment. A forester's responsibility extends not only to our present generation but to future ones as well. Today foresters are planting and managing the trees that will be used by your grandchildren.

In terms of our current forest resources, over 750 million acres, or one-third of the total land area of the United States, is occupied by forest cover. This total includes both commercial land, used to produce timber for use as wood products, and non-commercial land, which for various reasons has been taken out of production.

As society grows more complex, the need for wood and wood products will increase. In any given year our country alone uses billions of cubic feet of wood in a variety of products. This amounts to over 60 cubic feet of wood for each person in the nation, and has made the forest products industry the fifth largest in the nation. Today's professional foresters and forestry technicians are needed to provide tomorrow's wood, just as these forestry professionals depend in part on the rising demand for wood products and other forest values for their employment.

Tasks and Roles of a Forestry Professional

What does a forester do?

Some people think of a forester as a person who sits in a tower high above the forest watching for the first signs of smoke from a fire. Foresters do in fact play an important part in protecting our forests from fires. However, they perform many other jobs as well.

You might think a career in forestry means you will spend much of your time fishing, hunting and trapping the wilderness. Although any or all of these skills may aid the forester in his daily work, there is much more to being a forester than just enjoying the outdoors. A forester is responsible for the management and use of all the natural resources within the forest area. He is committed to the wise use of these resources for the benefit of the whole society.

The forest land managed by the forester can be quite extensive, sometimes totaling 100,000 or more acres. (A forest this size would cover an area 121/2miles square.) To manage and harvest such a large area, the forester must have specialized help. This help can be divided into two general categories: *forest management* and *forest production*.

Within the area of forest management, the most common position is that of *professional forester*. This person has acquired a Bachelor of Science degree from an accredited college or university either in forestry or a closely related field, including course work in dendrology, ecology, forest economics, forest policy administration, forest protection, mensuration, and resource management.

A *forest technician* has studied forestry in a one or two-year training program. This person does not have the amount of scientific knowledge that is required of a forester, but does understand basic forestry principles and the forester's general

objectives. Forest technicians are needed to control water resources and manage wildlife, forage, recreation and timber resources. They supervise and/or perform such tasks as timber cruising, log scaling, timber stand improvement, re-planting and re-seeding, insect and disease surveys and other related kinds of work. Forest technicians often supervise semi-skilled workers, or *forestry aides* in these tasks. In most cases, the technician is in turn supervised by the professional forester.

In addition to the forest management area, there are also many job roles on the production side of forestry. *Forest engineers* are responsible for designing logging plans for removing timber from the forest in the most efficient way possible with the least amount of damage to the forest ecosystem. Forest production workers do the actual physical work to convert trees into wood products. These tasks include: felling trees, operating heavy equipment, working on an assembly line, maintenance work, setting chokers, sawing, operating a dry kiln, trucking, laboratory work, clerical work, summer help and other supporting tasks.

Specialized forestry fields

As knowledge about forestry resources increases, work becomes more specialized. Some of the specializations that you may be introduced to in your forestry studies are:

Biometrics, the statistical study of biological observations and phenomena, involving such data as the effect of fertilization on plant growth, optimum stocking levels for specific site conditions, and mill tallies to increase production.

Ecology, the study of the interrelationship of organisms and their environment, including the succession of forest stands, the effect of forest litter on infiltration rates or the ability of plant material to withstand flooding.

Economics, the description and analysis of the production, distribution and consumption of goods and services. A forest economist analyzes the trends in the supply and demand of forest commodities and services to aid in recommending alternative uses of our forest land for the future.

Engineering, which studies the properties of matter and the sources of energy in nature and how these may be made useful. A forest engineer designs and supervises the building of logging roads, erosion and drainage control systems, logging devices and communication systems.

Entomology, the study of the life cycles of beneficial and destructive insects, their effect on forest areas and forest products and their propagation or control.

Fire management, the task of protecting forest land from fire. The fire manager supervises controlled burning that reduces hazardous fuel build-up in forest areas. He might also supervise suppression operations during wildfires. He is responsible for developing public awareness of both the beneficial and destructive effects of f i re.

Genetics, which studies plant breeding to produce trees that are resistant to specific diseases or insects, or that have an extremely fast growth rate and excellent form.

Hydrology, a study of the effect of forestry practices and natural phenomena on the availability and quality of water from watersheds.

Landscape Architecture, the manipulation of natural scenery and landforms to produce an aesthetic effect.

Nature Interpretation, the task of stimulating interest in and appreciation of the natural and human history of the forest through talks, tours, and interaction with visitors to the area.

Nursery Management, the task of producing and supplying vegetative cover crops, trees and other woody plants for use in the establishment of cover on non-forested land and reforestation on cut-over and naturally disturbed land.

Pathology, the study of diseases of forest trees and stands, and the resulting deterioration of forest products.

Range Management, the task of population control of animals and their forage supply, including a study of the

effect of grazing in terms of other forest uses.

Recreation, the task of planning and administering land acquisitions, development of facilities and use of forest lands for enjoyment and sport.

Silviculture, the task of creating and maintaining the kind of forest that will best fulfill management objectives

Urban Forestry, the task of caring for and maintaining existing city trees and developing plans for the establishment of new trees.

Watershed Management, the study of the affect of logging debris on streamflow, and how efficient logging methods can better protect water resources.

Wildlife Management, the task of harmonizing the needs of wildlife with alternative uses of the forest.

Wood Science, the study of the processes involved with growing, harvesting, manufacturing, processing, distributing or further developing wood products.

The following descriptions feature some of the more common jobs in which technicians are employed:

Research Technician, works directly with scientists and forest professionals in developing new forestry methods and techniques.

Sales and Service Technician, sells, installs, operates and often repairs forestry equipment (and trains personnel to service and maintain this equipment) located at the customer's installation.

Operations Technician, works as direct supervisor of field crews in many or all of the various operations assumed by a natural resources manager either in a public or private organization.

Forest Products Buyer, specializes in buying wood or other forest products.

In addition to the areas listed above, there are numerous other areas in which a forestry technician may work. Here are some of them:

Timber stand improvement
Lumber grading chain work
Logging
Timber cruising
(volume estimating)
Timber buying
Kiln operation
Forest insect control
Park and recreation management
Wood chemistry
Wood processing
Nursery culture work
Forest surveying
Log and pulp scaling
Timber marking
Small sawmill management
Fire control and suppression
Forest disease control
Company record manager
Helicopter piloting
Aerial photography

Potential Employers

There are many opportunities for forestry employment in the United States. If you plan to become either a professional forester or a forestry technician you can seek employment in three general areas: 1) Public agencies, 2) Private industry, or 3) Self-employment.

Public agencies in forestry

Public agencies, which are part of the government, exist at the federal, state, regional, county, municipal and educational institution levels.

Perhaps the best-known public employer of forestry professionals is the United States Forest Service, which employs around 20,000 full-time people and the same number part-time and seasonal employees.

Every state government has departments of natural resources, conservation, parks and recreation, fish and wildlife, and so on. These departments employ persons with forestry-related backgrounds.

Regional planning commissions, which are public agencies with regional jurisdiction over several counties or states, employ foresters, planners, biological scientists and recreation specialists.

Many counties employ foresters just as the states do, through county road and water commissions, forest preserve districts and the like.

Cities and towns often employ foresters and arborists to manage urban forest and tree resources. These local governments recognize that trees in the urban environment are extremely important in reducing noise, heat and wind.

Colleges and universities employ persons with backgrounds in forestry and natural resources to teach and conduct research. Extension foresters, located at the state land-grant universities, conduct various educational programs aimed at the general public.

The role of private industry

Private industry plays a very important role in the forestry job market. Currently, it offers around 35 percent of the entry job opportunities in forestry. Many companies own large amounts of forest land, which must have expert care and management, so this percentage is expected to increase in the future.

One of the important tasks of the industrial forester is to encourage private landowners to develop and sustain good forestry practices on private woodlands. This technical assistance helps to develop markets that will supply industry with additional sources of wood.

The self-employed forester

Many enterprising students are successful in starting up their own forestry businesses upon graduating from college. Some of the opportunities for the self-employed forester are timber-consulting work, land use planning, Christmas tree farming, managing a forestry supply business and developing a nursery-landscape operation.

Consulting foresters may be actively engaged in managing public and private woodlands. They develop and carry out a management plan for the owner which might include land and boundary surveys, timber volume determinations, stand improvement practices, logging layouts and reforestation recommendations. Some consultants are called to the stand as expert witnesses in legal disputes involving forestry operations.

Getting a Start in Forestry

If you decide to enter the forestry field you should obtain as diverse an education as your college program will permit. Foresters do more than grow and manage trees. They must also understand the principles of business management and be able to communicate their knowledge effectively. Business administration and communication arts courses prove very helpful in this regard. Forestry professionals may be called upon to speak to local civic groups or to assist in outdoor education programs. In general, a forestry professional spends much of his time communicating with people who, in one way or another, use the forest

Besides the requirement of a Bachelor of Science degree in forestry or a closelyrelated field, previous work experience is also very desirable when applying for a professional position. This experience, which may be gained for instance through summer work helps you to become familiar with and enthusiastic about forestry work. In most cases relevant education combined with practical experience is the key to desired employment.

To be hired by the federal government, you must first file a Civil Service Personal Qualification Statement with the U.S. Civil Service Commission in the region where you wish to work. You will be assigned a rating, and your name will be placed on a ranked list of qualified applicants. When an opening becomes available, the top three applicants in the region are interviewed for the position.

A CAREER ANALYSIS

How Do I Fit the Job?

Complete the statements below for each on-site career experience or any career investigated by you (using resources other than this activity guide).

1. The requirements for this career are:
   Physical Educational Certification licensing Personality traits Procedures for entering

2. The benefits are (e.g., paid vacation, holidays, sick leave, travel insurance, expense accounts, savings program, retirement plan, reduced health insurance, educational program, discount privileges, etc.):

3. Job satisfactions are:

4. Income range is: $_____ to $_____
   1. Starting salary (circle weekly, biweekly, monthly, annually): $ _____
   2. Expected earnings after 2 years: $ _____
   3. Expected earnings after 10 years: $ _____

5. The compatibility of my lifestyle with the income range is:

6. The chances for advancement in this position are: Good □ Average □ Bad(no possibility) □

7. Hazards connected with this job are:

8. The ratio of the number of applicants, to the number of vacancies in this career is:

9. The future outlook of this career is:

10. Advantages (LIST) Disadvantages

A SELF-EVALUATION

How Does the Job Fit Me?

Below are questions and statements which will help you to form answers to the question, "Who am I?" Do not be alarmed if you do not have all of the answers. Most people spend a lifetime getting to know themselves. The questions you cannot answer this year may be easier next year. On the other hand, your answers will probably change or will vary throughout your life as you make a self -evaluation. a useful tool now and in the future.

1. School subjects I enjoy and why: _____

2. School subjects I dislike and why: _____

3. My hobbies and why I like them: _____

4. Do I relate better to a few close friends than to a crowd? Clarify. _____

5. Do I prefer to work with people or by myself? Clarify. _____

6. Am I impatient to get a job done quickly then move on to something different or do I like to work more slowly with attention to detail? Clarify. _____

7. Am I "people oriented" or "action oriented" or "material oriented" or "data oriented"? (Explain to what extent you fall under each category and why. Then list some helpful qualities you have to apply to each:)

a. People _____

b. Action _____

c. Material (Working with Hands) _____

d. Data (Ideas) _____

8. Do I like to meet new people and live in a new location or do I prefer to stay in familiar surroundings? Clarify. _____

Things You Can Do

1 . Interview with a forestry professional

Under the guidance of your 4-H leader, select a job role in forestry that you would like to know more about. Then take the following steps:

a. Contact a local forestry professional who has a similar responsibility and arrange to meet with this person.
b. Review what daily tasks they do within a time period of a day or two, perhaps by "shadowing" them as they perform their duties. Learn what importance each of these tasks have within the forestry professional's overall objectives in forestry.
c. Make a chart of the forestry professional's tasks within the span of one month, grouping together similar tasks under one general heading.
d. Develop a written or oral presentation on this career for your club or school, perhaps with the aid of photographs or slides.

2. Locate several forestry-related agencies or industries in your area, find out the names of the heads of these organizations and discuss career possibilities with these people.
3. Invite a forester to talk to your club about his profession.
4 Take a tour of different forestry operations in your area.
5. Make a study of the entrance requirements of several schools or colleges of forestry and compare the cost and quality of each program.
6. Review a copy of the Civil Service Personal Qualification Statement and Application Form.
7. Develop a personal library of conservation-related career material, including the addresses of agencies that employ resource managers.
8. Sponsor a Forest Careers Day at your school. Ask representatives from forestry-related industries or agencies to attend. Contact your Cooperative Extension Service forester for advice in setting up the program.

Leader's Section

The members involved in this 4-H Forestry project will be relying upon you to become aware of different forestry professions, develop an appreciation for forestry work and stimulate their thoughts on a future career in forestry.

The most important activity in this project is the career interview. You can help the member decide upon a forestry career that is interesting yet practical. Your continued encouragement is important. The member may have to make several contacts before finding the right forestry professional who will take the time to be interviewed, so he or she should not be dismayed if the first contact does not produce the desired result.

The best initial contact for members would be your state extension forester. If you live in a state without an extension forester, contact your state forestry agency. The member should eventually be able to find a forestry professional somewhere in your state who is willing to be interviewed.

Have the member formulate a series of questions to ask the forestry professional before the interview takes place. The interview should focus on what activities the forestry professional does during the day, and what importance these daily tasks have to the overall objectives of forestry.

The member should ask the forestry professional to provide a copy of his/her activity report for one month. The member can then construct a cardboard calendar and list the forestry professional's different activities under specific dates.

If possible, the member should then develop both an oral and written report. The oral report should be given to the member's club or school class. The written report can be retained as part of the member's permanent record. (Note: a slide presentation would make the oral report more meaningful to non-forestry members.)

4-H FORESTRY PROGRAM Unit C-6

MAKING FORESTRY PAY

member's manual
and
leader's guide

Acknowledgment

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TABLE 1 — CHRISTM

Item	1	2	3	4
				Costs Per A
	$	$	$	$
Land preparation	34.00	5.00		
Plant oper. - layout		8.00		
- check row		90.00		
- trees		90.00		
Replant			24.00	
Weed control		16.25	16.25	16.25
- spot spray		20.00	15.00	10.00
Shearing				47.50
Pruning - leaders		12.00		
- handles				90.00
Rodent control				
Mowing				
Insect, disease control				
Fertilize				
Theft protection				
Harvest				
Stump removal, cleanup				
Taxes	10.00	10.00	10.00	10.00
General overhead	3.00	12.00	3.00	9.00
Int. on Oper. Capital	3.00	10.00	2.00	8.00
Total Costs per acre	50.00	273.25	70.25	190.75
Number of trees sold @ average $2.73/tree (stumpage)				
Total income - per acre				
Net Returns to Land and Management				

(1) Labor costs figured at $3.00/hour - Average stumpage sales price (va
1500 trees planted. 1,350 total trees sold in years 7, 8, and 9. Remain

The principal author

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The 4-H Forestry Program

Educational aids in the National 4-H Forestry Program consist of three parts. Unit A – Trees – explains what trees are, how they grow, why they are important and what characteristics identify them. Unit B– Forests — is about trees as part of the forest ecosystem, what values people hold for them, and how they are managed. Unit C — Forestry — discusses how people manage the forest resources which provide forest products, recreation, water supplies, wildlife shelter, jobs and other needs.

This sub-unit is only part of a much broader presentation of forestry interests contained in Unit C. In all there are eight publications in Unit C designed to give you an overview of various aspects of the forest industry. You will be advancing from general concepts, as presented in Unit B, to more specific topics, such as

*C – 1 The Tasks of Tree Farming
*C – 2 Forest Recreation
*C – 3 Managing the Forests for Water, Wildlife and Forage
*C – 4 Urban Forests
*C – 5 Careers in Forestry
*C – 6 The Dollar Value of Forestry
*C – 7 Timber Harvesting
*C – 8 Great Plains Forestry

AS TREE PLANTINGS[1]

cre By Year					
5	6	7	8	9	
$	$	$	$	$	
16.25	16.25	16.25	16.25		
59.00	77.50	99.00	74.50	33.00	
4.00	4.00	4.00	4.00	4.00	
20.00			20.00		
		69.60			
6.00	6.00	6.00	6.00	6.00	
				100.00	
10.00	10.00	10.00	10.00	10.00	
6.00	6.00	10.00	7.00	8.00	
5.00	5.00	9.00	6.00	7.00	
					Summary Totals
126.25	124.75	223.85	143.75	168.00	= $1370.85
.....		372	644	334	
.....		1015.56	1758.12	911.82	= $3685.50
.....		($3685.50 - $1370.85)			= $2314.65

lue of the uncut standing tree): $2.73
der either were culls or died.

Introduction

The objective of this unit is to make 4-H members aware of how forest resources can be productive investments for your time, money, supplies and talent. First, you must find out what resources are available in a forest area, and how their value might be converted into a dollar figure. Next, you will have to analyze the costs and returns of a potential business venture by preparing a simple analysis sheet. By learning basic elements of planning and decision-making and by keeping simple records you will be able to decide whether or not you should attempt your proposed business venture.

Before deciding on what business venture you might undertake within the forest industry, review the following questions to help you clarify your objectives.

1. **Goals** What do I want to accomplish this month, this year and in 10 years?
2. **Resources** What do I have to work with, including hours of labor per week, special skills, tools and investment capital?
3. **Analysis** What projects have I tried in the past? Why did I succeed or fail? What projects have others done successfully?
4. **Alternatives** What might I do? What possible options do I have for investing my own personal resources? (List them.)
5. **Decision** What project has the best chance for a profitable outcome, considering my resources and interests?
6. **Action** How and when do I start? (Write a plan of action showing step-by-step procedures, keeping it flexible so that it can be modified when you learn new facts.)
7. **Evaluation** How well did my plan work? What parts did I plan correctly? What would I do differently next time?

Remember that regardless of whether or not our enterprise shows a profit or a loss on labor and other investments, we have gained some valuable experience and information from our efforts.

Returns on Your Forestry Investment

Whether you have labor, equipment or any other kinds of resources to start, these can be looked at in terms of money. Money is a simple common denominator, and can be viewed as the reflection of your resources in "temporary storage," so to speak. With money you can purchase equipment (such as a shovel) or labor (such as the act of tree planting).

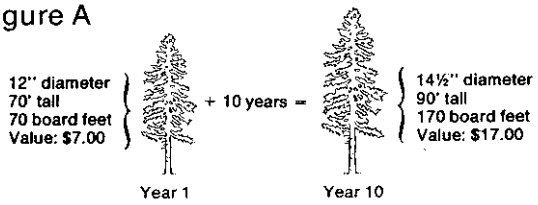
When you put your money in a savings account, your "stored" money can collect interest. *Simple interest* is money paid for the use of the principal, or the amount you originally deposited. *Compound interest* is paid on the principal *plus* the past interest you have accrued.

We generally think of a savings account being started in a bank or a savings and loan association. You can also start a savings account with a forestry investment, for it can be said that trees grow interest, too.

Take for instance a quick-growing tree 12 inches in diameter and 70 feet tall. Its growth

ring features a ¼ inch diameter increase each year **c** inch on each side of the tree). If the tree grows two feet higher each year, in another 10 years the tree will be 90 feet high and 144/z inches in diameter. Whereas the tree first yielded 70 board feet of lumber, in 10 years it will yield 170 board feet. At 10¢ per board foot the tree will have risen in value from $7.00 to $17.00 in 10 year's time. This is a compound interest rate of over nine percent each year.

Figure A



In comparison, if we had put our $7.00 in a savings account receiving a compound interest of 5½ percent our 10-year returns would have amounted to a total of $11.96.

In order to calculate whether or not an adequate return is being received on a forestry investment, members should keep a "cost-return record." This sheet records expenses such as time, money and supplies purchased, as well as returns from sales of the forest products. One example of a record sheet for a Christmas tree enterprise is shown on pages 2 and 3.

Forest Activities That Pay

Here are some examples of possible forest business ventures. Some are long-term activities, such as growing a timber crop, while some are very short-term and require only one ortwo months to complete.

1. Raising Christmas trees
2. Collecting cones for forest seed
3. Making Christmas tree wreaths or swags using cones and perennial greens such as conifer branches
4. Cutting fuelwood from logging residuals and thinnings
5. Cutting pulpwood
6. Planting trees or thinning trees on contract
   (Check Federal incentive arrangements such as the Agricultural Conservation Program for potential opportunities)
7. Digging and selling wild shrubs and ferns for ornamental landscaping
8. Picking and selling greenery to florists for use in bouquets or funeral arrangements
9. Building birdhouses from logs, slates or sawmill residuals
10. Raising seedlings for Christmas tree growers or forest farmers
11. Kindling bundles made from sawmill residuals and sold to homeowners
12. Picking wild berries for resale
13. Fashioning corsages from small cones, bark, greenery and artificial red berries (especially appealing to potential conventioneers in your city)
14. Harvesting cascara bark or other drug products purchased in your area

You can expand upon the above list by talking with local foresters, successful forest operators and your local Cooperative Extension office.

Note to the Leader:

In guiding your member or members through this unit, first let them read through the manual to understand the concept of a forest business venture. Then have them answer Planning Questions one through six on page 3. When they have completed their responses, hold an individual counseling session to review each member's course of action. Encourage the member to use a time table of target dates for each stage of the project if appropriate. Remind them that much of their success in the venture depends upon their own resources and energy.

Resources

Local forester

Agricultural banker

Federal Land Bank loan officer

Farmers' Home Administration loan officer

Cooperative Extension farm management specialist (especially those who prepare cost-return studies on various farm enterprises such as forestry)