

**The U.S. Army Corps of Engineers
and
Natural Resources Management
on Army Installations
1941-1987**

**by
James R. Arnold and Roberta Wiener**

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**ENGINEERING AND HOUSING SUPPORT CENTER
and
OFFICE OF HISTORY
UNITED STATES ARMY CORPS OF ENGINEERS
FORT BELVOIR, VIRGINIA
1989**

Library of Congress Cataloging in Publication Data

Arnold, James R.

The U.S. Army Corps of Engineers and natural resources management on army installations, 1941-1987.

Includes bibliographical references.

1. Military bases--United States--Maintenance--History--20th century. 2. United States. Army. Office of the Assistant Chief of Engineers. Buildings and Grounds Branch--History. 3. United States. Army--Facilities--Maintenance and repair--History--20th century. 4. Natural resources--United States--Management--History--20th century. 5. Land use--United States--History--20th century.

I. Wiener, Roberta. II. Title.

UC403.A76 1989

355.7'0973

89-17969

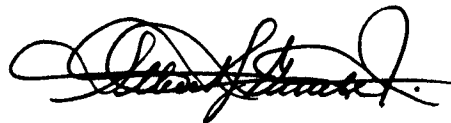
First Printing

EP 870-1-40

Foreword

This study shows the evolution of the Army Corps of Engineers' responsibilities for the natural environment on Army bases. Reflecting both wartime urgencies and peacetime concerns, The U.S. Army Corps of Engineers and Natural Resources Management on Army Installations, 1941-1987 is a comprehensive overview of the problems the Corps' natural resources managers faced on Army bases both domestic and overseas during those years. Their concerns included such topics as soil conservation during the emergencies of World War II and the impact of the environmental movement on Army environmental planners in more recent times.

Today's Army engineers facing multiple questions in the course of their work on installations should find this retrospective analysis useful. The authors, James Arnold and Roberta Wiener, break new ground in tracing the history of environmental work in the context of the military and civilian pressures surrounding the physical development and maintenance of bases.



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Preface

This history covers the U.S. Army Corps of Engineers' role in natural resources management on military installations from 1 December 1941, the date all construction activities transferred from the Quartermaster Corps, to the end of fiscal year 1987, the date natural resources management at Corps of Engineers Headquarters transferred to the Environmental Office from the Buildings and Grounds Branch. The Buildings and Grounds Branch, created after World War II, handled natural resources management throughout the period.

Natural resources management, as covered by this report, includes soil erosion control, grounds maintenance, land use management, forest management, wildlife management and conservation, and pest control. Each of these topics is discussed in three chapters covering the periods 1941-1959, the 1960s, and 1970-1987.

This history encompasses the Army-wide natural resources management program: the policy decisions of the Buildings and Grounds Branch at the Office of the Chief of Engineers (OCE) level, the technical assistance provided by land managers at the Army commands, and the influence of the program on activities at individual installations. Pest control, although not a direct natural resources management activity, is discussed herein as it relates to protection of soil and vegetation. The final chapter describes natural resources management in 1987 and provides illustrative examples of conservation programs at selected installations.

For the reader's convenience, an executive summary is provided. Assertions made in the summary are

footnoted only when they are not discussed and documented in detail in the subsequent chapters.

Thanks are due Drs. Frank N. Schubert and Martin K. Gordon, who reviewed and gave helpful advice on revising the manuscript, and Susan Carroll, who edited the manuscript. Special thanks go to Donald Bandel, who conceived the idea for this study and who extended the full cooperation of his office during the study's research and writing.

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Executive Summary

Wartime and the Postwar Years

The 1 December 1941 transfer of all construction responsibilities from the Quartermaster Corps to the Corps of Engineers included maintenance responsibilities. Maintenance, in turn, included grounds maintenance and pest control. Initially, representatives of the Corps of Engineers did not want to be saddled with these chores and resisted this part of the transfer. Colonel Leslie R. Groves, Operations Branch Chief of the Office of the Quartermaster General Construction Division, and later the Deputy Chief of Construction, Office of the Chief of Engineers, viewed them as more appropriate to the housekeeping duties of the quartermasters. However, the prevailing view in Washington was that those who built the structures should maintain them.¹

The new Construction Division under the Office of the Chief of Engineers retained the same five branches as the division had held under the Quartermaster Corps. One of these was Repairs and Utilities.² Reporting to the Repairs and Utilities Branch was a Maintenance and Repair Section. Under this section was a Grounds and Grassing Unit responsible for grounds maintenance and erosion control. (See Appendix A, charts A-1 to A-3.)

During World War II, land management consisted largely of dust and erosion control at newly constructed military installations. Natural resources management at this time strove only to maintain adequate living conditions for the troops and prevent the elements from interfering with training. "Spartan simplicity" was the

order of the day.

After the war, Repairs and Utilities became a division under the OCE Military Construction Directorate. Under the Repairs and Utilities Division (R&U), the Buildings and Grounds Branch (B&G) included three sections that dealt with natural resources: Grounds, Land Management (which included forestry and wildlife management), and Entomology. The organizational structure for natural resources management remained thus through the 1960s.

An agronomist headed the Land Management Section, and a forester reported to him.³ The branch's major functions were to make policy, approve plans, and allocate resources for Army-wide land management. The individual army headquarters and the installations mirrored this structure, with each headquarters and installation ideally staffed by a land manager/agronomist, a forester, and an entomologist. Typically, at all levels the forester reported to the land manager while the entomologist did not.⁴ In practice, entomologists were rarely assigned to the installations. Not all installations had this staff structure: smaller installations had to rely on the natural resources management staff of the nearest larger installation.⁵

Following the war, natural resources management progressed beyond such emergency concerns as land stabilization to the fostering of beneficial ground cover crops or tree species suited to the military purposes for which the Army held the land. During this period, Army foresters began to develop innovative techniques for controlling the frequent fires caused by training exercises.

Professional land managers also promoted nonmilitary uses such as timber production and agricultural leasing because they assisted in maintaining land in good condition while saving the Army labor. Since

forest management caused wildlife populations to flourish, installations permitted hunting to control wildlife populations and keep the land from being overbrowsed.

The postwar period also saw the recruitment and hiring of civilian professional agronomists, foresters, and entomologists (with bachelors' degrees or equivalent experience) to staff the army commands and installations. By the close of the 1950s, most installations had developed land management plans that were approved by the OCE Buildings and Grounds Branch. Lack of official support for sufficient professional staffing, particularly in the field, remained an ongoing challenge.

The 1960s

At the beginning of the decade, Public Law 86-797, "An act to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations"--known as the Sikes Act of 1960--established procedures for conserving fish and wildlife and allowing public access to outdoor recreation on military land. The act and its subsequent amendments were to have an enduring influence on Army natural resources management.

Buildings and Grounds' primary task remained the review of installation management plans. The required number and scope of these plans expanded to include landscaping, land management, forest management, and fish and wildlife management plans, plus cooperative plans for conservation and development of fish and wildlife resources. The evolution of scientific knowledge about natural resources management during this decade necessitated the overhaul of Army regulations and

technical manuals, a task which also occupied much staff time at Buildings and Grounds.

While erosion from new construction had been largely controlled, problems persisted in specific areas such as ammunition storage igloos. More importantly, tank maneuvers caused additional erosion, which had to be rectified through revegetation.

No longer did the rule of Spartan simplicity prevail for landscaping and grounds maintenance practices. A drive for beautification of military bases, fueled by public opinion and encouraged by the First Lady, Lady Bird Johnson, accelerated.⁶ Construction projects now had to include landscaping in their plans and preserve the natural features of the site.

The multiple use and sustained yield concepts, required by public law for management of national forests, entered into land and forest management. Henceforth, land management had to support more than military training. The production of crops and timber, conservation of wildlife, and public recreation occurred on Army land whenever possible.

Army forest management activities and timber production expanded rapidly in response to a landmark provision in the 1961 military appropriations bill. Commercial loggers and installation commanders alike had sought this provision, which allowed installations to pay for forestry activities directly from timber sales proceeds. This lent unprecedented stability to the funding source. This stability benefited not only forest management activities, but enhanced wildlife habitats, outdoor recreation, fire prevention, and military training areas as well. Yet many such benefits of land management remained unappreciated from a standard accounting perspective. Army land managers periodically debated the realistic valuation of land management costs and benefits.

The development of new and more effective pesticides brought with it increased risks to both handlers and the environment. The increased risks of contamination caused the expansion of training requirements for pest control. In addition, the public and the federal government took a closer interest in the military's use of pesticides.

1970 to 1987

The Army natural resources management program strove to mount an integrated response to the public's interest in protecting the environment.⁷ While the daily tasks and goals of natural resources management remained basically unchanged, the policy behind them came to be based largely on environmental legislation and public pressure.⁸ The growing importance of environmental protection culminated in the 1987 reorganization which moved the OCE natural resources management functions from the Buildings and Grounds Branch to the Environmental Office. This reorganization mirrored similar earlier changes at many installations.⁹

After 1970, the Buildings and Grounds Branch had been moved among several different directorates, including Facilities Engineering. However, it continued to discharge the same responsibilities and to be known as Buildings and Grounds until the 1987 reorganization. Up to 1 October 1987, an office separate from Buildings and Grounds dealt with environmental issues, despite the natural overlap in the concerns of the two offices.

Of the host of laws, both old and new, affecting the branch's work during the 1970s and 1980s, the most influential were the amendments to the Sikes Act of 1960 (Public Law 86-797), the National Environmental Policy Act of 1969 (Public Law 91-190), the Endangered Species Act of 1973 (Public Law 93-203), and the military

appropriations bills that permitted installations to use the proceeds from timber sales (1961) and agricultural leasing (1983) for natural resources management activities.¹⁰

The Sikes Act amendments permitted the collection of fees for hunting and their expenditure on wildlife conservation programs. The National Environmental Policy Act required environmental impact analyses for any environmentally significant activity on federal government land. The Endangered Species Act prohibited the expenditure of federal funds on any activity that would jeopardize an endangered or threatened species.¹¹ The ability to retain and use timber and leasing proceeds provided a measure of funding stability to natural resources management programs. The programs became largely self-sustaining and had less need to compete for scarce appropriated funds.¹²

Public relations grew in importance as public knowledge about conservation issues and awareness of Army activities and their impact on natural resources increased. Public pressure for both recreational access and wildlife conservation became a fact of life.

The period extending from the early 1970s through fiscal year 1987 saw a gradual evolution in the daily tasks and overall mission of Buildings and Grounds. During the early 1970s, the basic duties remained review of installation plans, supervisory visits, technical assistance, and resource allocation. However, it became necessary to spend more time providing policy guidance as environmental laws proliferated. In 1975, the chief agronomist decided to stop reviewing installation natural resources management plans, to cut back the amount of travel to installations, and to devote more effort to policy development and administrative tasks.¹³

The improvement in natural resources staff and expertise at the commands and the installations made

this decision possible. The staff-building efforts of the early decades had finally paid off. The agronomists and foresters at the command level were now capable of providing the necessary supervision, plan review, and technical assistance to the installations. In addition, despite the continued Department of Defense (DOD)-wide lack of support for staff increases, many installations had built outstanding staffs and programs which were capable of operating independently.¹⁴

Due in part to the increased sophistication of installation firefighting skills, erosion reemerged to replace fire control as the number one problem in the 1980s. Modern armored vehicles were both heavier and more mobile than those of the past, causing much greater damage to soil and vegetation.¹⁵

Problems associated with preserving training grounds were particularly acute at overseas installations. The local environmental pressure in the host countries of Europe was even more intense than in the United States because the land area of most of these countries was smaller and the Army leased rather than owned the land.¹⁶ Buildings and Grounds provided general policy guidance to overseas installations. As was done by their stateside counterparts, the major commands overseas assisted the installations with technical aspects of natural resources management. From the late 1970s, the commands proved increasingly capable of independent operation and no longer required supervisory visits.

In the late 1970s, Army agronomists, foresters, and wildlife biologists began to recognize that they were harming their programs by competing for scarce resources. By 1977, the requirement for a single installation natural resources management plan replaced the separate landscape, land, woodland, and wildlife management plans.¹⁷ At Buildings and Grounds and many

installations, agronomists, foresters, and wildlife biologists became known as natural resources specialists or environmental protection specialists. Another amendment to the Sikes Act mandated an integrated approach to wildlife and forest management, forcing foresters and wildlife biologists to compete less and cooperate more.¹⁸

Foresters grew more knowledgeable about wildlife management as a result.¹⁹ Thus, the separate disciplines of agronomy, forestry, and wildlife biology became parts of a single integrated field--natural resources management.

Notes

1. L. Fine and J.A. Remington, The Corps of Engineers: Construction in the United States (Washington, DC: Government Printing Office, 1972), pp. 463-472.
2. Ibid., pp. 473 and 494.
3. Interview, authors with Wendell R. Becton, Gainesville, GA, 15 January 1988. Hereafter cited as Becton interview.
4. Interview, authors with Burton F. Kiltz, Arlington, VA, 22 January 1988. Hereafter cited as Kiltz interview.
5. Becton interview.
6. Interview, authors with Donald Bandel and Donald Cole, Washington, DC, 23 March 1988. Hereafter cited as Bandel interview.
7. Interview, authors with Vance W. Mays, Glenwood, MD, 29 October 1987. Hereafter cited as Mays interview.
8. Bandel interview.
9. Ibid.
10. Ibid.
11. "Making Natural Resources Work for You," no date, File 3, Donald Bandel Historical Collection, Buildings and Grounds Branch, Corps of Engineers, Washington, DC. Collection hereafter cited as Bandel collection.
12. Bandel interview.
13. Ibid.
14. Ibid.
15. Ibid.
16. Ibid.
17. "Department of the Army Land Management Program," no date, File 3, Bandel collection.

18. Telephone interview, authors with Tom Warren, Fort Carson, CO, 7 April 1988. Hereafter cited as Warren interview.

19. Telephone interview, authors with John Andrews, Vienna, VA, 6 April 1988. Hereafter cited as Andrews interview.

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CHAPTER 1

The War Years and the Postwar Growth of Natural Resources Management, 1941-1959

Erosion Control

During the prewar buildup of the U.S. Army, many soldiers had to live and train in dismal surroundings. The joke about living at 'Camp Swampy' was all too real for many recruits.¹ During rainy periods the bare earth around new installations became a sea of mud. During dry weather it produced immense amounts of dust. Army physicians believed that these conditions contributed to flu epidemics and other diseases among the troops.²

Prior to war's outbreak, the U.S. Department of Agriculture Soil Conservation Service (SCS) willingly responded to Army installation requests for erosion control assistance on an individual basis.³ On 1 December 1941, representatives of the Office of the Quartermaster General Repairs and Utilities Branch (R&U), Construction Division, met with experts from the Soil Conservation Service to formalize their cooperation for erosion control on Army bases.⁴ They created the liaison representative program so that SCS experts could provide surveys, planning, and technical assistance to the Army in response to the national emergency.⁵ However, the ongoing reorganization process caused by the Construction Division's transfer from the Quartermaster Corps to the Corps of Engineers also on 1 December complicated the liaison program. For example, SCS liaison representatives encountered

confusion regarding who to report to until mid-January 1942.⁶

The Japanese raid on Pearl Harbor on 7 December 1941 brought the United States into formal conflict with the Axis powers. Military planners recognized that national wartime mobilization required a military construction and training program on a massive scale. Natural resources management within the Army focused on facilitating the war effort.

A short three weeks after Pearl Harbor, an SCS regional officer sent a circular letter to area conservationists notifying them that erosion control operations in Army camps "has first priority as far as technical planning and the use of the technical facilities of this Service are concerned."⁷

An example of a typical inspection of an Army installation by an SCS liaison representative occurred on 19-20 December 1941 at Fort Leonard Wood, Missouri. The inspection concentrated on the cantonment area "and only a very brief amount of time was given to the balance of the 85,000 acre reservation."⁸ The inspector found enormous problems with drainage, grading, road work, and the development of a parade ground and artillery range. Plant cover and topsoil had been removed, leaving a sterile subsoil. River bottom soil was being hauled in and dumped but no one knew if this soil would support a vegetative cover. The inspector requested a party comprising a conservation engineer, soils specialist, and erosion control planner to prepare an erosion control plan that would supplement the proposed landscaping plan. Absent such planning, the inspector worried that runoff from the denuded construction site would create a constant and costly upkeep problem.⁹

Erosion control received early attention from Repairs and Utilities because serious erosion hampered

troop training. In turn, training exercises and tank traffic tore up the ground and caused erosion.¹⁰ From the beginning, the lack of trained personnel and equipment made the erosion control effort difficult.¹¹ The available manpower was spread so thin that when a civilian landscape architect unexpectedly quit at one installation, the commanding officer was "in a bad spot" without a technical person to supervise erosion control measures.¹² Lieutenant Colonel E.F. Ketcham, chief of Repairs and Utilities, noted in 1943 that "the shortage of qualified agronomists in the Seventh Service Command has made it necessary that the fullest use be made of those who are available."¹³ He explained that those installations lucky enough to have agronomists had to share their "technical knowledge and experience" with installations lacking agronomists.¹⁴

The magnitude of Army erosion control needs led to their classification as a national priority and a "Direct National Defense Activity" in early 1942.¹⁵ Simultaneously, installation officers became so conscious of the need for erosion control for practical and tactical reasons that many objected to any so-called landscaping plans because they appeared to go beyond erosion control.¹⁶

In the nationwide push for erosion control at Army installations, some planners went a bit overboard and forgot about their budget limitations. The Agronomy Division chief of the Soil Conservation Service, C.R. Enlow, was forced to write to the San Antonio District Engineer, "While you fellows have done a whale of a piece of work in a very short time, I am afraid that you have over-controlled the erosion a bit. If all of the money that the Army has for erosion control were allotted to the 8th Corps Area, you still would not have enough to do the job you have outlined."¹⁷

After the Soil Conservation Service's initial rush

to help the Army with its erosion control problems, some SCS personnel expressed a desire to return to their normal routine. The Soil Conservation Service chief felt obliged to remind his subordinates that "The erosion control work on cantonments, forts, camps, and all other Army posts, that may be requested by the Utilities Officers in the District Engineers Offices, is No. 1 priority."¹⁸

The beginning of July 1942 saw the transfer of SCS liaison representatives to the War Department payroll so they could function more efficiently within the military chain of command.¹⁹ The Soil Conservation Service accepted the transfers as necessary, agreeing to give the liaison personnel their jobs back when the war ended.²⁰ Ultimately, many former SCS agronomists opted to remain with the military after the war.²¹ The Army and the Soil Conservation Service maintained their erosion control partnership in the decades following the war. Under a departmental cooperative agreement and memoranda of agreement with individual installations, the conservation service continued to provide Army installations with technical assistance, such as soil surveys, on request.²²

Over time, the Soil Conservation Service developed guidelines for erosion control. The guidelines emphasized the need to control excess water before attempting any planting and specified soil preparation methods, methods of seeding and sodding, appropriate regional grass mixtures, and management of growing vegetative cover.²³

In general, the erosion control problems Repairs and Utilities confronted occurred on installations east of the Mississippi.²⁴ In the arid West, problems centered around dust control. Wind rather than rain propelled construction-exposed soils and created dustbowl-like conditions on many installations. Prob-

lems were particularly acute at newly built air bases where the effects of frequent air traffic augmented natural forces.

Burton F. Kiltz, Buildings and Grounds' chief agronomist from 1951 to 1965, served as a dust control specialist with Eighth Army in Dallas during the war. Like many others, he moved from the Soil Conservation Service to the Army engineers to lend his expertise to the military construction effort. Kiltz's first chore was to establish dust control schedules for each installation that had to be met "no matter what the cost."²⁵

Repairs and Utilities, located in faraway Washington, DC, contributed little toward a solution to dust control problems. Headquarters personnel tended to be Easterners who did not know very much about the special problems occurring in desert environments. Accordingly, Kiltz supervised a series of trial and error experiments at various installations until finding a solution. The solution involved dumping crushed rock on dusty areas. Supported by the planting of drought-resistant plants, this approach worked at such places as Fort Bliss.

News of the successful use of crushed rock spread to other installations. By 1943 it became a standard procedure for dust control at airfields. Workers at Dugway Airfield in Utah, for example, covered 22 acres with a gravel blanket and sprinkled additional areas with gravel as needed. They supplemented this by seeding vegetative cover on 320 acres.²⁶

Solving dust problems at air bases required Repairs and Utilities to coordinate with the Buildings and Grounds Section of the Army Air Force. Beginning in 1943, the Repairs and Utilities Grounds Maintenance Unit advised the Army Air Force on how to plant turf and ground covers to control dust at airfields.²⁷

Until the Air Force became an independent branch of the military in 1947, overlapping lines of authority caused confusion for workers in the field.²⁸

In sum, Repairs and Utilities' wartime efforts centered on making installations livable while solving any problems that interfered with troop training. In the East, the water erosion of bare soils at new installations was the major challenge. In the West, wind erosion of dry soil and resulting dusty conditions predominated.

Igloos

In the postwar years, Repairs and Utilities continued to oversee projects begun during the war.²⁹ In addition to the old erosion and dust control problems, a new erosion problem centered around land management practices in ammunition storage areas.³⁰ Earth-covered structures called igloos served to store ammunition. Soils easily eroded from the igloos. The area around the igloos required an extensive system of firebreaks and vegetation had to be controlled to preclude the accumulation of combustible material.

In 1947, Repairs and Utilities, now a division under the Military Construction Directorate, considered procedures for repairing ammunition igloos and magazines. Heretofore, water leakage into the igloos had been a serious problem. Repairs and Utilities' initial efforts to solve this problem focused on mechanical solutions such as correcting defective flashings or using a different waterproofing material.³¹ Efforts then turned to the problems of erosion control around the igloos.

Vegetative cover was not an option in very arid locations. Asphalt roofs tended to crack. Each crack became a vulnerable spot in the protective cover.

Tumbleweed sprouted in the cracks, eventually died, and left a root network that weakened the soil and attracted rodents. Rodents further eroded the protective cover. Installation maintenance personnel explored a variety of solutions, including a barricade of protective gravel on top of an arsenic trioxide soil sterilant.³²

The lack of detailed policy statements regarding grounds maintenance in general and igloo maintenance in particular was the subject for a meeting between Repairs and Utilities and the Personnel and Training Division of the Office, Chief of Ordnance, in November 1949. Repairs and Utilities worried that there were widely varying standards of grounds maintenance at Ordnance installations.³³ Repairs and Utilities recognized such variation was partly due to the fact that local conditions rendered detailed instructions undesirable and that change of commands often caused a revision of ground maintenance plans. Repairs and Utilities made two proposals to address these problems. It suggested that specific conditions at all installations should be subject to detailed analysis during the normal review and approval of the land management plan by Army headquarters and the Offices of the Chief of Ordnance and the Chief of Engineers. It further proposed that a special regulation should require that major revisions to grounds maintenance plans be approved through the same channels as the original plan. In this fashion Repairs and Utilities hoped to introduce some standardization in grounds maintenance procedures.

The value of land management planning quickly became apparent in the field. In response to Engineer Letter Number 46, 28 November 1949, requiring Fourth Army installations to consider how to utilize their grounds economically, the Louisiana Ordnance Plant in

Shreveport began a grazing program. The plant found that grazing around its igloos and production line areas was an excellent way to control vegetative growth. Grazing reduced mowing requirements, virtually eliminated hand labor requirements, reduced soil erosion and fire hazards, and contributed substantial revenue from leases.³⁴

Throughout the 1950s, the dual problems of vegetative cover on top of and soil erosion around the storage igloos continued to plague Repairs and Utilities. The American Society of Agricultural Engineers discussed the problem at its annual meeting in 1956. Papers presented by military land managers compared various types of grass as vegetative covers for explosive storage igloos and considered aggregate blankets for earth-covered structures.³⁵

During the 1950s, Repairs and Utilities promoted herbicides for controlling vegetative growth in certain situations, including around igloos.³⁶ Installations employed chemical sterilization of the soil, chemical elimination of undesirable species, and chemical control of plant height, known as chemical mowing.

In 1960, the Office of the Chief of Ordnance sent a letter to Repairs and Utilities indicating the continuing severity of the igloo problem and requesting technical assistance: "This office is vitally interested in assembling data and criteria upon which to base engineering decisions regarding maintenance and repair of protective earth cover on ammunition storage igloos."³⁷ Ammunition storage igloos at Ordnance installations had been built using a minimum of at least two feet of earth cover. Erosion had reduced numerous igloos to less than this minimum. Restoration was necessary, but funds were limited.

Repairs and Utilities had carefully considered the erosion problem the previous year and published a

supplement to Technical Manual 5-630, Repairs and Utilities, Grounds Maintenance and Land Management. The supplement dealt with planting and erosion control on earth-covered structures. While the Ordnance Corps recognized the wisdom of Repairs and Utilities' approach, it decided that "to permit efficient and orderly programming of required maintenance work, it is considered necessary to establish tolerances which will allow a reasonable degree of deviation from the standard."³⁸

Grounds Maintenance

In addition to the special problems associated with igloos, Repairs and Utilities confronted other types of grounds maintenance problems. During the war its Grounds and Grassing Unit provided oversight for the post engineer's grounds maintenance responsibilities. These responsibilities were codified in Technical Manual 5-600: "The post engineer's grounds-maintenance responsibilities include revegetation, renovation, fertilization, and grass mowing."³⁹ Technicians on the staffs of service command engineers supervised grounds maintenance and dust and erosion control projects. During the war, any landscaping done in the name of groundskeeping had to meet a standard of Spartan simplicity.⁴⁰

Land management planning was becoming a major concern, and grounds maintenance, a subset of land management planning, had to fit in with an installation's overall management plan. In 1949, an engineer conference at Fort Belvoir considered how this could best be done. The conference focused attention on cost records for grounds maintenance.⁴¹ Cost records were important, because while some 80 percent of all Army installations were wooded, more funds were spent on the

other 20 percent for such activities as landscaping, maintenance, and grass cutting.⁴²

By 1958, Army Regulation (AR) 420-74 defined grounds maintenance in some detail as

work essential to the assigned military mission for preservation, development, and improvement of lands. It includes technical land management planning and supervision; control of erosion, dust, and vegetative fire hazards; field drainage; establishment, maintenance, and control of vegetative cover; control of weeds and noxious plants; development and maintenance of landscape plantings; traffic control on other than established traffic areas; repair of eroded areas; soil conservation; and woodland management and improvement practices.⁴³

The regulation, as had previous versions of Army Regulation 420-74, distinguished improved from unimproved grounds. Improved grounds were those on which "intensive development and maintenance measures are effected to facilitate the military mission."⁴⁴ These normally included an installation's built-up sections that had lawns and landscape plantings such as parade grounds and athletic fields. Unimproved grounds were areas not defined as improved or woodlands. Normally the term applied to such zones as maneuver areas, artillery ranges, ammunition storage areas, and outlease areas.

Land Management

During the war, land management planning "consisted of evaluating individual proposals which demanded immediate attention with little thought to the

results of such action beyond the immediate future." Following the cessation of hostilities, the Army began to seriously plan for land management.⁴⁵

By 1949, professional Army land managers had formulated a policy for the management and utilization of lands within military installations: "It is the policy of the Department of the Army to manage, utilize and maintain all lands and grounds within the boundaries of an installation so as to facilitate its present and future military mission, and to conserve and maintain all its lands including forests in accordance with sound agricultural principles."⁴⁶ Buildings and Grounds' major tool for implementing this policy was the land utilization and management plan required of each Class I and II installation.⁴⁷

Such plans had become requirements for installations with sufficient acreage only in the previous year. Timber and crop sales, leases, permits, and related activities were predicated upon an approved land management plan. Initially, installations tended to concentrate on land that could be leased for crops and grazing and on woodland management.⁴⁸ As a result, the Army began to find that many of its lands could yield economic benefits without impairing an installation's military mission.

By 1951, the chief of Buildings and Grounds' Land Management Section, Walter Kell, was vigorously promoting land management plans. He wanted each installation protected by a plan that said how it should be managed and what resources would be required. Heretofore, few land management plans had been in effect. When Burton F. Kiltz succeeded Kell as the chief that same year, one of his first tasks was to prepare a new land management manual to assist installations in preparing plans. Kiltz soon realized that he was really creating a forestry manual, so he

delegated the task to Buildings and Grounds' forester, Cyril Webster. However, Webster died before completing the task, and Kiltz finished the manual.⁴⁹ This episode illustrates how throughout its early history the Buildings and Grounds' professional land management staff was beset by frequent turnover and unfilled vacancies.⁵⁰

Buildings and Grounds land managers in the mid-1950s sought to put installation planning on a scientific basis.⁵¹ They promoted scientific applications as well as the hiring of experienced professionals at the installation level. To further these goals, the chief of Buildings and Grounds' Land Management Section, Burton Kiltz, took an important step that contributed to the growing sophistication of Army land management planning. Kiltz belonged to the American Society of Agronomy (ASA). In 1955, he supported the creation of a military land management division (A-2 Division) within the society. This established a link between the society and military land planners. It brought scientific recognition of military land management problems to a national technical audience. The recognition helped attract trained professionals to the Army.⁵² Periodically, Army specialists presented papers to this division. Furthermore, topical section meetings developed ideas and disseminated information that influenced Army policy.⁵³ In sum, the creation of the A-2 Division elevated the stature of military land managers within the scientific community.

The problem of staffing persisted, however. In 1956, Kiltz wrote, "Our greatest need is for more professionally competent employees; however, technical excellence is not enough. We need employees who know military regulations and who sympathize with the military problems of the installations or commands to which they are assigned."⁵⁴ During his installation

visits, Kiltz pressed installation commanders to hire professionals who understood land management.⁵⁵ The installations' staffs usually recognized the value of Kiltz's advice, but it took time for them to act upon the suggestions. Many installations continued to do without specialists who could advise a commander about such issues as the environmental consequences of training activities. When a commander inquired about the effect of shrapnel on future timber harvesting or the effect of tank training on erosion, often there was no one qualified to answer.⁵⁶

Gradually this changed as the drive for professionalism began to pay dividends. For example, special fire problems occurred in the pine areas of the Atlantic Seaboard states. A peculiar weather phenomenon sometimes caused the jet stream to descend and create extremely low relative humidities. As Wendell Becton described the situation: "In the past these had caused fires to run completely across whole states. The prevailing opinion was that nothing could be done to combat such fires."⁵⁷ However, installation foresters devised an elaborate firebreak system and successfully used large-scale controlled burning during low danger periods to alleviate the problem.

During World War II, dire necessity forced Repairs and Utilities to focus on land stabilization at Army installations. Once this was accomplished, the question became what to do with the land. It took until the mid-1950s for a policy to evolve. From the end of the war until this time the land management planning that took place was rudimentary in nature. One veteran of this era states that the Army did not participate in land management before about 1955.⁵⁸

The 1958 version of Army Regulation 420-74 defined Repairs and Utilities' land management goals: "These regulations prescribe applicable procedures for the

economical maintenance of grounds and management of land, conservation of agricultural and forested lands, and establishment and maintenance of durable turf for troop training, lawns, and recreation areas." The regulation called for "modern, progressive methods of land management and improvement for all applicable lands."⁵⁹

Buildings and Grounds realized that installations needed an organized approach. With this realization came the birth of modern land management planning in the Army. Before planning could be effective, people would have to be trained to implement plans. On the basis of an installation's acreage, Buildings and Grounds established criteria as to how many and what types of trained personnel were needed.

An agronomist generally headed an installation's land management team. Foresters had a more limited role and reported to the agronomists.⁶⁰ The agronomists reported up the chain of command to their counterparts at the headquarters of the numbered armies. The headquarters personnel closely cooperated with the Buildings and Grounds Branch. Under Repairs and Utilities, the Buildings and Grounds Branch Land Management Section prepared policy and disseminated the policy to the army headquarters. After review and comment, a final policy evolved that guided installation procedures. All in all, there was a good feedback network up and down the chain of command and good coordination between the headquarters and Buildings and Grounds.⁶¹

By the end of the decade, land and forest management had progressed from the scattered application of Buildings and Grounds' broad management policies to the widespread development and approval of sound management programs.

Agricultural Leasing

Agricultural leasing programs began during World World II. The first such programs were in place by the 1943 growing season.⁶² As the program evolved during and after the war, farmers leased open land around airfields and ammunition storage sites. Their activities formed buffer strips, controlled weeds, and reduced maintenance costs. Army policy promoted leasing because of its economic benefits. Local farmers of good reputation worked under strict surveillance. Farmers whose land had been acquired by the military initially had first priority in leasing the land. By 1955, installations awarded leases to the highest local bidder.⁶³ National policy called for consultation with county agricultural agents on crop rotation and soil management. Leases could be revoked if the Army again needed the land for military purposes. By 1956, the Army leased 992,894 acres.⁶⁴

Forest Management

During the 1940s and 1950s, there was a close connection between the status of Army land management and individual installations' forestry programs. Until 1942, the forestry program on Army reservations operated under an old regulation prohibiting the sale of timber except trees that had been so damaged that they were unusable for construction purposes.⁶⁵ In 1942, Army regulations changed the definition of damaged to include timber that had reached maturity and was beginning to deteriorate. Two years later a new regulation considerably broadened the criteria for disposing of timber.⁶⁶

During World War II, large supplies of wood products from Army reserves had been assembled for

shipment to Europe. The forestry activities of the Allied Forestry Section in the Chief of Engineers' European Theater of Operations were so successful that these stockpiles were not needed.⁶⁷ When the war ended, the stockpiles were sold as surplus property to create a revolving fund to finance future lumber procurement contracts at Army installations. This revolving fund operated until 1952.⁶⁸

Postwar forest management got off to a slow start. Much of the forest land acquired during the war had been heavily cut over and had little standing timber left.⁶⁹ When Repairs and Utilities turned its attention to timber management on military installations after the war, it faced the same problem confronting dust and erosion control efforts--lack of trained personnel. Accordingly, the chief of Repairs and Utilities, Colonel Frank Forney, requested that the U.S. Forest Service loan forest management experts so that productive timberland on military installations could be used.⁷⁰ The foresters were to assist the War Department in "the formulation of broad War Department policy which will correlate the best possible forestry practice with military plans."⁷¹

Repairs and Utilities did not expect sophisticated timber management plans. Given the Army-wide shortage of trained forestry personnel, it could not have implemented such plans. Rather, it requested "simple plans of management worked out in order to insure at least reasonably good timber cutting."⁷² The division also wanted timber harvesting to accord with watershed protection needs at military installations.

In August 1947, Repairs and Utilities requested the Forest Service to study forest resources.⁷³ Forest Service experts reported in June 1948 that "at least 1,432,500 acres of the total forest land was free from contamination and could, without limiting military

operations, be managed to yield 200 million board feet of lumber annually."⁷⁴ From this time, the Buildings and Grounds Branch of the Repairs and Utilities Division viewed proper timber management as the key to profitable timber harvesting.⁷⁵

The Forest Service's studies and reports pointed out the economic potential of timberlands on Army installations. In addition, the earlier success of the Army-Navy Lumber Agency's revolving fund program "served to inform everyone that large supplies of timber did in fact exist on lands held by the services."⁷⁶ The chief R&U agronomist, Walter Kell, believed that the Corps could manage a sound forestry program because he had seen the Corps' success in France during the war.⁷⁷ He decided that Army installations should each prepare a detailed forestry plan using the Forest Service plan as a model. It was "to show requirements for manpower by types, equipment needed, suggested harvesting schedule, forces needed to combat fires . . . where active firing ranges lay, how to isolate them by construction of fire breaks."⁷⁸

Each numbered army, operating under the general guidance of the Buildings and Grounds Branch's Land Management Section, attended to the task of devising a forestry management plan. Skepticism greeted the request for individual plans. Many officers felt that installations "were so badly duded and the trees so full of metal that a forestry program was likely to fail."⁷⁹ At first, the Third and the Sixth Armies were the only ones to show any interest in forest management.⁸⁰

In the Third Army, as elsewhere, installations lacked foresters to devise management plans. The army called upon the proven technical expertise of the South Atlantic Division engineers.⁸¹ Wendell R. Becton received the assignment to assist the Third Army by

writing forestry management plans for each installation. The task involved detailed coordination and cooperation with installation commanders who had to treat forestry projects with the same seriousness as other military missions. Becton found that "a knowledge of Army Staff operations that had been gained by study and experience proved of great assistance in tailoring forestry practices to the military situations and having the plans accepted."⁸²

Ultimately, such an ad hoc approach could not endure. The Forest Service study had recommended that a civilian chief manage the forestry planning process. In 1950, Becton departed from active duty to fill this position.

The Fort Benning Experience

The history of forest management at Fort Benning, Georgia, shows the evolution of management practices. In 1920, the Army requested that a Forest Service employee inspect Fort Benning. The forester's report recommended the employment of a forester on-site. The report led to the establishment by executive order of a national military forest in 1924. The Forest Service established an organization to administer nearly 78,560 acres under an agreement between the Secretaries of Agriculture and War. The laws and agreement recognized that the land would be "subject to the unhampered use of War or Navy Department."⁸³

Three years later, the Forest Service requested that the executive order be canceled, because "a forest land use policy cannot be founded upon the notions and absent interest of a shifting Army personnel."⁸⁴ In 1936, the Army again requested Forest Service personnel to make a detailed study of the fort's timber resources. The foresters identified areas for cutting

and trained Army personnel in proper harvesting techniques. They again recommended that a trained forester be assigned to the installation. The fort's expansion in World War II made this plan obsolete.

A third request to the Forest Service came in 1943. The 1943 study determined that the 1936 plan had been followed for about two years. Subsequent harvesting practices ignored its recommendations.

In 1948, a forester from the Forest Service returned to Fort Benning. He found that cutting could be performed without interfering with current military practices provided there was constant supervision by a capable person and continuous liaison with the Infantry Center. However, such a person would have to start from scratch because "there has been no continuity of management or records of cutting." The 1948 report concluded that the installation's history "demonstrated conclusively the futility of drawing up detailed management plans without the continuity and guidance of a well trained technical forester." It criticized the Army for merely expressing support for good forest management without actually investing the resources necessary to carry out such a program: "If one lesson can be learned it is that the forest management activity should be carried out by a technical forester under the direction of the Army and not by an unrelated agency on a personnel assignment basis."⁸⁵

Forest Management Continuing Into the 1950s

Meanwhile, in the late 1940s, the numbered armies continued with the task of devising forestry management plans for each installation. In the Third Army, Wendell Becton began by writing broad policy statements. They described personnel and financial requirements, equipment, and a harvesting schedule. He

advised installations where they could find qualified people.⁸⁶ At Repairs and Utilities' request, the Forest Service, other government agencies, and the nation's forestry schools advertised the need for Army foresters. At this time the most important goal was simply "to get a body in there" so each installation would have someone to begin the work.⁸⁷ In some cases, positions could not immediately be filled by professional foresters because the Army did not want to displace the incumbent active-duty World War II veterans.⁸⁸

The Buildings and Grounds Branch received copies of each installation's forestry plan. It did not influence the plan's details but instead provided oversight. While Buildings and Grounds nominally had to examine such details as plans to erect watchtowers for fire control at an installation, the few people assigned to this top level of responsibility had more than a full-time job establishing policy, approving the detailed plans, and allocating money and manpower.⁸⁹ Buildings and Grounds was the driving force propelling the planning process. It verified that installations made plans and that the plans appeared reasonable.

Around 1948, an unidentified R&U employee wrote about the division's future direction. He asserted that land held for military purposes presented a tremendous national resource and that the timber growing on military lands was vital to meeting national emergencies whether they occur "this year, in five years, or a hundred years."⁹⁰ Past inattention had reduced most of the forest lands to overgrown woodlots containing undesirable species. The writer concluded that either qualified personnel had to be assigned to timber management or future harvests had to be abandoned.⁹¹

When Kiltz joined Repairs and Utilities in 1951,

he found a well-managed office whose major job was to keep track of projects started during the war years.⁹² In addition to soils stabilization, major challenges centered around forest management.

During the early 1950s, the biggest problem confronting Buildings and Grounds and Corps of Engineers foresters in the field was fires caused by training exercises. While each installation had a post engineer, his major concerns were buildings and maintenance, not land management. Land management simply was not part of most post engineers' experience. They were ill-prepared to handle the special land management problems caused by fires.

Fires happened with great frequency. As the Third Army's forester observed, there was "no way to get around it, fires are going to happen."⁹³ Fires had been a persistent problem over the years. When foresters in the Department of Agriculture examined the problem, they concluded that "there was no reason the Army couldn't successfully handle the problem."⁹⁴ These foresters believed that it merely was a matter of getting people assigned to the installations to do the work. This suggestion hit at Buildings and Grounds' core problem--the lack of trained personnel. According to Wendell Becton, before 1950 "the Army dragged its feet on making such assignments. It didn't want to utilize scarce resources for this task. Thus the problem lasted longer than it had to."

When Becton became civilian chief forester in 1950, he immediately set out to address the fire problem. His solution was to use the time-tested forestry practice of controlled burns. Becton visited installations where he worked with foresters to isolate firing ranges by clearing fire breaks. This created dedicated areas for exclusive use as firing ranges. Becton told installation commanders, foresters, and

post engineers alike, "Forget trying to keep fires off it, let it burn."⁹⁵ Instead, fire breaks and prescribed burning on adjacent lands controlled the fires.

At Buildings and Grounds, the new chief of the Land Management Section inherited the same problem for installations nationwide. Forest and brush fires were an all too common experience. Typically, some installation would have heavy rains that yielded tall grass. Absent cutting or grazing, the grass would dry out and catch fire easily. A rapidly spreading, tremendous fire would start--in the West burning tumbleweeds carried the flames--and there was little anyone could do. Kiltz recalls, "First thing you knew, the whole county was on fire."⁹⁶

Sometimes a fire spread beyond the boundaries of a base and private landowners would sue. In one case at Fort Bragg, Becton investigated a citizen's complaint and determined that the owner had repeatedly experienced this problem. He sued not to recover losses but to motivate the Army to control its fires.⁹⁷

Becton became known as a consistent champion of the importance of fire prevention. Burton Kiltz, chief of the Land Management Section, recognized that Becton was more familiar with fire problems than anyone in the Army. Kiltz endorsed Becton's solution, calling Becton "the best salesman on the need to manage forests."⁹⁸

Over time, Kiltz spread knowledge of Becton's fire prevention techniques. Under his direction, Buildings and Grounds began promoting fire control measures including timber harvesting, building fire lanes, using grazing to control combustible growth on nonforested areas, and conducting controlled burns in forested areas.⁹⁹

The fire control issue also highlighted another problem: differing perceptions held by field foresters versus headquarters agronomy personnel. Becton recalls

that Buildings and Grounds' suggestions were sometimes geared toward cleared, cultivated areas and thus did not accord with the management needs of rough, uncleared woodland areas. He believed that the B&G personnel were spread too thin to visit the field often enough to understand forestry needs.¹⁰⁰

Simultaneously, B&G personnel felt that they contributed to solving the fire problem by disseminating information about control techniques. Kiltz recalls that he personally visited installations as often as possible, usually making at least one inspection trip a month.¹⁰¹ While headquarters and field personnel worked toward the same goal, there apparently existed some understandable tension stemming from their different responsibilities.

Also in 1951, the Departments of the Army and Agriculture issued a joint policy statement on the use of national forest lands for defense purposes. The statement recognized that national forests were vital to the economy and for the defense production of the country. However, "the use of national forests for maneuvers and training will inevitably result in damage to important natural resources and frequently inflict damages of an irreparable nature."¹⁰² Consequently, the Department of the Army pledged that it would try to obtain alternative lands for maneuvers whenever possible. Beginning in 1954, Buildings and Grounds' Land Management Section expanded its cooperation with the Department of Agriculture by compiling and reporting annual reforestation data for all branches of the Department of Defense.¹⁰³

Buildings and Grounds continued to request technical assistance from the Forest Service. In 1955, the Chief of Engineers, Major General Samuel D. Sturgis, Jr., informed the Army Chief of Staff, General Maxwell D. Taylor, about the ongoing good relationship and

close cooperation between the Corps of Engineers and the Forest Service.¹⁰⁴ In particular, the two exchanged information about research and development activities related to forest management. Buildings and Grounds participated in exchanges regarding forest and grass fire prevention techniques, control of forest insects and tree diseases, optimum timber production on military lands, and wood preservation methods.

In response to the growing body of knowledge about forestry and recognition of the value of forests, a 1955 regulation required that a woodland management supplement to the approved land management plan had to be completed for each Army installation having 100 acres or more of productive or potentially productive timberland.¹⁰⁵ The same year, the Department of Defense provided a statement regarding management of woodlands: "Forest areas of commercial value shall be maintained in accordance with the management plan which will include provisions for the removal of dead, diseased, or poor risk trees; the harvesting of merchantable timber; protection from fire; control of disease and insects, reforestation, and other approved practices."¹⁰⁶

Not every installation complied with the Army Regulation 420-74 dictates. In 1955, Redstone Arsenal, Alabama, and Volunteer Ordnance Works, Tennessee, requested assistance from forestry experts in order to improve their timber stands. Examination of the record revealed that neither installation had submitted an approved woodland management plan nor did they have trained foresters. Field inspections revealed that although the installations lacked the formal plans required by Army Regulation 420-74, they had responded to the Army-wide growing awareness of the value of land management.¹⁰⁷ At Redstone, all unimproved grounds that would require mowing were under agricultural or

grazing leasing. At Volunteer, an extensive reforestation effort was under way. Neither of these findings would have been likely before the advent of the Army Regulation 420-74 planning mandate.

In 1956, Cyril B. Webster, the B&G forester, addressed the annual meeting of the American Society of Agricultural Engineers on the topic of managing military woodlands. He explained that it was Department of the Army policy to provide, to the extent consistent with an installation's mission, "scientific management of the installation woodlands in order to conserve and protect natural resources, give proper maintenance to military grounds, insure continuing production of forest products useful to National Defense." The Chief of Engineers held the responsibility for making this policy effective as part of his installation maintenance and repair duties. At this time, the total reported acreage of Army woodland was 1,940,154 acres in the United States, Alaska, the Canal Zone, and the Caribbean.¹⁰⁸

The annual cost for "good management," including protection for the 77 installations reporting woodland in 1956, would have been about \$2 million, according to Webster. However, the actual cost to the installations that year was about \$0.5 million, and the U.S. Treasury received an income of about \$1.25 million from the annual timber harvest. Webster believed that costs would diminish as management was extended and that "good forestry practices applied to the installations need not constitute a drain on the taxpayer's pocketbook, but will actually pay cash dividends."¹⁰⁹

In 1958, Army Regulation 420-74 elaborated on what constituted woodland management. Such management included "the development and application of technically sound operating plans and practices which will insure the continuous production of designated

tree species."¹¹⁰ It defined a woodland as an area of 100 acres or more that produced or could produce productive forest products. This meant that in addition to standing timber capable of harvest for pulpwood or sawtimber, treeless areas designated for reforestation were classified as woodland.

One benefit of knowledgeable woodland management practices was the cultivation of the specific types of cover required for each training area. Such cultivation created training areas without drawing on appropriated military funds. This resulted in a tremendous savings that was not generally acknowledged by installation commanders when they considered their budgets.¹¹¹

Another important benefit of good forestry practice was that it prevented major insect problems. As the Third Army forester recalls, "Insects are not a big problem if you manage trees well."¹¹² Becton reminded installation commanders that thinning increased the vigor of the remaining trees, and the removal of infested or decaying trees kept harmful insects from spreading. A woodlot required such thinning once every 8 to 10 years. Becton helped installations plan an 8- to 10-year maintenance cycle. An installation's woodlands would be divided into 8 or 10 segments and one segment would be worked on per year. The application of such forestry management practices obviated the widespread use of chemicals for woodland insect control.¹¹³

Wildlife Management

In the years following World War II, wildlife management on Army installations consisted primarily of enforcing all state and federal fish and game laws. The dilemma presented by large animal populations

confined in fenced installations caused commanders to turn to state fish and wildlife laws as the basis for hunting policy.¹¹⁴ However, consistent policies for enforcement did not exist among military installations until the 1958 passage of the Engle Military Lands Bill.¹¹⁵

Periodically, Repairs and Utilities sent installations regulations on the "Development and Conservation of Wildlife on Military Reservations." These both stated existing policy and updated installation commands about new federal and state laws. For example, Repairs and Utilities issued a 1950 regulation, Army Regulation 210-480, to alert installations that henceforth the Migratory Bird Treaty Act would be operative on all military reservations and the Alaska Game Law would be enforced in Alaska. The regulation also addressed the enforcement of fish and game laws and the duty of the commanding officer to issue hunting and fishing permits.¹¹⁶

Prior to the mid-1950s, wildlife management programs existed on only a few installations. In 1949, the passage of Public Law 81-345 initiated the first official DOD wildlife program by providing for a fish and wildlife program to be implemented at Eglin Air Force Base in Florida. The law further provided that the program be conducted in cooperation with the state and the Interior Department and that the base could sell special hunting and fishing permits and keep the proceeds to sustain the program. The success of the Eglin program ultimately led to the 1960 passage of the Sikes Act, Public Law 86-797, which extended the law to all military bases.¹¹⁷

In general, during the 1940s and 1950s, the public lacked concern about wildlife on existing military lands.¹¹⁸ However, the public prevented several Army attempts to acquire more land that they viewed as

important for wildlife conservation. In 1941, public pressure forced the Army to abandon plans for a training center near North America's last refuge of trumpeter swans in Montana.¹¹⁹ The public also objected in 1955 when the Army tried to incorporate 10,700 acres of a national wildlife refuge into the Fort Sill Military Reservation. Conservationists opposed this action and began to examine military natural resources management policies. This examination led to the Engle Military Lands Bill.¹²⁰

Testimony on the bill provided a blanket condemnation of military wildlife policies. When passed as Public Law 85-337 in February 1958, the bill tried to resolve basic conflicts between military and civilian conservation agencies. It dealt with hunting, fishing, and trapping on military reservations and required that all such activities accord with state and federal laws. The Engle Act also required state licenses for hunting and fishing and granted access by conservation officials for management and conservation activities.¹²¹

Outside pressure for public use of military lands increased as a result of the vast increase in land controlled by the Department of Defense. In 1940, the military controlled 2.5 million acres (excluding Alaska). By the early 1960s, the figure had risen to 28.7 million acres.¹²²

Although they controlled a great deal more land than ever before, post commanders did not make public access to hunting and fishing a high priority. Any plans for such recreation could not be allowed to affect adversely the use of the land for military purposes. When deer herds on bases got too big, only military personnel received permission to hunt. Public pressure eventually led to various forms of supervised public access. Each of the field army headquarters

designed hunting policy with input from Buildings and Grounds, the individual installations, and the states.¹²³ The installation's land manager usually handled wildlife management.¹²⁴ In 1960, the Sikes Act and its provision for collecting and retaining license fees gave installations the necessary incentive to welcome public access.

Pest Control

The 1941 transfer of responsibility for military construction and maintenance of Army installations from the Quartermaster Corps to the Corps of Engineers included most of the quartermasters' former responsibilities for controlling insects, rodents, and other pests. Initially, much confusion occurred among the Surgeon General, Quartermaster General, and Chief of Engineers about who would now be responsible for what aspects of pest control.

Procurement of pest control equipment and supplies for indoor and outdoor use was one of the points of contention. A series of letters and circulars addressing these responsibilities began in March 1942 and culminated in War Department Circular No. 178 dated 7 August 1943.¹²⁵ This circular, titled "Insect and Rodent and Vermin Responsibilities in the Armed Forces," made the engineers responsible for carrying out pest control tasks on real property. This involved such chores as draining for mosquito control, outdoor spraying, and fumigation of entire buildings. The engineers also had to procure their own supplies for these functions. The Quartermaster General retained responsibility for procuring pest control supplies for routine indoor spraying. The Surgeon General and post medical officers remained responsible for oversight of pest control, including conducting inspections and

initiating and enforcing preventive measures.¹²⁶

Embarrassing newspaper publicity arising from a squabble over who--the quartermasters or the engineers--must procure poison to kill ants in one installation office is said to have directly led to the assignment of an entomologist to the Office of the Chief of Engineers in July 1943.¹²⁷

In July 1943, the OCE Repairs and Utilities Branch established the Insect and Rodent Control Unit, which later became the Entomology Section. An entomologist for the U.S. Department of Agriculture, William D. Reed, transferred to the Corps of Engineers to organize and staff the entomology services at the Office of the Chief of Engineers and at army headquarters and installations.¹²⁸ The Corps of Engineers also held its first entomology training course in the summer of 1943, and the courses have continued on a regular basis since that time.¹²⁹

As with other activities under the Repairs and Utilities Branch, the lack of trained personnel greatly impaired the mission: "During initial phases of organization of the mission the engineers attempted to provide technical and administrative leadership for pest control activities with unsatisfactory results."¹³⁰ In the summer of 1943, Reed was the only trained entomologist in the Corps of Engineers. Only four or five types of pesticides existed, and there was little equipment to apply them with. The unit cost of pest control in 1943 was \$6.27 per 1,000 square feet of buildings, a figure which decreased in subsequent years as the technology improved.¹³¹

Post engineers were responsible for pest control activities to protect the health and morale of the troops and to preserve property. Post engineers did not become responsible for pests affecting trees or other plants until the late 1950s. The post engineer

performed the work of spraying, supervised drainage projects, and installed screens under the supervision of the medical officer.¹³²

The Office of the Surgeon General provided "such technical advice or recommendations as may be required to aid the Chief of Engineers in carrying out his functions in the Insect Control Program."¹³³ The Office of the Surgeon General also performed rodent and mosquito control research, as well as providing Repairs and Utilities with relevant publications advising post surgeons and post engineers on such topics as "Methods for Insect and Rodent Control."¹³⁴

Repairs and Utilities largely confined itself to information dissemination through circular letters on such topics as mosquito control. Each month, J.L. Vincenz of Repairs and Utilities submitted a report on insect and rodent control to the Surgeon General.¹³⁵ Repairs and Utilities' pest control activities focused not just on pests affecting human health but on those that harmed installation property. In 1945, Vincenz provided Repairs and Utilities' perspective on the damage caused by powder-post beetle attacks. Vincenz described Repairs and Utilities' control strategy, which relied upon the use of a solution of pentachlorophenol. Repairs and Utilities employed this approach based on practices developed by the Department of Agriculture. He noted that application of the chemical caused skin irritation to workers using the chemical and recommended that applicators wear rubber gloves and goggles. He sent his recommendations to the Office of the Surgeon General for review.¹³⁶

Unusual evidence of early concern about the environmental effects of pest control practices appears in the November 1945 edition of Technical Manual 5-600. The section on "Airplane Spraying of DDT" states, "Much still must be learned about the effect of DDT on

the balance of nature important to agriculture and wildlife before general outdoor application of DDT can be safely employed in the continental United States." The balance of the paragraph set forth procedures for obtaining approval of such spraying.¹³⁷ However, such concern about the potential harmful effects of toxic chemicals rarely surfaced during the 1940s and 1950s.¹³⁸

The years following World War II saw the development of new pesticides, better equipment, and technical knowledge among the Corps of Engineers entomologists. Ongoing entomology training courses and updated technical manuals disseminated the growing body of knowledge. The 1956 edition of Technical Manual 5-632, Repairs and Utilities, Insect and Rodent Control, originally issued in October 1945, stated the importance of field rodent control in preventing both the erosion and the hazardous training conditions caused by their burrowing.¹³⁹

On one occasion, the Entomology Section attracted the unfavorable scrutiny of Congress. A soldier's complaint of roaches and other insects reached his congressman and led to a congressional inquiry into unsanitary conditions at Fort Gordon, Georgia, in the fall of 1957.¹⁴⁰ The New Jersey recruit had been horrified at the size of the cockroaches and the abundance of insect life at Fort Gordon. The inquiry determined that he was simply unfamiliar with the effects of the southern climate on insects. No one else at the base had complained, and the congressmen concluded that Fort Gordon applied pesticides regularly and effectively.¹⁴¹

Notes

1. Mays interview.
2. Ibid.
3. Merrill to Field Officers, Soil Conservation Service (SCS) Letter #553, re: Cooperation with Army on Erosion Control, 23 Dec. 1941, File 1, Bandel collection.
4. See draft memo on "Conference on Erosion Control at Army Posts," 1 Dec. 1941, File 1, Bandel collection.
5. Musser to Area Conservationists, 30 Dec. 1941, File 1, Bandel collection.
6. "Due to the start of hostilities and the reorganization of the War Department, it has been difficult to get organization procedure established." Middleton to Enlow, 17 Jan. 1942, File 1, Bandel collection.
7. Musser to Area Conservationists, 30 Dec. 1941, File 1, Bandel collection.
8. Kell to Seymour, re: Soil erosion control at Ft. Wood, MO, 24 Dec. 1941, File 1, Bandel collection.
9. Ibid.
10. Mays interview.
11. Morrish to Windom, re: Erosion control at Ft. Knox, KY, 15 Dec. 1941, File 1, Bandel collection.
12. Colman to Kell, re: Cooperation on erosion control, 26 Jan. 1942, File 1, Bandel collection.
13. See Ketcham's memo of 29 June 1943, re: "Personnel and Organization of Army Installations for Erosion Control and Grounds Maintenance Work," OCE General Correspondence 1918-45, Box 775, Records of the Office of the Chief of Engineers, Record Group 77, National Archives, Washington, DC (hereafter cited as RG 77, NA).
14. Ibid.

15. For an example, see Roosa to Utilities Officer, re: Implementing SCS erosion control plans, 24 Jan. 1942, File 1, Bandel collection.
16. Middleton to Enlow, re: Erosion control, 8 Jan. 1942, File 1, Bandel collection.
17. Enlow to Cheek, re: Erosion control plans, 17 Jan. 1942, File 1, Bandel collection.
18. Bennett to Regional Conservators, re: SCS personnel detailed to War Dept., 8 Apr. 1942, File 1, Bandel collection.
19. Morrish to Roth, 30 Oct. 1951, File 1, Bandel collection.
20. Enlow to Cheek, 4 June 1942, File 1, Bandel collection.
21. Kiltz interview. One former SCS employee, Ralph H. Morrish, became chief land manager of the Repairs and Utilities (R&U) Buildings and Grounds (B&G) Branch. Morrish was instrumental in getting the branch started between 1943 and 1945. His successor, Walter Kell, was one of the first SCS liaison representatives.
22. Bandel interview.
23. Middleton to Enlow, re: Erosion control, 10 Jan. 1942, File 1, Bandel collection.
24. Kiltz interview.
25. Ibid.
26. Truax to Chief of Engineers, re: Dust control at airfields, 30 June 1943, OCE General Correspondence 1918-45, File 612, Box 775, RG77, NA.
27. See File 618.38, Box 782, OCE General Correspondence 1918-45, RG77, NA.
28. Kiltz interview.
29. Ibid.
30. Vance W. Mays, "Evaluation of Vine Honeysuckle as a Protective Cover for Earth-Covered Structures," presented at the 1959 annual meeting of the American Society of Agronomy, File 2, Bandel collection.
31. Rossell to Commanding General, Fifth Army, re: Repair of Igloos, 18 Apr. 1947, File 2, Bandel collection.

32. See File 2, Bandel collection, most of which is devoted to discussion of igloos.
33. Memo for Record on Meeting with Office, Chief of Engineers representatives on Grounds Maintenance, 16 Nov. 1949, File 2, Bandel collection.
34. Commanding General, Fourth Army to Commanding Officer, Louisiana Ordnance Plant, re: Grounds maintenance at ordnance installations, 8 Feb. 1950, File 2, Bandel collection.
35. See File 2, Bandel collection.
36. For a typical example, see HQ 5th Army to Chief of Engineers, re: "Stabilization of Storage Pad Barricades," 9 Aug. 1955, File 2, Bandel collection.
37. "Review of Criteria for Earth Cover on Igloos," 8 Dec. 1960, File 2, Bandel collection.
38. Headquarters, Department of the Army, Chief of Ordnance, re: "Earth Cover on Igloo Magazines," 28 July 1959, File 2, Bandel collection.
39. Department of the Army, Guides and Procedures: Repairs and Utilities, Technical Manual (TM) 5-600 (Washington, DC: November 1945), p. 66.
40. Ibid.
41. Kell to Agronomists, 15 June 1949, File 1, Bandel collection.
42. Becton interview.
43. Department of the Army, Repairs and Utilities: Grounds, Army Regulation (AR) 420-74 (Washington, DC: 1958), in OCE Maintenance Management Branch, Policy Section, Box 1, Accession No. 67-4785, RG77, Washington National Records Center (WNRC), Suitland, MD. (Hereafter cited as Army Regulation 420-74, 1958.)
44. Ibid.
45. Burton F. Kiltz, "Maintenance Planning for Army Building Areas," presented at the Annual Meeting of American Society of Agricultural Engineers, 21 June 1956, Vance Mays Papers, Office of History, Corps of Engineers, Washington, DC. (Collection hereafter cited as Mays papers.)

46. HQ 4th Army Engineer Letter #46, 28 Nov. 1949, File 2, Bandel collection.
47. Department of the Army memo 100-80-4, 27 Feb. 1948, cited in Engineer Letter #46 above, required commanding officers at each Class I and II installation to prepare such plans.
48. Kiltz, "Maintenance Planning for Army Building Areas," Mays papers.
49. Kiltz interview.
50. Becton interview.
51. Kiltz interview.
52. Ibid.
53. Mays interview.
54. Kiltz, "Maintenance Planning for Army Building Areas," Mays papers.
55. Kiltz interview.
56. Mays interview.
57. Becton, "Military Forestry History," p. 9.
58. Mays interview.
59. Army Regulation 420-74, 1958.
60. Mays interview.
61. Ibid.
62. Alvin T.M. Lee, "Getting and Using Land in Time of War," in Land: USDA Yearbook of Agriculture (Washington, DC: 1958), pp. 93-94.
63. Mays interview.
64. 1) Lee, "Getting and Using Land in Time of War."
2) Although planned by installation land managers, the actual leases are administered by District Engineers and the Real Estate Division, OCE, as is the actual sale of timber. Becton interview.
65. Burton F. Kiltz, "Progress of the Woodland Management Program," presented at the 1964 Annual Meeting of the American Society of Agronomy, November 1964, Wendell Becton Papers, Office of History, Corps

of Engineers, Washington, DC. (Collection hereafter cited as Becton papers.)

66. Ibid.

67. 1) Wendell R. Becton, "Military Forestry History," p. 5, File 3, Bandel collection. 2) Correspondence, Becton to authors, 2 Feb. 1988.

68. Ibid., p. 6.

69. "Resume--DA Forest Management Program," no date, File 3, Bandel collection.

70. Forney to Watts, re: loan of foresters to Army, 28 June 1948, File 1, Bandel collection.

71. Crawford to Chief, U.S. Forest Service, 6 Aug. 1947, File 1, Bandel collection.

72. Ibid.

73. Ibid.

74. Forest Management Weekly Log--Week Ending 25 June 1948, File 1, Bandel collection.

75. Ibid.

76. Becton, "Military Forestry History," p. 6. This agency had coordinated military lumber procurement contracts in the years following the war. See also Becton to authors, 2 Feb. 1988.

77. Becton interview.

78. Becton to authors, 2 Feb. 1988.

79. Becton, "Military Forestry History," p. 7.

80. Kiltz to author, 23 Mar. 1988.

81. Because of its work for the Army-Navy Lumber Agency, the division had foresters, timber estimators, and other technical help. See Becton to authors, 2 Feb. 1988.

82. Becton to authors, 2 Feb. 1988.

83. E.T. Hawes, "Report on Forest Management Activities & Possibilities at Fort Benning, GA," 1948, File 1, Bandel collection.

84. Ibid.

85. Ibid.
86. Becton, "Military Forestry History," p. 8.
87. Becton interview.
88. Ibid.
89. Ibid.
90. Report on role of R&U in land management, no date, File 1, Bandel collection.
91. Ibid.
92. Kiltz interview.
93. Becton interview.
94. Ibid.
95. Ibid.
96. Kiltz interview.
97. Becton interview.
98. Kiltz interview.
99. Ibid.
100. Becton interview; also Becton to authors, 2 Feb. 1988.
101. Kiltz interview.
102. U.S. Department of Agriculture/Army Joint Policy Statement on Forest Lands, approved 3 July 1951 by Secretary of the Army Frank Pace, Jr., File 1, Bandel collection.
103. Records of the R&U Division, B&G Branch, Land Management Section, Reforestation Report Files, Box 11, RG77, Accession No. 64A-2124, WNRC.
104. Sturgis to Taylor, re: Cooperation with Forest Service, 6 July 1955, File 1, Bandel collection.
105. HQ 5th Army, "Forestry Management and Coordination with United States Forest Service," 10 June 1955, File 1, Bandel collection.

106. Department of Defense (DOD) Instruction 4150.6, 7 June 1955, cited in Kiltz, "Progress of the Woodland Management Program," p. 5.
107. C.B. Webster, Report of special visit to ordnance installations, 16 Dec. 1955, File 2, Bandel collection.
108. Cyril B. Webster, "Managing Military Woodlands," presented to the Annual Meeting of American Society of Agricultural Engineers, 21 June 1956, Mays papers.
109. Ibid.
110. Army Regulation 420-74, 1958.
111. Becton to authors, 2 Feb. 1988.
112. Becton interview.
113. Ibid.
114. Mays interview.
115. G. Blair Joselyn, "Wildlife Management on Military Installations--A Critique of Army Policy," Journal of Wildlife Management, 29, No. 1 (January 1965): 216.
116. Department of the Army, Installations: Development and Conservation of Wildlife on Military Reservations, Army Regulation 210-480 (Washington, DC: 17 August 1950), OCE Maintenance Management Branch, Policy Section, Box 1, RG77, Accession No. 67-4785, WNRC.
117. E.J. Bedker, "National Security Management: Renewable Natural Resources," 1979, p. 14, File 3, Bandel collection.
118. Joselyn, "Wildlife Management on Military Installations," p. 215.
119. Lenore Fine and Jesse A. Remington, The Corps of Engineers: Construction in the United States (Washington, DC: Government Printing Office, 1972), p. 347.
120. Joselyn, "Wildlife Management on Military Installations," pp. 215-216.
121. Ibid.
122. Ibid.
123. Mays interview.

124. Becton interview.
125. Rough draft of chapters for Army Medical History WWII, 1945, WWII Administrative Records ZI, Box 1257, Entry 31(2I), Records of the Office of the Surgeon General (Army), Record Group 112, National Archives (hereafter cited as RG112, NA).
126. Ibid.
127. Ibid. Also see handwritten draft, "The Army Engineer Entomology Program," no date, File 3, Bandel collection.
128. "History of Engineer Entomology Services," no date, File 3, Bandel collection.
129. Handwritten draft, "Current status of Entomology Services," no date, File 3, Bandel collection.
130. "History of Engineer Entomology Services," no date, File 3, Bandel collection.
131. Handwritten draft, "Current Status of Entomology Services," File 3, Bandel collection.
132. TM5-600, November 1945, pp. 73-76. Also see Department of the Army, Repairs and Utilities: Insect and Rodent Control, TM5-632 (Washington, DC: Government Printing Office, February 1956), pp. 112-121, for material on plant-attacking pests.
133. Robinson to Chief of Engineers, re: "Funds for mosquito control," 17 Aug. 1942, OCE General Correspondence 1918-45, Box 838, RG 77, NA.
134. WWII Administrative Records ZI, entire contents Boxes 1263 and 1262, Entry 31(2I), RG112, NA.
135. OCE General Correspondence 1918-45, Box 838, RG77, NA.
136. Vincenz to Reagan, "Recommendations for Use of Pentachlorophenol-oil Solutions in Treating Seasoned Lumber for Insect Control," 29 Oct. 1945, OCE General Correspondence 1918-45, Box 838, RG 77, NA.
137. TM5-600, November 1945, p. 75.
138. 1) Kiltz interview. 2) TM5-632, February 1956, p. 30, presents a much weaker warning about DDT than that in TM5-600 of November 1945.

139. TM5-632, February 1956, p. 132.

140. Brown to Chief of Engineers, re: Congressional inquiry of alleged unsanitary conditions at Ft. Gordon, 25 Oct. 1957, O&M Administrative Files FY 58, Entomology Section, Box 11, RG77, Accession No. 64A-2124, WNRC.

141. Ibid.

CHAPTER 2

The 1960s--Responding to the Public's New Interest in Natural Resources

Erosion Control

By the 1960s, problems with dust were largely under control, but erosion persisted as a concern for the Buildings and Grounds Branch. Tank training maneuvers tore up the ground cover and caused erosion. Land management personnel were responsible for ongoing cleanup and revegetation of training areas.¹

In 1961, staff visits uncovered extensive erosion damage of ammunition storage igloos. As a result of this discovery, Buildings and Grounds suggested the use of aggregate as an erosion control measure in arid zones where vegetation could not be established.²

Grounds Maintenance

During the 1960s, landscaping for its own sake grew in importance. Maintaining installations in a state of spartan simplicity, the guiding principle of the past, became unpopular with the public. The public began to pressure the military to beautify its bases. One common source of pressure came from local garden clubs that donated shrubs to the bases. At Buildings and Grounds, chief agronomist Burton Kiltz received calls from installation engineers asking what to do about the arrival of truckloads of shrubs, as such an influx was disruptive to the landscape development plans. "Plant them and hope they die," was his

answer.³ However unwilling, installations felt they had to accept such donations because it was good public relations.

Public pressure, coupled with the active interest of the First Lady, Lady Bird Johnson, eventually led to changes in DOD and Army policy. The 1966 version of Army Regulation 420-74 was the first to include among its objectives the requirement to "beautify the appearance of installations and facilities through appropriate landscaping."⁴ The regulation set forth responsibilities for mowing lawns and for maintaining playing fields, golf courses, parade grounds, and cemeteries. It also specified that grounds maintenance responsibilities on overseas installations should conform to the prevailing practices of the host country.⁵ Army policy further required that all new construction projects must preserve natural features of the site and include lawns and landscaping.⁶

Poorly planned landscaping in the early years of an installation led to problems later. Installations often chose shrubs solely for their low price and fast growth without regard to hardiness and planted them in excessive numbers too close to buildings. Expensive maintenance resulted, including removal of dead plantings, transplanting, and radical pruning.⁷ Another type of problem arose during a major drought in 1966. B&G land managers faced the unusual task of developing irrigation systems for the dying grass of cemeteries in the Northeast.⁸

Land Management

The 1960s saw the growing sophistication of the land management concept and continued efforts to expand and improve the professional land management staff throughout the Army. During the early part of this

decade, management for "multiple use," "sustained yield," and protection of natural resources became DOD and Army policy in response to the enactment of public laws. Although the Multiple Use, Sustained Yield Act of 1960 applied to national forest management, the Department of Defense also endorsed it.⁹

The multiple use concept as cited in Army Regulation 420-74 in 1961 involved "a coordinated program of land management and improvement . . . applied on a multiple use basis to provide maximum military use; control vegetation to prevent destructive fires; stabilize soil to control erosion; protect natural resources; sustain productivity of croplands, grasslands, and timberlands; and encourage fish and wildlife."¹⁰ Henceforth, land management had to support not only military training, but such additional uses as agriculture, timber production, and recreation. Buildings and Grounds staff put much effort into overhauling Army regulations and technical manuals to reflect these changes.¹¹

Planning requirements expanded to include a landscape, land management, and woodland management plan for each installation. Each army headquarters reviewed and revised these plans. The Buildings and Grounds Branch held ultimate authority for them. Buildings and Grounds reviewed approximately one land management plan per week during this period. It had to heavily revise some of them because they were written by unqualified people. With the chief agronomist occupied in reviewing plans, the assistant agronomist and the forester at Buildings and Grounds performed installation inspections. They each averaged one inspection per week.¹² Installations also submitted landscape development plans to Buildings and Grounds, but the chief agronomist rarely had time for them.¹³

As before, the need for more foresters and

agronomists remained pressing. Buildings and Grounds lacked sufficient time and personnel to carry out field visits to all the installations. A command consensus on this problem proved difficult to reach. The staffs at Buildings and Grounds and at the numbered army headquarters each thought the other should be making more field visits.¹⁴

Overall, developments in the field mirrored events at Buildings and Grounds: installations promptly reported successes or failures to Buildings and Grounds; Buildings and Grounds, in turn, reflected these experiences by making policy changes.¹⁵

During the late 1960s, forestry personnel apparently attempted to separate forest management from the supervision of the land management agronomists.¹⁶ However, the Land Management Section retained control of forestry, arguing, "The Army holds land for military purposes and not to raise trees. We are not trying to compete with the forest industry but are using the military land effectively on a multiple use basis. Forestry is just a part of land management."¹⁷

Agricultural Leasing

Buildings and Grounds continued to actively promote agricultural leasing during the 1960s. Installation commanders had to examine land "constantly" to determine its availability for leasing.¹⁸ In 1960, the Army leased more than a million acres of land for agricultural use, with grazing comprising close to three-quarters of the acreage. The U.S. Treasury collected approximately one million dollars from these leases.¹⁹ In 1964, the Office of the Chief of Engineers studied the possibility of installations keeping the rental income to use for base maintenance, but no sponsor volunteered to champion the cause and no

change resulted, nor would it for another two decades.²⁰

The Buildings and Grounds Branch recognized, however, that the Army derived benefits from agricultural leasing that went beyond the money collected for rent. The lessees provided mowing, weed and brush control, fence construction and repair, correction of drainage problems, construction of fire lanes, and control of field rodents at no cost to the installations. An additional benefit was fire prevention: land leased for grazing experienced a reduction in the underbrush and grasses that could fuel serious fires. Were the land not leased, an installation would have been required to deplete its limited maintenance budget for these purposes. An indication of the value of leasing comes from three installations that in 1960 reported annual maintenance cost savings per acre ranging from 53 cents to \$6.66.²¹

W.G. Ralph, an agronomist with the Buildings and Grounds Branch, worried about the future of agricultural leasing because, "if the trend of reduced funds available to installations for maintenance continues, it appears that lessee maintenance participation will become increasingly more important."²² He noted that unless an installation commander could justify agricultural leasing in terms of dollars, the leasing would cease and the installation would have to either pay for the land's upkeep or allow it to become an unsightly jungle. He suggested that the value of the post engineer's time should be included in calculations of the savings from agricultural leasing.²³ A 1967 calculation estimated that agricultural leasing netted, above and beyond rental payments, approximately two million dollars in services such as mowing, fence repair, and fire prevention.²⁴

The growing importance of both conservation and

recreation in Army land use planning began to influence leasing decisions. This is illustrated by provisions in the 1966 edition of Army Regulation 420-74 that required installation commanders to report on conservation measures to be taken by lessees. In addition, wherever possible, leases had to provide for safe public recreational use of the leased land.²⁵

Forest Management

Army regulations required forest management programs on Army installations that had a minimum of 100 acres of productive or potentially productive woodlands. The stated objectives of forest management included facilitation of the military mission, protecting woodlands from exploitation and depletion, maximum production of forest products, development of live reserves for mobilization, contribution of forest products to the economy, watershed protection, and erosion control. However, the military mission of troop training remained the primary concern of woodland management. The public relations benefits of selling timber on a regular schedule made such sales an important secondary goal.²⁶ Each dollar realized from Army timber sales in fiscal year 1967 generated \$25 of economic activity for local logging, transport, and manufacturing industries.²⁷

The concept of multiple use as applied to forest management required that each acre of woodland support as many other uses as could coexist with military use, including timber production and sale or improvement of wildlife habitat. Forests were also to be managed for a "sustained yield" of trees over time. Wendell Becton, Third Army forester throughout the 1950s and 1960s, recalls that Army foresters practiced multiple use management from the beginning of the forestry

program, long before it was known by that name.²⁸

As was true of leased agricultural land, the benefits of management activities outweighed the costs. Woodland was much cheaper to maintain than any other type of cover. Unmanaged forests would have grown too thick, tangled, and fire-prone to be useful for military training.²⁹ Although military use of woodlands held priority over all other uses, most forest management activities would still have been necessary in the absence of military use. Fires, tree-attacking insects and diseases, and soil erosion required control regardless of the land's use.³⁰

The major costs associated with Army forest management included planning, purchase of seedlings and preparation of land for reforestation, purchase of equipment and supplies, construction and maintenance of roads and trails, timber marking, and fire prevention and control.³¹ Among the benefits were opening access to wooded areas for troop training, firefighting, timber harvesting, and base security patrolling; providing cover for training; fire prevention; insect control; watershed protection; habitat improvement; economic activity for timber-related industries; and beautification.³²

The Army woodland management program also included the development of scenic corridors along highways and around cantonments, shorelines, and public recreation areas. Pines planted along roads provided both snow fences and winter cover for wildlife.³³

Timber Sales Proceeds Won

The year 1961 saw the resolution of an important conflict affecting the Army forestry program. Funds for forestry operations had come from regular grounds maintenance budgets. Revenues derived from timber

harvesting were exceeding costs. The question arose, "Why not carry all forest management costs from proceeds?"³⁴ The question became more urgent in the late 1950s, when all types of military funding declined.

In 1959, the commanders at Forts Benning and Stewart, two of the Army's most productive timber harvesting installations, forced the issue by withholding forestry funds. The commanders publicized the consequences of this act, informing both the Army and the private sector that timber harvesting on their bases would cease.³⁵ Their superior officer, General Clark L. Ruffner, went to the Secretary of the Army to propose special legislation to authorize using timber harvesting revenues to cover costs. Ruffner's intercession failed.

Meanwhile, commercial loggers who depended upon supplies from Forts Benning and Stewart suffered. They complained to their congressmen, the most important of whom was Senator Richard Russell of Georgia, the powerful chairman of the Armed Forces Committee. Russell "worked out a revolving fund so that part of the money from sale of timber from military land went back into management of the forests."³⁶ Russell's plan became Section 511, Public Law 601, 86th Congress, in 1961. It stated that "appropriations of the Department of Defense available for operation and maintenance may be reimbursed during the current fiscal year . . . for all expenses of production of lumber or timber products . . . from amounts received as proceeds from the sale" of the timber.³⁷

Hailed by the timber industry as "one of the most important steps ever taken for conservation in this country," the law had dramatic impact upon Army forestry practices.³⁸ Much of the progress made in forest management and timber production dates from the

resolution of the funding uncertainty that existed prior to 1961. In comparison to the seven years preceding the change, the next seven years saw the number of woodland acres on Army installations increase slightly from 1.1 to 1.5 million. Yet concurrently, the gross income derived from these lands soared from 10.5 million to 26.7 million.³⁹ From the time of the passage of Public Law 86-601, forestry operations on military installations required no appropriated funds during the 1960s.⁴⁰

Of a total of 70 Army installations with active forest management programs, 12 operated at a profit in 1964, 18 were profitable by 1965, and 50 were expected to turn a profit by 1975. However, the Army forestry program as a whole made a profit throughout the 1960s.⁴¹

As a result, the scope of Army forest management expanded greatly. In fiscal year 1967 Army installations planted a total of 9,742 acres of trees, completed 20,672 acres of stand improvement, built 1,108 miles of fire lanes and access roads, maintained another 6,753 miles of road, harvested trees from 129,000 acres, and conducted controlled burns on 197,000 acres. In addition, 89 million board feet and 205,000 cords of wood were sold.⁴² Eighty percent of the woodlands managed by the Army at this time had been acquired as open or sparsely wooded land during World War II.⁴³

Organization, Planning, and Staffing

By its nature forest management responsibility tended to be decentralized. The basic responsibility resided at the installation level because of the unique soil and climate conditions at each location.⁴⁴ Foresters at the installations usually worked from the

post engineer's office. Each army headquarters within the Continental Army Command (CONARC) and the Army Materiel Command also employed a forester.⁴⁵ The role of the chief forester at the Buildings and Grounds Branch remained that of providing technical assistance and reviewing management plans for the installations.

The Army first required woodland management plans for installations in 1954.⁴⁶ By 1962, most installations with 100 acres or more of forest lands had put a plan into effect, although a few bases had not yet activated their plans or made the required revisions as of late 1963.⁴⁷ By late 1964, 65 installations had put their woodland management plans into effect. These plans were considerably more sophisticated than the plans of the mid-1950s.⁴⁸

Each Army installation submitted woodland management plans, which were essentially a series of annual work plans, to the appropriate army headquarters. The headquarters, in turn, provided copies of these plans and their revisions to CONARC and Buildings and Grounds.⁴⁹ The plans had to be revised at approximately five-year intervals, although some required annual revision.⁵⁰

Throughout the 1960s, inadequate staffing continued to be a widely recognized problem. A 1964 U.S. Forest Service study of woodland management requested by the Second Army commander concluded that the current staffing level was "wholly inadequate."⁵¹ In 1965, Buildings and Grounds studied Army-wide forestry staffing in response to complaints about its adequacy. The study identified staffing as a primary obstacle to the forestry program reaching its full potential. Less than 60 percent of the needed professional forestry manpower had been hired. In 1968, Buildings and Grounds again stated that forestry staffing remained "at an austere level."⁵²

Army foresters saw only limited value in the use of consultants or contractors to alleviate the shortage of professional forestry personnel. The B&G forester in 1963 asserted that experts borrowed from other agencies were effective only when working on very specific problems and that consultants had to work closely with Army foresters to be satisfactory.⁵³ The Third Army, which encompassed two-thirds of all managed Army woodlands and had the longest experience in Army woodland management, used contractors for tree planting, spraying, and timber inventories, but considered such tasks as firefighting, fire lane construction, and timber marking to be unsuitable for contracting.⁵⁴

However, funds were frequently available for staff training even when personnel funding was scarce. The command level provided the training. For example, the Sixth Army agronomist conducted training sessions for installation land management personnel, and the Army Ordnance Corps agronomist also offered natural resources management workshops in cooperation with several universities.⁵⁵

Fire Prevention and Control

The prevention and control of fires caused by training exercises remained a persistent concern of forest management. Forest management programs spent 50 to 60 percent of their budgets on fire protection.⁵⁶ The Third Army, which had woodlands over 80 percent of its area, reported an average of 900 fires a year by the mid-1960s.⁵⁷

Weed and brush removal was an important fire prevention activity. Technicians employed controlled burning or herbicides to clear brush from woodlands. Buildings and Grounds' former chief agronomist recalls

that the Army used herbicides liberally through the mid-1960s.⁵⁸ The Third Army forester during that period reports that although chemicals did not play a big role, herbicides were sometimes a necessary alternative when conditions were too dangerous for prescribed burning.⁵⁹

Timber Production, Harvesting, and Sale

The Third Army conducted a profitable forest management program, yielding a 3 to 1 profit/cost ratio.⁶⁰ Buildings and Grounds disseminated information on their experience and methods to the other armies. Third Army expertise in both controlled burning and reforestation benefited other Army programs. By planting reforested areas with sufficient space between the rows of trees, troops and vehicles could maneuver during training. The open strips between the rows could occasionally be leased for agriculture, thus accomplishing weed control while making money.⁶¹

The harvesting and sale of timber, although secondary to the use of woodlands for military training, paid for all other forest management activities. Army regulations authorized timber harvesting for three reasons: to create training areas, to ensure maximum sustained productivity, and to maintain the health of woodlands by removing sources of disease or insect infestation.⁶²

An installation would make a declaration of availability and send it to the B&G forester for review. If he approved it, the Department of Defense and other departments reviewed their need for the timber. Only if they did not require the timber would it be made available for disposal to the public sector. District Engineers awarded and administered timber

sales contracts under the supervision of the Real Estate Division.⁶³

The monies earned by installations' timber harvests periodically caused problems at the installation level. Post engineers and installation commanders occasionally coveted these revenues to finance nonforest projects. The Third Army forester recalled some examples, including an attempted diversion of funds to build access roads to fishing lakes at Fort Gordon. Other bases sometimes tried to use forestry funds to build roads needed for troop training. The lesson learned from the experience was that it was "important to ride herd" on forestry monies to ensure they were correctly spent.⁶⁴

Two different studies also found fault with the administration of timber harvesting and sales. The U.S. Forest Service believed that the Real Estate Division, which administered sales, was too far removed from the activity. They suggested that Real Estate establish a close liaison with post foresters because the foresters would be better able to develop local timber markets.⁶⁵ A 1966 DOD audit found that installations were not effectively controlling and monitoring the amount of timber removed during harvests. A lack of security measures during cutting facilitated the theft of timber from the installations.⁶⁶

Foresters recognized the link between sound forestry practices and the growth of wildlife populations. The diverse cover created by forest management activities was known to be attractive to a wide variety of birds and animals. According to Eugene Oren, the B&G forester during most of the 1960s, "It is not by accident that the best hunting occurs on the installations with the most active timber harvest programs."⁶⁷

Wildlife Management

The 1960s saw continuing public pressure on the Army to open its lands to public recreation, especially hunting and fishing. Public interest in wildlife conservation also gained momentum during the decade. In response to public demand, the passage of the Sikes Act (Public Law 86-797) in September 1960 provided the legal basis for wildlife conservation and public access to recreation on military land. The Sikes Act, along with its subsequent amendments, has remained a major influence on Army natural resources management policy until the present day.⁶⁸

The act intended "to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations."⁶⁹ It authorized public recreational access to military land and the collection of fees for this privilege. It also authorized the formation of cooperative plans among the Department of Defense, the Department of the Interior Fish and Wildlife Service, and state fish and wildlife agencies. The cooperative plans, in turn, specified how to develop and manage fish and wildlife resources on military installations. The cooperative plan required an installation to provide a general inventory of fish and wildlife resources. The plan also established a research and development program and described the extent of public participation in the harvest of fish and game.⁷⁰

The 1962 Army Regulation 210-221, "Natural Resources--Management and Harvesting of Fish and Wildlife," reflected contemporary concerns in its statement of policies and procedures. The regulation decreed that all Army personnel "must support national

conservation policies and programs." Henceforth, an important function of command management should be an "intelligent and sympathetic understanding of natural resources and recreation problems."⁷¹

In accordance with the provisions of the Sikes Act, Army Regulation 210-221 required installations to provide as much public recreational access as possible without impairing the military mission. Any limitations or denials of such access had to be justified in writing. In addition, the 1962 regulation stated that, where possible, outleased land on military installations was to be made available for public recreation. The regulation further required annual reports to the Office of the Chief of Engineers on the extent of public access provided at each installation.

The planning tool to accomplish the regulation's intent was the cooperative plan. The Departments of Defense and the Interior had developed a model cooperative plan for use by installations. Those with suitable wildlife areas used the model to develop their own plans. Finally, installation commanders were to appoint conservation committees to coordinate conservation efforts. The suggested composition of these committees included land management and engineer personnel.⁷²

The 1960 passage of the Sikes Act led to the widespread opening of military areas to public recreation by 1962.⁷³ Although outdoor recreation included camping, picnicking, boating, swimming, and a host of other outdoor activities, hunting and fishing were in the greatest demand by both the public and military personnel. Military personnel and their families received the first priority on recreational use of military land.⁷⁴ Public access could also be restricted by the lack of funds and personnel needed to police an installation and ensure public safety. Some

bases required elaborate military security precautions.⁷⁵

The fees collected for hunting and fishing licenses supported installation wildlife management activities. These fees were frequently insufficient, so the 1968 amendment to the Sikes Act authorized the use of appropriated funds commencing in fiscal year 1969. However, installation commanders were reluctant to use appropriated funds for wildlife management because they had higher operational priorities. As a result, Buildings and Grounds proposed increasing license fees to provide a steadier source of funding.⁷⁶

In the opinion of one critic, who had served as conservation and wildlife management officer at Fort Riley, Kansas, from 1960 to 1962, "Of the three military services, the Army has placed the least command emphasis on wildlife management programs."⁷⁷ Although some good programs existed (including those at Camp A.P. Hill, Virginia, and Fort Gordon, Georgia) and a 1962 Army regulation prescribed general policies and procedures for wildlife management, "coordinated, centralized direction from the Department of the Army . . . did not follow, and successful implementation of this regulation will no doubt be hindered."⁷⁸ Lack of regulatory emphasis on staffing and lack of sufficient funding were additional hindrances to the development of good wildlife management programs.⁷⁹

In addition to requiring annual management plans and consultation with state and federal fish and game experts, Army regulations specified which wildlife management techniques should be used. The 1966 version of Army Regulation 420-74 identified habitat improvement as the primary means of wildlife management. Stocking of fish and wildlife or introduction of nonnative species was to be avoided with few exceptions, as was the wholesale destruction of

predator species. The regulation also called for preservation of wetlands and endangered species, although public law did not address endangered species until 1973.⁸⁰

Wildlife population control, planting feed crops, and opening clearings for wildlife became land management responsibilities of the post engineers. They employed such forest management practices as controlled burns and firebreak construction to provide additional food and habitat for wildlife. They also had to protect wildlife from fires, poachers, and predators.⁸¹ During the 1960s, forest management personnel often doubled as wildlife managers or game wardens. Only rarely did bases place sufficient priority on wildlife to justify employing full-time civilian wildlife managers.⁸²

State wildlife agencies provided installations with plants, animals, and advice, while the installations, in turn, furnished excess animals for the states to stock in other areas.⁸³ Excessive deer populations were an ongoing problem on many bases, especially those that could not allow public hunting for security reasons. Collisions between deer and vehicles occurred frequently.⁸⁴

In fiscal year 1966, 100 major Army installations in the United States had programs for developing recreational resources. Of these, 51 granted liberal public use, 28 restricted public access because large resident military populations used all available resources to capacity, and 21 restricted all recreational use because of conflict with military use.⁸⁵ By 1969, 110 installations operated fish and wildlife management programs.⁸⁶

The passage of the National Environmental Policy Act in 1969 marked the beginning of a new era of environmental consciousness. The act established

federal agency goals for enhancing and preserving natural resources, created the Council on Environmental Quality, and introduced the environmental impact statement process.⁸⁷ The act's provisions and the increased public awareness of environmental issues influenced all future Army natural resources management. In fact, some of the basic policies mandated by the act had already taken effect in the Army prior to its passage.⁸⁸

Pest Control

The Buildings and Grounds Branch's Insect and Rodent Control Services became the Engineer Entomology Services in 1961 in response to advice from the Armed Forces Pest Control Board.⁸⁹ Army Regulation 420-76 formalized the change and described the duties of the Engineer Entomology Services. They were "the supervision, execution, and evaluation of pest control operations."⁹⁰ This involved conducting inspections both to determine the need for control measures and to assess the effectiveness of applied control measures. The new regulation charged the entomology services with establishing procedures in connection with 11 activities: controlling termites, wood borers, and wood rots; ratproofing and screening structures; disinfesting stored supplies, generally by fumigation; using wood preservatives; applying pesticides as soil poisons; draining, ditching, and clearing and controlling vegetation to prevent mosquito and fly breeding; controlling lawn pests; controlling rodents and predatory animals; participating in the pest control phases of woodland and wildlife management programs; supervising aerial spraying; and applying pesticides.

The 1960s saw the continued development of

numerous and diverse new pesticides. The Engineer Entomology Services struggled to keep abreast of these advances. B&G entomologists responded to what they perceived as an urgent need for guidance on the use of improved but more dangerous pesticides. The result was Army Circular 420-3 issued in 1964. It noted that new pesticides and dispersal equipment "provide for selection from a wider range of items for spraying, dusting, application of fumigants, and use of poison baits. This has necessitated the development of improved methods and techniques for use by pest controllers at installations."⁹¹ More powerful poisons meant increased risk. Accordingly, the circular stressed the need for greater vigilance and noted that "the improper or careless use of these pesticides and equipment by untrained personnel may result in contamination of areas treated and the introduction of health hazards."⁹²

Throughout the decade, the basic mission of pest control remained "combatting disease, maintaining morale and efficiency, and preventing property losses." As knowledge and technology expanded, Army pest control expanded its scope to include protection of stored food, forested areas, shade trees, and grassed areas from loss or damage. At this time the Army could boast that preventive measures had reduced the incidence of pest-borne diseases to the "lowest point in military history."⁹³

In fiscal year 1967, the unit cost of pest control was \$5.43 per 1,000 square feet of building area. This represented a savings of 84 cents over the 1943 cost, attributable to improved supplies, methods, and training. At this time, the Army employed 15 engineer entomologists nationwide.⁹⁴ Also by the late 1960s, the Army engineer entomology program conducted pest control in 924,127,000 square feet of building area and

11,335,906 acres, excluding Southeast Asia, an area the size of Massachusetts and New Hampshire combined.⁹⁵

A new concern in the late 1960s involved preventive treatment of cargoes returning from Southeast Asia, which posed the threat of introduced infestations. The U.S. Department of Agriculture advised the Army on treatment of the receiving areas that had high potential for infestation.⁹⁶ Other new concerns involved controlling pests in stored food and responding to the growing public and official interest in the Army's use of pesticides.

The available technology for control of insects in food storage depots and in transit stood on the threshold of a major expansion in 1969. Until then, the only insecticide considered safe for fogging was a pyrethrum solution, but it lacked effectiveness. However, the U.S. Department of Agriculture had just introduced "a safe insecticide, dichlorovos, that will provide excellent control." Training in its use would be required before it could be adopted by the Army. Also at this time, fumigation of infested stored food employed methyl bromide in vacuum fumigation chambers. The food had to be hauled to the chambers for treatment, and if an item required more than one application, the residual bromide would exceed Food and Drug Administration standards. The Department of Agriculture then began recommending phostoxin, which could be used right in the warehouse and was cheaper and safer than the bromide. The use of phostoxin had to be delayed several months as well, until "proper instructions can be written and pest control operators and depot storage personnel trained."⁹⁷

The Armed Forces Pest Control Board, formed in 1957 to provide DOD-wide cooperation and coordination, continued to operate through the 1960s. In addition, the Federal Committee on Pest Control mandated

cooperation with outside agencies during this period. This committee performed annual reviews of all federal programs using pesticides. Proposed programs had to specify in detail the pest to be controlled, pesticide to be used, rate of application, strength of finished spray, total acres or square feet to be treated, method of application, storage, and safety precautions.⁹⁸ However, many GIs who worked in pest control resented this outside supervision because they had grown up on farms and used pesticides all their lives.⁹⁹

The introduction of new and better insecticides would be an ongoing concern for Corps of Engineers entomologists as they attempted to keep up with the resulting training needs. Simultaneously, a major new consideration entered the picture. Public awareness about and concern for the environment were increasing: "The current public and official increased interest in pesticides is resulting in congressional and other government agencies inquiry into Army use of pesticides."¹⁰⁰ Henceforth, pest management decisions had to take public concerns into account.

Notes

1. Telephone interview, author with Edward O. Gangstad, Springfield, VA, 27 March 1988. Hereafter cited as Gangstad interview.
2. Bourkland to Maintenance Management Branch, "Revision of AR 420-74," 1 Mar. 1961, Box 1, RG77, Accession No. 67-4785, WNRC.
3. Kiltz interview.
4. Department of the Army, Repairs and Utilities: Natural Resources--Land, Forest, and Wildlife Management, Army Regulation 420-74 (Washington, DC: Government Printing Office, June 1966), p. 4.
5. Ibid., p. 15.
6. Miller, "Army Natural Beauty Program," 11 Feb. 1966, File 3, Bandel collection.
7. R.A. Schrack, "Land Use Policy, Planning, and Management for DOD Installations," no date, File 3, Bandel collection.
8. Gangstad interview.
9. Bedker, "National Security Management: Renewable Natural Resources," File 3, Bandel collection.
10. Department of the Army, Repairs and Utilities: Grounds, Army Regulation 420-74 (Washington, DC: November 1961), p. 1., Box 1, RG77, Accession No. 67-4785, WNRC.
11. B.F. Kiltz to authors, 23 Mar. 1988.
12. Gangstad interview.
13. Kiltz interview.
14. Becton interview.
15. Kiltz interview.
16. Mays interview.

17. "Land Management Program," no date, File 3, Bandel collection.
18. Army Regulation 420-74, Nov. 1961, p. 3; Mar. 1964, p. 4; June 1966, p. 15.
19. W.G. Ralph, "Benefits and Savings Possible from Agricultural Leasing Program," 1960, prepared for presentation at American Society of Agronomy meeting, Box 1, RG77, Accession No. 67-4785, WNRC.
20. AMC Staff Study, "Reimbursement to O&M, Army Funds and Operating Cost and Agricultural Outleasing," 4 Mar. 1964, Mays papers.
21. Ralph, "Benefits and Savings Possible from Agricultural Leasing Program."
22. Ibid.
23. Ibid.
24. "Land Management Program," no date, File 3, Bandel collection.
25. Army Regulation 420-74, June 1966, p. 15.
26. Department of the Army, Installations: General Woodland Management, TM5-631 (Washington, DC: Government Printing Office, April 1963), p. 4.
27. "CONARC Forest Management Program," no date, File 3, Bandel collection.
28. Becton interview.
29. "CONARC Forest Management Program."
30. Department of Agriculture, Forest Service, "Effective Multiple Use Forest Management for Second U.S. Army Woodlands" (Washington, DC: Government Printing Office, 1964), Bandel collection.
31. Department of Defense, "Report on DOD-wide Audit of Reimbursable Expenses Incurred in the Preparation for Sale of Scrap, Salvage, Surplus or Foreign Excess Personal Property," Dec. 1966, Bandel collection.
32. "CONARC Forest Management Program."
33. Miller, "Army Natural Beauty Program."
34. Becton, "Military Forestry History," p. 9.

35. Ibid., p. 10.
36. Orr Kelly, "Trees: An Army Success Story," The Evening Star, Washington, DC, 6 May 1969, sec. A, p. 4.
37. Kiltz, "Progress of the Woodland Management Program," p. 3.
38. Kelly, "Trees: An Army Success Story," The Evening Star, 6 May 1969, sec. A, p. 4.
39. Ibid.
40. Wendell Becton, "The Third Army's Forestry Program," Forest Farmer (April 1972): 29-30.
41. E.A. Oren, "Department of the Army Forestry Program," presented to the DOD Real Property Maintenance Conference, 19 Jan. 1966, File 3, Bandel collection.
42. "Land Management Program," no date, File 3, Bandel collection.
43. "Resume--DA Forest Management Program," no date, File 3, Bandel collection.
44. Y.H. Choi, "DOD Management of Natural Resources: Last Frontier," no date, File 3, Bandel collection.
45. Department of Defense, "Report on DOD-wide Audit . . . ," 1966, p. 79, Bandel collection.
46. Kiltz, "Progress of the Woodland Management Program," Nov. 1964, Becton papers.
47. 1) "Resume--DA Forest Management Program," no date, File 3, Bandel collection. 2) E.A. Oren, "Management of Wildlife and Related Natural Resources," Oct. 1963, File 3, Bandel collection.
48. Kiltz, "Progress of the Woodland Management Program," Nov. 1964, Becton papers.
49. 1) E.A. Oren, "Department of the Army Forestry Program," 19 Jan. 1966, File 3, Bandel collection. 2) W.R. Becton, "Woodland Production Program," no date, Item 1, Becton papers.
50. Oren, "Management of Wildlife and Related Natural Resources."
51. U.S. Forest Service, "Effective Multiple Use Forest Management. . . ."

52. "Resume--DA Forest Management Program," no date, File 3, Bandel collection.
53. Oren, "Management of Wildlife and Related Natural Resources."
54. 1) "Resume--DA Forest Management Program," no date, File 3, Bandel collection. 2) Becton, "Woodland Production Program," no date, Item 1, Becton papers.
55. Vance W. Mays to authors, 15 Feb. 1988, Mays papers.
56. Oren, "Department of the Army Forestry Program" and "Management of Wildlife and Related Natural Resources."
57. W.R. Becton, "Woodland Production Program," no date, Item 2, Becton papers.
58. Kiltz interview.
59. Becton interview.
60. Becton, "Woodland Production Program," no date, Item 2, Becton papers.
61. Becton, "The Third Army's Forestry Program."
62. Army Regulation 420-74, Nov. 1961 and Mar. 1964.
63. 1) Department of Defense, "Report on DOD-wide Audit . . .," 1966, Bandel collection. 2) U.S. Forest Service, "Effective Multiple Use Forest Management. . . ."
64. Becton interview.
65. U.S. Forest Service, "Effective Multiple Use Forest Management. . . ."
66. Department of Defense, "Report on DOD-wide Audit . . .," 1966, p. 80, Bandel collection.
67. E.A. Oren, "Army Conservation Pays Off," Army Digest (January 1970): 31-33, File 3, Bandel collection.
68. Bandel interview.
69. Public Law 86-797, 86th Congress, in H.R. 2565, 15 September 1960.

70. U.S. Department of the Interior, Fish & Wildlife Service, Circular letter on "Implementation of Public Law 86-797--The Sikes Act," Exhibit 4, 9 Jan. 1961, Mays papers.
71. Department of the Army, Installations: Natural Resources--Management and Harvesting of Fish and Wildlife, Army Regulation 210-221 (Washington, DC: 24 July 1962), Box 1, RG77, Accession No. 67-4785, WNRC.
72. Ibid.
73. J.E. Brown, "Warriors and Wildlife: The Odd Couple," National Wildlife 12, No. 2 (February/March 1974): 25, File 3, Bandel collection.
74. Oren, "Army Conservation Pays Off."
75. A.T. Port, Memo re: "Intermittent and Part Time Use of Military Properties for Outdoor Recreation and Natural Beauty Purposes," 23 Mar. 1967, File 4, Bandel collection.
76. 1) Bedker, "National Security Management: Renewable Natural Resources," 1979. 2) "Department of the Army Land Management Program," no date. Both in File 3, Bandel collection.
77. Joselyn, "Wildlife Management on Military Installations," p. 217.
78. 1) Army Regulation 210-221, July 1962. 2) Joselyn, "Wildlife Management on Military Installations," p. 217.
79. Joselyn, "Wildlife Management on Military Installations," pp. 221-222.
80. Army Regulation 420-74, June 1966, pp. 13, 24.
81. Oren, "Management of Wildlife and Related Natural Resources."
82. E.E. Lowry, Briefing for Mr. Fitt on Hunting and Fishing, no date, File 4, Bandel collection.
83. Ibid.
84. Gangstad interview.
85. Port, "Intermittent and Part Time Use of Military Properties. . . ."
86. Oren, "Army Conservation Pays Off."

87. Schrack, "Land Use Policy, Planning, and Management. . . ."
88. Gangstad interview.
89. "Revision of AR 420-76, Repairs and Utilities, 'Engineer Entomology Services,'" 17 Apr. 1961, OCE Maintenance Management Branch, Policy Section, Box 1, RG77, Accession No. 66A-3180, WNRC.
90. Department of the Army, Repairs and Utilities: Engineer Entomology Services, Army Regulation 420-76 (Washington, DC: May 1961), Box 1, RG77, Accession No. 66A-3180, WNRC.
91. Department of the Army, Repairs and Utilities: Entomology Services, Circular 420-3 (Washington, DC: August 1964), p. 1, Publication Background File, Box 1, RG77, Accession No. 68-1920, WNRC.
92. Ibid.
93. Department of Defense, Military Entomology Operational Handbook, TM5-632 (Washington, DC: Government Printing Office, June 1965).
94. Handwritten draft, "Current Status of Entomology Services," no date, File 3, Bandel collection.
95. Handwritten draft, "The Army Engineer Entomology Program," no date, File 3, Bandel collection.
96. "Continuity of the Entomology Program," no date, File 3, Bandel collection.
97. Ibid.
98. Ibid.
99. Gangstad interview.
100. "Continuity of the Entomology Program," no date, File 3, Bandel collection.

CHAPTER 3

Responding to the Public Mandate for Environmental Protection, 1970-1987

The View From Washington

The 1970s and 1980s saw changes in natural resources staffing levels, the focus of B&G management tasks, and the recognition given to natural resources concerns by the Department of Defense.

Between 1975 and 1987, the commands lost natural resources personnel and the installations gained them. The B&G staff described 1987 command staffing levels as "bare bones," but believed that installation staffing was more important to getting the actual work done. However, the loss of command personnel adversely affected natural resources programs in several ways. There were fewer people available to make supervisory visits, and installation personnel lacked the necessary command authority to win the installation commander's compliance.¹

The loss of command-level personnel spaces for natural resources management was part of an ongoing Army-wide and DOD-wide situation that intensified in 1980. The Reagan administration, in the interest of cutting government spending, promoted contracting as an alternative to staffing. Thus, when a vacancy occurred, it would be reevaluated and might be eliminated or left vacant as a result. The same drive to involve the private sector in government work gave installation commanders more autonomy in allocating resources. They did not always choose as natural

resources managers would have liked.²

The lack of time and money for supervisory visits to installations remained a problem. Command-level personnel believed that B&G personnel should make more field visits, while Buildings and Grounds wanted command personnel to make the visits.³ The conflict is well illustrated by the comments of a former B&G forester. He reported that time and money limitations precluded his making as many visits as he believed necessary and that the visits he did make were extremely rushed.⁴

Gradually, as installation programs became better established, Buildings and Grounds spent less time assisting installation and command personnel and more time providing information to the Secretary of the Army. Interaction with the secretariat, rare in 1975, was routine by 1987.⁵ Also by 1987, Buildings and Grounds staff spent increasing time responding to congressional inquiries, requests for public access to Army land by special interest groups, and letters from the public about wildlife issues.⁶

Another responsibility that captured an increasing portion of B&G staff time was research and development. In the late 1970s, Buildings and Grounds Branch realized that military land management presented unique problems that Department of Agriculture consultants could not adequately address. Therefore, the branch began to initiate, monitor, and disseminate research and development projects in natural resources management. An example is the Integrated Training Area Management system, a computer-supported program for controlling and evaluating the impact of training activities on the land. An Army engineer research laboratory developed the system in 1987. At that time, the chief agronomist spent close to 25 percent of his effort on such research and development-related tasks

as introducing new developments to the installations through reports and conferences.⁷ The installations also conducted research and development projects in cooperation with other organizations.⁸ An example is the Fort Meade project that fostered parasites of the cereal borer for use in other parts of Maryland.

The early 1980s saw greater DOD recognition of natural resources management and more communication and coordination among the armed services. The Department of Defense began to mount an official response to the environmental movement. In 1982, a DOD-level natural resources position was created. In this new position, Christina Ramsey activated the Department of Defense Natural Resources Group to coordinate among the services. DOD-wide natural resources management improved as a result.

Despite the increased DOD-wide recognition and coordination, natural resources management remained secondary to the military mission. To a great extent, the amount of work accomplished still depended on the backing of individual installation commanders, who were not uniformly receptive to the natural resources program.⁹ However, installation personnel observed increasing receptivity among the commanders.¹⁰ Given the inconsistency of commander support, the relative self-sufficiency provided by the reimbursement of timber sales, agricultural leasing, and hunting fee proceeds was doubly important to the natural resources program.¹¹

Land Management

Multiple use land management remained the primary concept of DOD natural resources policy throughout the 1970s and 1980s. Its new definition in the 1977 version of Army Regulation 420-74 reflected the

changing values of the era: "The integrated management of all natural resources, each with the other, to achieve the optimum use and enjoyment while maintaining the environmental qualities, ecological relationships and esthetic values in proper balance."¹²

In the past, Army land supported the multiple uses of military training, natural resources conservation, timber and crop production, and outdoor recreation. Multiple use land management responsibilities expanded, along with public awareness, to include floodplain management and protection of beaches, wetlands, and endangered species. The establishment of wetlands was important not only for habitat development, but for water conservation and watershed management as well.¹³

During the 1970s and 1980s, the total area managed by the Army fluctuated between 11 and 12 million acres. Approximately 1.5 million acres comprised forests, while improved grounds acreage hovered around 300,000.¹⁴ The number of natural resources professionals employed Army-wide expanded from 38 agronomists, 51 foresters, and 10 wildlife biologists in 1976 to 53 agronomists, 52 foresters, and 23 wildlife biologists in 1983.¹⁵ However, this expansion had not kept pace with the need perceived by Buildings and Grounds.

Soil Erosion and Conservation

While soil conservation had long been recognized as basic to all other natural resources conservation, it was not until 1977 that the growing body of knowledge about soil found expression in Army regulations requiring land use planning to be based on assessment of soil capabilities and limitations.¹⁶ Although both soil capacity and the public mandate to conserve natural resources imposed limits on the

military use of land, Buildings and Grounds sought to inform installations that natural resources management could also make training areas more durable and diversified.¹⁷ Diversified environments were useful because they allowed units to train on different kinds of terrain.

The need for military training land grew more acute because modern weapons systems required as much as ten times the land area as systems of the 1940s. Heavier vehicles and longer-range weapons added to the damage that mechanized infantry could do to soil and vegetation.¹⁸ Reestablishment of vegetation after training exercises was an ongoing major task of installation land managers.¹⁹ Training sites had to be rotated to prevent the soil from losing its ability to support any vegetation.²⁰

In the past, Army trainers regarded land for tracked vehicle training ranges as an infinite resource. Over time, they began to feel the pinch as the amount of available land declined. Soil erosion and compaction, externally imposed ecological restrictions, granting of easements, and cession of land to other agencies were among the causes of training area losses. In 1983, the Director of Training, Office of the Deputy Chief of Staff for Operations and Plans, explained, "Loss of training lands through poor management is endemic."²¹ In addition to erosion, excess growth of underbrush caused loss of training areas. Only one base had a program to clear overgrown training land in 1983.²²

To address this problem, Buildings and Grounds sponsored several research and development efforts by the Construction Engineering Research Laboratory. They resulted in the development of three computer-based land management programs during 1987. The Geographic Resources Analysis Support System (GRASS) and the Land

Condition-Trend Analysis programs provided automated support for land use decisions. GRASS displayed data and maps of terrain features and analyzed suitability for proposed uses. The Land Condition-Trend Analysis system assessed data on changes in land condition that result from multiple uses. The Integrated Training Area Management (ITAM) program combined computer analysis of land condition with soil stabilization and revegetation techniques, coordination among trainers and land managers, and an environmental conservation awareness program for base personnel. In 1987, the systems were being demonstrated at selected Army installations.²³

Grounds Maintenance

The attractive appearance of Army bases remained a primary concern of improved grounds maintenance. However, partially in the interest of economy, the elaborate landscape plantings of the 1960s gave way to a more natural look. Despite the introduction of occupant self-help programs for grounds maintenance around dwellings, grounds maintenance remained the most expensive component of land management costs.²⁴ Improved grounds comprised 3 percent of total Army land area and 75 percent of the maintenance budget. In an attempt to cut these costs, installations put their efforts into converting improved grounds to semi-improved or unimproved grounds that require less work to maintain. The emphasis changed to natural landscaping and economical, low-maintenance plantings.²⁵

As concern about the appearance of military lands increased, grounds maintenance requirements extended to sodding or landscaping of spoil banks, borrow pits, and quarry areas. Construction projects not only had to include landscaping in the contract, but also had to

analyze and preserve natural features of the site. Projects had to provide safeguards against environmental damage, such as erosion, that might be caused by construction activities.²⁶

Agricultural Leasing

During the late 1970s and early 1980s, agricultural leasing involved approximately 850,000 acres on 60 Army installations. Leasing for crop production occurred on some 160,000 of the acres, and the balance featured grazing.²⁷ Leases required adherence to the proper agricultural practices for erosion control and enhancement of soil fertility and productivity.²⁸ By this time, installations recognized the value, above and beyond cash rental, of maintenance work performed by lessees. Other benefits included improved public relations with local farmers and enhancement of habitats and food sources for wildlife.²⁹

Agricultural leasing continued to be promoted Army-wide as an inexpensive means of managing natural resources. A supplement to Army Regulation 420-74 also cited the worldwide need for food and fiber production as a rationale for encouraging agricultural leasing.³⁰

A surge in both the demand for and the rents offered by agricultural leases in the late 1970s caused Buildings and Grounds to investigate the possibility of requiring a wider range of maintenance and conservation tasks as part of its leases.³¹ In 1983, military installations finally won the authorization to use agricultural-leasing proceeds for improvement of agricultural land. A Navy-sponsored provision to this effect, quietly tacked onto the DOD appropriations act, passed through Congress in that year.³² This provision provided an even greater incentive for installations to offer land for lease.³³

Forest Management

In 1976, Buildings and Grounds recognized Army foresters' ecological achievements.³⁴ For example, in response to public law mandate, forest management objectives had expanded to include protection of the environment, endangered species, and historical sites. Also, cover for recreation supplemented the former objective of providing cover for training.³⁵

The Army forest management program could take credit for supporting the military mission, the economy, and environmental programs, as well as supplementing the Operation and Maintenance budget by paying for fire protection from timber sales proceeds. In fiscal year 1977, the Army harvested close to 75 million board feet of lumber and 84,000 cords of pulpwood. The improving quality of Army timber stands indicated that the annual harvest would probably continue to increase.³⁶

Partially as a result of the 1961 authorization to retain timber sales proceeds, managed Army woodland acreage grew from 1 million acres in 1955 to 1.5 million acres in 1973.³⁷ By 1982, the Army forest management program comprised 1.4 million acres on 61 installations employing a total of 52 professional foresters and 42 forestry technicians.³⁸

One episode in the constant DOD-wide competition for tight money and manpower was a 1975 challenge by the Deputy Secretary of Defense to forestry staffing levels. He called for Army forestry spaces to be reduced to levels comparable to those of the other armed services. Buildings and Grounds successfully argued that fire control would suffer because forestry personnel were on call 24 hours a day for fire control on all installation grounds except improved grounds.

Forestry programs on smaller Army installations and adjacent Air Force bases would also suffer from any manpower cuts, because they frequently borrowed personnel from larger Army installations.³⁹

Since its 1961 authorization to use timber sales proceeds, the Army-wide forestry program has only once required appropriated funds. That occurred in 1982 due to the expense of the newly created state entitlement program. The program developed from complaints by state and local officials that Army installations removed large blocks of land from local tax bases. To compensate for this revenue loss, the entitlement program required installations to share 25 percent of net profits from timber sales with the host states, who in turn passed the money on to the counties. The state share rose to 40 percent in 1984. The state entitlement program had the twofold effect of creating more paperwork for the B&G forester while enhancing the Army's popularity with the states and counties.⁴⁰ Due to the Army's greater experience in natural resources management, the B&G forester began serving as the executive agent for all DOD forestry programs in 1982. This job involved handling the budgetary paperwork and allocating extra Army funds to the other military services' forestry programs.⁴¹

Weather and climate, local timber demand, protection of endangered species, military training requirements, and metal contamination of trees all continued to place external limits on Army forest management activities.⁴² The damage done to forest vegetation by training exercises was a major concern of forest managers. However, as one installation forester pointed out, firing ranges did not have to be written off. They could still produce forest products through management practices that work around the training schedules.⁴³

As wildlife conservation grew more important in the public eye, foresters became better versed in wildlife management.⁴⁴ They were well aware of the ways in which forestry practices could improve wildlife feed and habitats. The Sikes Act amendment of 1986 recognized the link between forest and wildlife management. The amendment allowed timber sales proceeds that remain after all forestry expenses have been met to be placed in a special fund for use on other natural resources such as wildlife.⁴⁵

Wildlife Conservation and Outdoor Recreation

Only a few years after the National Environmental Policy Act (NEPA) took effect, Congress passed the Endangered Species Act of 1973. The act prohibited federal agencies from conducting any activity that would harm an endangered species. Under the act, the military had to inventory the species and habitats on their lands and protect endangered species and critical habitats.⁴⁶ Installations also had to protect species that resembled endangered species to forestall the potential for misidentification.⁴⁷

As in previous years, Army manuals and regulations strictly limited introduction or reintroduction of species. Pursuant to the National Environmental Policy Act, such activities also required an environmental impact assessment.⁴⁸ Wildlife management evolved to emphasize preservation as well as harvesting.

Army wildlife managers continued to rely on technical assistance from state and federal wildlife agencies. Installations without resident wildlife expertise particularly required assistance in identifying endangered species. Another concern requiring interagency cooperation was the potential for disturbing habitats just off of installation property

by such practices as overflights of critical nesting areas.⁴⁹ Communication among the natural resources disciplines, the federal agencies, and the levels of Army command regarding wildlife issues improved significantly. Both installations and major commands had been compelled by law and public opinion to be more receptive to the views of wildlife managers.⁵⁰

Although money and personnel remained scarce and the commitment of installation commanders to wildlife management remained inconsistent, the Army wildlife management program continued to grow. Overall, the program achieved greater use of Army land for both wildlife management and recreation without an adverse impact on the military mission.⁵¹

Public concern about endangered wildlife also continued to grow after the passage of the Endangered Species Act. By the early 1980s, wildlife had become a particularly emotional public issue. This had a major Army-wide impact resulting in a higher status for wildlife management programs and more wildlife personnel at the installations. Consequently, by 1987 wildlife specialists were as numerous as foresters.⁵²

Buildings and Grounds frequently received letters from the public on wildlife issues. For example, in 1987 letters from a group of school children asked that an endangered wolf species be introduced to an installation in the Southwest. Buildings and Grounds provided guidance about the potential impacts of fulfilling such requests to the Secretary of the Army. The Secretary had the authority to make the final decision on such issues and could overrule the installation commanders.⁵³ The 1982 version of Army Technical Manual 5-633, Fish and Wildlife Management, devoted an entire chapter to public relations and cited the avoidance of congressional inquiries as one of the justifications for maintaining good public relations.⁵⁴

As of 1987, wildlife experts recognized that military installations had become the final refuges of many endangered species. Had the military not held the land, much of it would have been developed and many habitats destroyed as a result.⁵⁵

In 1982, 115 endangered species were under protection at 33 installations in the continental United States, Hawaii, and Panama.⁵⁶ Wildlife programs existed on 95 installations, which managed a total of nine million acres for wildlife. About five million of these acres on 71 installations were open to the public or to guests of base employees. Another 9 installations allowed recreation for DOD personnel only. The entire Army employed a total of 23 wildlife professionals and 31 technicians.⁵⁷

The Sikes Act of 1960 and its amendments authorized cooperative interagency management of fish and wildlife on military land, collection of fees for recreational use, and the funding of public recreational facilities with fee collections and appropriated funds. Fees collected for hunting, fishing, and other outdoor recreation were used by installations for their wildlife management and outdoor recreation programs. However, during the early 1980s, the General Accounting Office, consulting wildlife experts, and Buildings and Grounds agreed that the fees charged by many installations were unrealistically low. Of 95 installations, only 39 charged any fees at all in 1984.⁵⁸ Buildings and Grounds had repeatedly recommended that installations charge higher hunting and fishing fees, as well as institute admission fees for other recreation, so that the wildlife and recreation programs could become more self-sufficient. Installation commanders had other priorities and thus were reluctant to use any of the authorized appropriated funds for wildlife and recreation. This

caused wildlife programs to remain dependent on fee collections.⁵⁹ In fiscal year 1979, however, Congress directed the military to expend the appropriated funds of \$1.5 million a year.⁶⁰

Access to recreation on Army land offered the advantages of improved public relations, heightened employee morale, and reduced pressure on adjacent nonmilitary recreation areas. Regulations evolved to require installations to develop outdoor recreation plans. Technical Manual 5-635 provided criteria for developing different types of recreational facilities. Concern about the growing popularity of off-road vehicles and the environmental damage they can cause led to a 1972 executive order, which permitted such vehicles on Army land only if strictly planned and controlled to prevent adverse impacts on the environment and on other recreation.⁶¹

Preservation of Historic Sites

The Army's first serious efforts to implement the National Historic Preservation Act of 1966 followed a 1971 executive order. Executive Order 11593 mandated the preservation, restoration, and maintenance of historic sites on federally owned land. In 1974, the Department of the Army directed the Buildings and Grounds Branch, Office of the Chief of Engineers, to implement the order.⁶² In 1977, the branch hired its first historic preservation expert, whose efforts led to wider recognition that construction projects, training activities, or even such natural resources activities as clearing land can destroy archaeological or historical sites.⁶³ In 1981 and 1982, Army technical manuals dealing with land management, outdoor recreation, and forest management all discussed the identification and protection of archaeological sites.

Pest Control

The continued trend of increasing public scrutiny and limitation of Army pesticide use in many cases has caused friction between the installations and adjacent landowners. Environmental Protection Agency regulations had frequently barred the military from using pesticides that were still permitted to private landowners. This led to a situation where landowners complained that pests thrived on Army land, reinfested private land, and thus harmed their crops.⁶⁴

Even before external limits governed pesticide use, Army foresters tended to avoid it. Whether controlling weeds or insects, foresters preferred such alternatives as burning for weed control or selective thinning for control of tree-attacking insects.⁶⁵

In 1970, the Army issued its first technical manual on herbicide use. Technical Manual 5-629, prepared by a B&G agronomist, stated, "With the present concern over the impact of pesticides on the environment, it is most important that herbicide selection and application be managed by professional personnel."⁶⁶ In 1971, Army Regulation 420-76 was the first edition of the regulation to reflect environmental concerns. The 1978 version was the first to require an environmental impact statement for aerial spraying.⁶⁷ The 1980 version of Army Regulation 420-76 introduced Integrated Pest Management, which utilized a combination of chemical and nonchemical pest control techniques in an attempt to reduce chemical pesticide use.⁶⁸

Notes

1. Bandel interview.
2. Ibid.
3. Becton interview.
4. Andrews interview.
5. Bandel interview.
6. 1) Andrews interview. 2) Bandel interview.
7. Bandel interview.
8. Department of Defense, "Proceedings of the Fourth DOD Real Property Maintenance Conference," Jan. 1974, pp. 67-74, Bandel collection.
9. Bandel interview.
10. Warren interview.
11. Mays interview.
12. Department of the Army, Facilities Engineering: Natural Resources--Land, Forest, and Wildlife Management, Army Regulation 420-74 (Washington, DC: Government Printing Office, 1977), p. 3.
13. Bedker, "National Security Management: Renewable Natural Resources," 1979, File 3, Bandel collection.
14. See various sources in File 3, Bandel collection.
15. 1) Department of the Army Annual Historical Summary FY1976, Corps of Engineers Historical Division, Washington, DC. 2) Bandel to Ramsey, "Update of Wildlife Management Programs," 24 Feb. 1983, File 3, Bandel collection.
16. Army Regulation 420-74, 1977.
17. "Making Natural Resources Work for You," no date, File 3, Bandel collection.

18. L.R. Jahn et al., "An Evaluation of U.S. Army Natural Resources Management Programs on Selected Military Installations and Civil Works Projects," Oct. 1984, Bandel collection.
19. Andrews interview.
20. "Making Natural Resources Work for You."
21. Brig. Gen. John M. Kirk, "Training Land Management," 10 Aug. 1983, in "Secretary of the Army Briefing on Natural Resources," Oct. 1983, Bandel collection.
22. Ibid.
23. 1) Bandel interview. 2) Fact Sheets, File 3, Bandel collection.
24. Bedker, "National Security Management. . . ."
25. Schrack, "Land Use Policy, Planning, and Management. . . ."
26. "Talking Paper--The Army Corps of Engineers' Role in Conservation," 13 Dec. 1971, File 3, Bandel collection.
27. 1) Bedker, "National Security Management. . . ."
2) "Secretary of the Army Briefing on Natural Resources," Oct. 1983, Bandel collection.
28. Bedker, "National Security Management. . . ."
29. "Making Natural Resources Work for You."
30. Department of the Army, Facilities Engineering: Natural Resources--Land, Forest and Wildlife Management, Pamphlet PAM 420-7 (Washington, DC: Government Printing Office, 1977).
31. "Department of the Army Land Management Program," no date, File 3, Bandel collection.
32. Bandel interview.
33. "Secretary of the Army Briefing on Natural Resources," Oct. 1983, Bandel collection.
34. "Information Furnished DA Supporting TRADOC Forestry Programs," no date, Becton papers.
35. Department of the Army, Natural Resources: Forest Management, TM5-631 (Washington, DC: Government Printing Office, 1981).

36. "Army Forest Management Program," no date, File 3, Bandel collection.
37. "FY73 Base Data--Land Utilization and Management," File 3, Bandel collection.
38. Bandel to Ramsey, 24 Feb. 1983, File 3, Bandel collection.
39. "Information Furnished DA Supporting TRADOC Forestry Programs," no date, Becton papers.
40. 1) Bandel interview. 2) "Making Natural Resources Work for You."
41. Bandel interview.
42. "Secretary of the Army Briefing on Natural Resources," Oct. 1983, Bandel collection.
43. "Woodland Management in the Small Arms Area, Fort Gordon, GA," no date, Becton papers.
44. Andrews interview.
45. Bandel interview.
46. Bedker, "National Security Management. . . ."
47. "Department of the Army Land Management Program," no date.
48. Ibid.
49. Department of Defense, "Proceedings of the Fourth DOD Real Property Maintenance Conference," 1974, Bandel collection.
50. Warren interview.
51. Mays interview.
52. Bandel interview.
53. Ibid.
54. Department of the Army, Natural Resources: Fish and Wildlife Management, TM5-633 (Washington, DC: Government Printing Office, 1982).
55. "Making Natural Resources Work for You."

56. Jahn, "An Evaluation of U.S. Army Natural Resources Management Programs. . . ."
57. Bandel to Ramsey, 24 Feb. 1983, File 3, Bandel collection.
58. Jahn, "An Evaluation of U.S. Army Natural Resources Management Programs. . . ."
59. "Department of the Army Land Management Program."
60. Bedker, "National Security Management. . . ."
61. Ibid.
62. "Development of Criteria and Guidance for Historic Preservation to Implement Executive Order 11593, 'Protection and Enhancement of the Cultural Environment,'" 28 Jan. 1974, File 3, Bandel collection.
63. Bandel interview.
64. Mays interview.
65. Becton interview.
66. Department of the Army, Herbicide Manual for Non-Cropland Weeds, TM5-629 (Washington, DC: Government Printing Office, 1970).
67. Department of the Army, Facilities Engineering: Pest Control Services, Army Regulation 420-76 (Washington, DC: Government Printing Office, 1971 and 1978).
68. Department of the Army, Facilities Engineering: Pest Management Program, Army Regulation 420-76 (Washington, DC: Government Printing Office, 1980).

CHAPTER 4

Natural Resources Management in Action

Fort Meade, Maryland--October 1987

William Harmeyer, a wildlife biologist, had served as natural resources specialist and chief of the Natural Resources Office at Fort Meade since 1975. He defined his mission as the sound stewardship of renewable natural resources. Fort Meade encompasses approximately 13,500 acres, of which more than 5,000 were managed forest and 11,000 were managed for wildlife.

The Natural Resources Office reported to the Environmental and Energy Control Office (ECO) at Fort Meade. This organizational structure reflected the nationwide trend of increasing environmental consciousness. Natural Resources managed forestry, timber sales, wildlife, and hunting programs. Also reporting to the Environmental and Energy Control Office was the fort's Buildings and Grounds Office, which was headed by an agronomist and dealt with landscaping.

Until the late 1970s, Fort Meade did not place natural resources management high on its list of funding priorities. Sporadic natural resources projects relied on the military training program for labor. For example, a habitat would be created by a training exercise that happened to involve clearing land. Only when military exercises damaged the environment to the point that it interfered with the ability to keep training did natural resources management gain official recognition.

Repeated use of favored training sites had caused loss of ground cover and serious soil compaction. Once ground cover was lost, the nutrients leached out of the topsoil, making it extremely difficult to reestablish a cover crop. To prevent the recurrence of such situations, in 1987 Harmeyer introduced a simple one-page "Natural Resources Impact Evaluation Worksheet" as a planning tool for land use. Accompanying this worksheet was a land use key that ranked specific land areas according to their condition. "Critical" referred to areas in danger of sustaining irreparable damage or to areas with archaeological sites. "Sensitive" might refer to an overused bivouac site. At the time it was introduced, the worksheet was viewed as sufficient to current needs.

Harmeyer's office was attempting to integrate natural resources management with military use of the land. One way of accomplishing this goal involved planting hedgerows around military use areas. This served the double purpose of creating edge habitat and marking off different types of training environments.

Fort Meade was selling timber to an active local post and pole market. They had not always had the resources to conduct timber sales, so they used to let the public come in to remove forest litter from thinning operations, exchanging free wood for free labor. By 1987, they had gained the ability to estimate the volume of wood available from thinning and arrange for its sale.

Harmeyer strove for variety in replanting forest areas, allowing natural regeneration in some areas while planting selected commercial species in others. He adopted this approach because it integrated forest management with habitat management, creating diverse habitats and diverse training areas while enhancing the trees' disease resistance.

Fort Meade had a high quality deer herd, a popular hunting program, and a good rapport with hunters. The hunting program was open to the public within the limits of safety requirements. The management goal was to control the size of the herd while improving its health. Additional successes in wildlife management included enhancement of wetland habitats and propagation of wood ducks and Canada geese.

The installation had experienced very little public pressure from environmental groups. Harmeyer attributed this to two factors: Fort Meade's relatively longstanding concern with environmental issues and the antispraying orientation of the pest control program. For example, the primary approach for controlling gypsy moths was to thin out the most susceptible tree species. Harmeyer also attributed the base's large bluebird population to the limited use of pesticides.

A cooperative program between Fort Meade and the University of Maryland had assisted the state in developing a natural means of pest control. Fort Meade planted wheat as a fall cover crop and did not harvest it. The wheat fields thus supported several varieties of parasites that afflict the cereal borer. The state collected these parasites for release in western Maryland to control cereal borers.

Harmeyer observed several trends that affected natural resources management. He saw integrated management as an idea whose time had come. In the past, forestry and agronomy specialists had competed for scarce funds and worked at cross purposes. By 1987, they cooperated in evaluating land use plans for their effect on the total environment. Harmeyer also observed that it had become easier to get the attention of the decisionmakers and to acquire command support. Commands were better informed and had come to recognize the value of natural resources management.

Aberdeen Proving Ground (APG), Maryland--October 1987

Aberdeen encompasses close to 80,000 acres. More than 5,000 acres were managed as forest land, and over 29,000 acres were covered by the wildlife management program.

Cornelius Powells, management agronomist since 1975 for the installation's Buildings and Grounds Office, administered the forestry, land use management, and grounds maintenance programs at Aberdeen. His duties included landscape design and review and contract administration. Another task performed under his office was the spreading of sewage sludge on agricultural land. Aberdeen's Buildings and Grounds Office conducted forest management according to a forestry plan that a contractor had formulated.

Aberdeen's grounds maintenance contract was one of the largest in the Department of Defense. The Army-wide commercial activities program, which required the use of contractors whenever possible, had imparted some uncertainty to Aberdeen's future grounds maintenance work. The grounds maintenance work was performed by government employees, but they were facing the prospect of competing for the work in future years.

Jim Pottie had been fish and wildlife biologist, and then environmental protection specialist/biologist for Aberdeen's Environmental Management Office since 1980. He administered the wildlife and endangered species programs and led the Natural Resources team. The original wildlife program had emphasized planting food for wildlife and administering hunting. The Buildings and Grounds Office had handled the planting work because they already had the heavy equipment and operators. The growth of the environmental movement caused this work to be shifted to an environmental

office in the early 1980s. In addition, the wildlife program shifted its emphasis to environmental management.

The passage of the National Environmental Policy Act increased the documentation requirements, causing Aberdeen's wildlife biologist to spend more of his time on paperwork with less time remaining for field work. The act also changed the emphasis of wildlife management from consumption to a combination of consumption and preservation. However, demand for hunting privileges continued to grow.

Aberdeen Proving Ground had excellent food plots, but in the past an out-of-control deer population had severely depleted the plots. The deer population had been actively fostered until about 1944 and had grown too large since then. The wildlife program attempted to manage and control the herd, because the alternatives, starvation or slaughter, would have been unacceptable to the public. Aberdeen's hunting program combined a longer season with the requirement to kill at least one doe before killing a buck. Deer hunting permits were available to Aberdeen's active-duty military and civilian personnel, its military and civilian retirees, and their escorted guests.

The Department of the Army required that hunters on Army land take annual hunter safety courses. Pottie argued that every year is too frequent, and that the requirement would discourage hunters from coming to Aberdeen. The Army modified the requirement in response to input from the proving ground and the command level.

Noting that Aberdeen encompassed good Chesapeake Bay wildfowl habitat, Maryland requested the Office of the Chief of Engineers to allow the state to establish and manage duck hunting blinds at the proving ground. The OCE management agronomist asked Pottie to report on

the potential impact of such a program. Pottie was concerned that public access would enable foreign agents to infiltrate as hunters and monitor ordnance tests. A compromise resulted in Aberdeen Proving Ground controlling the issuance of duck hunting permits and restricting them to days when no testing is scheduled. The proving ground bought up the permits and issued them by lottery to current or past installation personnel who had security clearances.

In recognition of each installation's unique conditions, natural resources professionals at the installations gained increased autonomy. As an example, Pottie worked with the Environmental Protection Agency to set up a model wetlands program at Aberdeen, which was then approved at the OCE level. Similarly, the proving ground formulated most of its hunting and endangered species programs and then passed the plans up the chain of command for approval.

National Guard Bureau, Edgewood, Maryland--October 1987

The OCE Buildings and Grounds Branch oversaw natural resources management on Army-owned National Guard land, which comprised about 20 percent of total National Guard land. Jamie Rappaport had served since 1982 as the first natural/cultural resources program manager for the National Guard's Environmental Resources Branch. The National Guard's natural resources management program trailed that of the Army by several decades; the Environmental Resources Branch had not even been created until 1980.

The National Guard program included land management, forestry, timber sales, archaeology and historic preservation, and pest control for the 54 National Guard sites nationwide. Like the Army 30 years ago, the biggest problem was the lack of trained

natural resources personnel to implement policy at the installations. Although National Guard installations were facing the same public environmental pressures that affected all of the Department of Defense, they were less prepared to respond because the program was so new.

Rappaport actively sought technical assistance from the Buildings and Grounds Branch and benefited from their experience. The branch had been particularly helpful in obtaining program funding, involving the National Guard in natural resources management activities at the DOD level, and providing information about new computer applications.

In 1987, the National Guard was researching the effects of long-term intensive training on the land and soil. The study used the Land Condition-Trend Analysis computer program developed by the Corps of Engineers. Rappaport planned to make the program available to the state National Guards. She anticipated a trend toward increasing computerization because land use decisions often have to be made quickly.

V Corps Area, West Germany--August 1988

Martin Elyn, a landscape architect and a Belgian national, had served as a civilian employee of the V Corps Directorate of Engineering and Housing (DEH) since 1977, which marked the beginning of V Corps natural resources and land management efforts. As a management agronomist, he headed the Land Management Section of the Roads and Grounds Branch of the Facilities Support Division.

Natural resources management for the ten military communities and six training areas of the V Corps area fell under the supervision of the Directorate of Engineering and Housing, which in turn reported to U.S.

Army, Europe (USAREUR). USAREUR then reported to the Buildings and Grounds Branch at the Corps of Engineers in Washington, DC.

The U.S. Army after World War II had no formal natural resources management organization in Europe. Management practices began and ended with mowing, raking, and snow and ice control. Only in 1976 did the Army begin to see the necessity of long-range planning. One of Elyn's early tasks at the V Corps Directorate of Engineering and Housing was to draw up natural resources management plans. This exercise revealed the lack of trained people to implement the plans, but, as elsewhere in the Army, approval for additional personnel spaces was not forthcoming.

In the mid-1980s, the Army decided to return to regular duty the soldiers detailed to grounds maintenance. This action created 400 new positions for groundskeepers. The Directorate of Engineering and Housing's planning paid off; the plan specified skills and job descriptions, allowing the directorate to immediately request the management personnel they needed. From this time, the natural resources management program experienced dramatic growth.

The natural resources management program in Germany had to contend with conditions and limitations not present in the United States. First, some segments of German society objected to the U.S. Army presence and most of its actions. Thus, the Directorate of Engineering and Housing had to be sensitive to the Army's image in all of its actions. Second, the United States leased rather than owned the limited amount of land it used and had no means of acquiring more land for military use. Although under the North Atlantic Treaty Organization Status of Forces Agreement the Army could overrule German land use laws in theory, in practice, they have adhered to such laws as a courtesy

to an ally.

Accordingly, under German law, for each acre of forest cut on a U.S. facility, one acre had to be reforested, in the immediate vicinity when practicable. The Army has selected for reforestation areas where no future construction will occur or areas that will not interfere with the military mission, such as the perimeters of bases. Some military security personnel, however, have objected to perimeter reforestation, arguing that it makes their job more difficult. As in the United States, it has been difficult to convince military commanders to release land for reforestation, because they have viewed it as losing control over the land. In fact, reforested acreage has remained under Army control, while the German government has paid for forest planting and management. From fiscal year 1984 to fiscal year 1986, the V Corps cut 27 hectares (67 acres) and reforested 58 hectares (143 acres).

Also under German law, the Army had to seek permission to cut trees for construction, and projects had been delayed as a result. In addition, the state of Hessen had asked for cash compensation for any land the U.S. Army has paved over.

It was not possible, as it was in the United States, for an installation to conduct wood sales and sell hunting/fishing licenses to earn money. The German forest manager controlled hunting permits, and his stringent training requirements assured that only qualified hunters had access to the land. Hikers also had free access to trails through training areas, as live ammunition was not used in all areas.

U.S. forces in Europe authorized such activities as crop production and grazing on their land. The leasing arrangement, however, was between the farmer and the German government. The V Corps area permitted grazing on several airfields.

Elyn identified education as a large component of his job. He has had to sell the value of natural resources planning to both the U.S. Army and local officials. Because of the Army's two-year rotation policy, he has had to repeat himself when new personnel arrive. Because of both the rotation policy and the perceived advantage in dealing with European nationals, the Army has tended to employ Europeans as civilian land managers overseas.

Friedberg Training Area, West Germany

In the early 1950s, the U.S. Army started conducting tracked vehicle training exercises on a small portion of the 10,000-acre Friedberg site. The steep, hilly site was clearcut for the exercises. During training, vehicles sought cover along the borders of the clearing. They ran over tree roots, which destroyed the trees and gradually expanded the cleared area to 200 acres. Close to 90 percent runoff occurred from this site, causing 12 foot deep gullies. On several occasions, runoff down the gullies blocked a local road. Cleanup after one such incident cost the Army almost 200,000 Deutschmarks (about 1.8 Deutschmarks per \$1.00 or \$111,111). On the opposite side of the mountain, sediment runoff occluded a private trout pond.

A German architect-engineer initially proposed building catch basins. This was rejected because it didn't address the cause of the problem. The second proposal was to build check dams and plant vegetation on the bare sites. Temporary fences were built around the new vegetation. At first some soldiers would occasionally ignore the fences and knock them down. Efforts focused on convincing the Army that it was in their interest to restore the site because units were

losing too much time during maneuvers extricating bogged vehicles. Typically, a wrecker had to accompany all maneuvers to pull out bogged vehicles. In addition, vegetation could provide concealment for more realistic maneuvers. Finally, it would save money by eliminating local cleanup costs.

For an expenditure of 950,000 Deutschmarks (\$527,778) over the three years from 1984 to 1987, 60 small log weir barriers were built to serve as check dams. Trees that were cut down had to be replaced by planting an equal number: 10 percent were replanted on site and the balance elsewhere. The ditch was reshaped and replanted. Elyn anticipated that the rehabilitation of the area would prove to be a sound investment for erosion control, improved training conditions, and public relations.

According to Elyn, the training operations conducted on the 200-acre cleared area at Friedberg would have taken place on a 28,000-acre site if they were conducted in the United States. Thus, platoon leaders fresh from the States could find it difficult to confine their activities to such a small area. Since the training areas in Germany were relatively few and small, training exercises could not be rotated through other sites while exhausted sites were being renewed.

The U.S. training areas have faced one problem that those in Germany do not share: forest fires. The rainy climate reduces the threat to relatively minor proportions.

Ammunition Storage Site: Koeppern South, Pre-stock Point 3J

Koeppern South was one of six sites where munitions were pre-positioned in V Corps. This site

featured a pilot program to demonstrate the value of reforestation at ammunition sites. In 1977, maintenance of ammunition storage sites presented a costly problem because of the steep slopes of the earth-covered magazines. The Directorate of Engineering and Housing proposed reforestation because it would provide such advantages as erosion control, reduced maintenance costs, and passive air defense. In addition, ammunition storage sites provided an area that was not subject to future construction and could thus be reforested in exchange for tree-cutting operations elsewhere. Opponents argued that tree roots would break down the bunkers, trees would ruin the lightning protection system, and forests would cause a fire hazard. Nonetheless, in 1978, USAREUR approved the pilot reforestation program.

Normally, at federally owned German sites, federal funds were available to pay for the planting, labor, and maintenance of forested areas. Koeppern was not federally owned but instead owned by local communities. The significance of this was not realized until the first bill came due and was sent to the Corps of Engineers. As a result, forest planting and maintenance ceased. Consequently, grasses and broom took over, creating a fire hazard and future maintenance problems.

Platen Gardens Housing Area, Frankfurt, West Germany

American family housing areas normally have not been intensively landscaped, in sharp contrast to adjacent German areas that feature dense landscaping. Since fiscal year 1982, the Directorate of Engineering and Housing had participated with the state of Rheinland-Pfalz in a joint German-American landscaping program for Army family housing areas. In fiscal year

1984, the directorate proposed a similar program to the state of Hessen, and the first plantings were completed in 1987. The program's advantages included integration of American housing areas into the surrounding communities and improvement of morale among the occupants. U.S. Army installations are generally located in urban areas with high visibility.

The German-American landscaping program matched funds and manpower to plant trees and shrubs in selected, highly visible areas so the planting would also benefit local Germans. At Platen Gardens, a border area across from a German housing area and adjacent to the autobahn was landscaped. However, as Elyn noted during a 1988 visit, poor follow-up maintenance had detracted from the result. Furthermore, one still had a basically unobstructed line of sight from one end of the American housing area to the other, in contrast to the lush appearance of the adjacent German apartment complex.

CHAPTER 5

Conclusion

Natural resources managers on military installations perform a continuous balancing act. On the one hand, they must accomplish their goals within an organization whose primary purpose is not natural resources management. On the other hand, the public eye focuses intently on the millions of highly visible acres controlled by the military. Increasingly, the public demands that conservation of the natural resources on military lands be given a higher priority.

Other federal agencies charged with stewardship of natural resources as their prime objective do not face the same challenges as military natural resources managers. Military land is by definition subject to uses that damage soil and vegetation. Natural resources depleted by training activities must be managed, protected, and renewed so that the land can continue to support military uses.

When the U.S. Army Corps of Engineers first assumed responsibility for construction on Army installations during World War II, they only reluctantly assumed the accompanying task of maintaining all of the surrounding installation land. Assisted by experts borrowed from the Soil Conservation Service, the first Army land managers developed techniques for controlling the erosion caused by widespread construction.

After the war, a handful of farsighted Corps of Engineers foresters and agronomists promoted the economic benefits of going beyond maintenance and

damage control. They pioneered land use planning on Army installations. Installations leased unused land to neighboring farmers and reaped the benefits of both income and free maintenance. Forest management evolved from control of fires set by training exercises to development of commercial timber production. The resulting economic benefits allowed natural resources managers to carry on their work despite the low priority given them in the military budget.

Although economics spurred the growth of natural resources management, evolving public policies influenced its direction. During the 1960s, the multiple use and sustained yield concepts developed for national forest management became Army policy. Army lands began to support multiple uses and to promote forest growth. At the same time the public demanded and received greater access to hunting and other recreational uses of Army land. The success at creating viable ecological niches led to new concerns in the 1970s and 1980s. Conservationists recognized that many endangered species took refuge on military installations and that they needed protection. Consequently, public law increasingly governed the details of Army land use and management.

Throughout these decades, heavier vehicles and longer-range weapons increased the strain that training put on the environment. However, the budget for natural resources management remained limited. Charged with protecting and conserving natural resources according to rigorous public requirements, the Corps of Engineers strove to meet the challenge. The success they achieved came from keeping abreast of new technology, building a staff of qualified natural resources management professionals, and fostering greater cooperation among the natural resources disciplines and the branches of the military.

The Corps of Engineers' 46 years of experience managing natural resources on Army installations has demonstrated what is required to succeed under challenging circumstances. Given limited money and manpower, a host of legal requirements, and the pressure of public opinion, the Army's natural resources managers have met the twin demands of maintaining land to support military uses while conserving natural resources.

Appendix A

CHARTS

- A-1. Organization of Construction Division, OQMG, 17 October 1941
- A-2. Organization of Construction Division, OCE, April 1942
- A-3. Organization Chart, Repairs & Utilities Branch, Construction Division, O.C.E.

Chart A-1-- Organization of Construction Division, OQMG,
17 October 1941

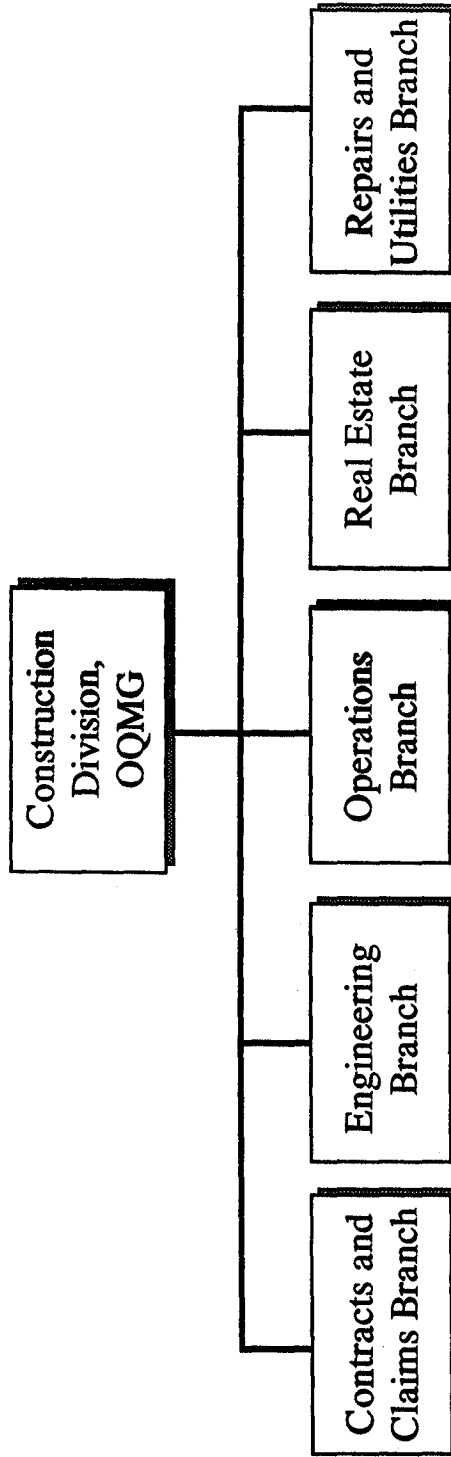
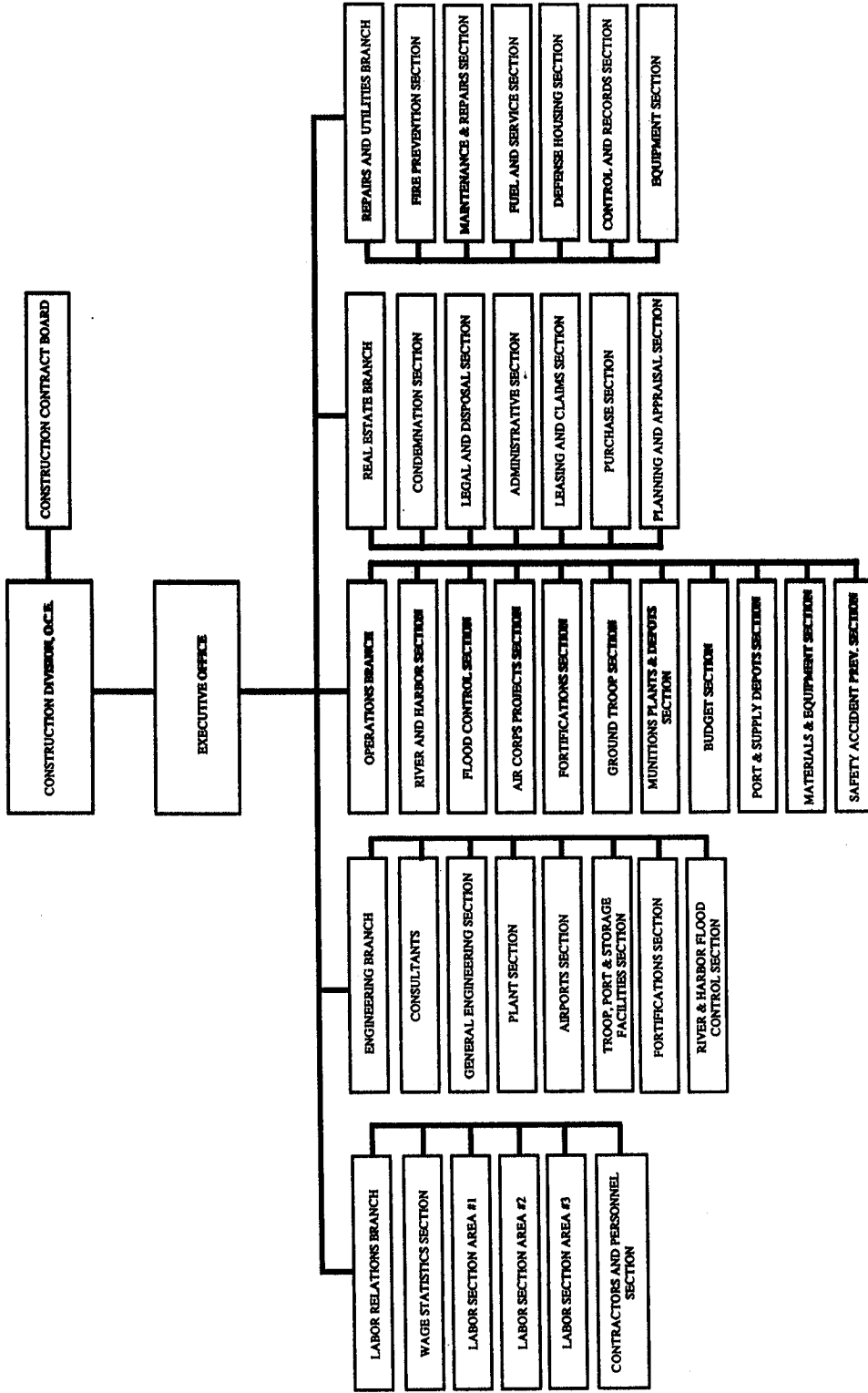
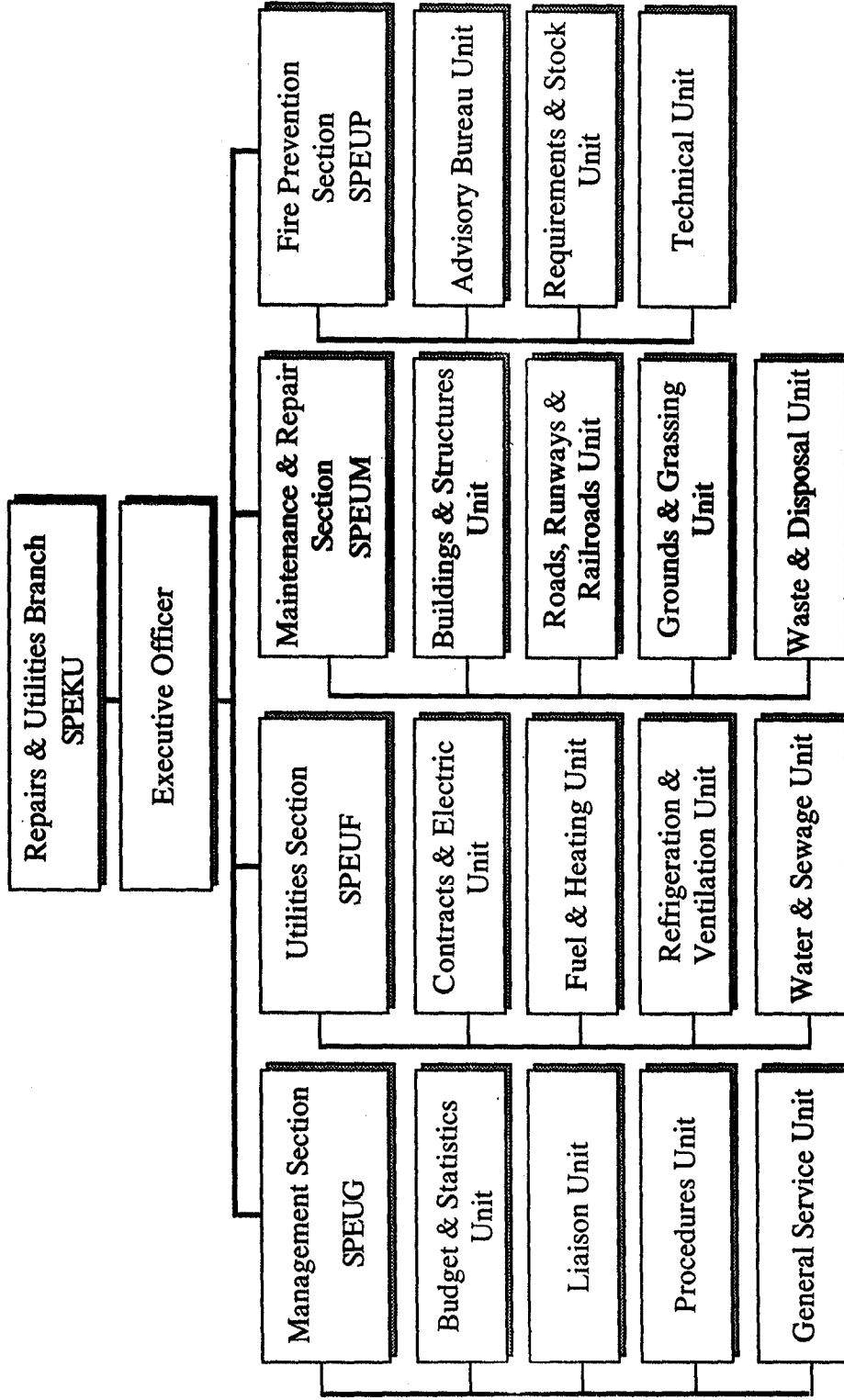


Chart A-2--Organization of Construction Division, OCE, April 1942



Source: Fine and Remington, p. 494

**Chart A-3-- Organization Chart
Repairs & Utilities Branch
Construction Division, O.C.E.**



Bibliographical Note

Oral history interviews played the leading role in assembling this narrative. The personal files and recollections of John Andrews, Wendell R. Becton, Edward O. Gangstad, Burton F. Kiltz, and Vance W. Mays, former Corps of Engineers employees, were invaluable sources. Their files include office correspondence, Army publications, and papers covering the period from the 1940s to the 1970s. Notes and tape recordings of interviews are on deposit at the Corps of Engineers' Office of History, along with photocopies of selected file materials.

Andrews spent 20 years as an Army forester in the field before serving at the Office of the Chief of Engineers' Buildings and Grounds Branch from 1978-1984. Becton, a forester with the Army since 1942, served both overseas during World War II and as chief forester for the Third Army from 1950-1973. Gangstad served as assistant agronomist at Buildings and Grounds from 1966-1969. Kiltz, an agronomist with Soil Conservation Service, Army, and Air Force experience--and particular expertise in dust control--served as chief of the Land Management Section at Buildings and Grounds from 1951-1965. Mays, an expert in agronomy, soil conservation, and forestry with several decades of Army experience, was chief of the Land Management Section from 1972-1977 and assistant to the chief from 1970-1972.

The current staff of the Buildings and Grounds Branch provided access to their files, which included both publications and historical items for the entire period covered by this history. Donald Bandel, management agronomist since 1977, and Donald Cole, forester since 1985, were interviewed.

Visits were made to Fort Meade and Aberdeen Proving Ground in Maryland and to three U.S. Army sites in West Germany to learn about current practices in natural resources management at individual installations. Martin Elyn, management agronomist for the V Corps Directorate of Engineering and Housing since 1977; William Harmeyer, chief of the Natural Resources Office at Fort Meade since 1975; Jim Pottie, environmental protection specialist at Aberdeen Proving Ground since 1980; Cornelius Powells, management agronomist at Aberdeen since 1975; and Jamie Rappaport, natural/cultural resources program manager for the National Guard Bureau since 1982, provided the interviews and base tours. Tom Warren, environmental resources officer at Fort Carson, Colorado, provided information by telephone.

All of the former and current natural resources personnel assisted the authors in identifying the impacts of societal trends on Army policies and actions.

Department of the Army publications such as technical manuals, regulations, pamphlets, bulletins, and directives were available in Washington through the Buildings and Grounds Branch, the National Archives, and the HQ, USACE, Library, and through the Military History Institute at Carlisle, Pennsylvania. Some of the publications date back to the 1940s. As well as covering both overall policy and procedural details on such topics as how to apply pesticides, these documents provided insight into the changing issues and concerns of each period.

At the National Archives Washington National Records Center (WNRC) at Suitland, Maryland, material from the Records of the Office of the Surgeon General, Record Group 112, provided information on wartime insect and rodent control performed by the Corps of Engineers under Medical Corps supervision. In Record Group 77, Office of the Chief of Engineers General Correspondence 1918-1945, items found in decimal files 612, 618.34, 618.36, 618.38, and 725 provided source material for this history.

Department of the Army Annual Historical Summaries for fiscal years 1974-1985, on file at the Corps of Engineers Office of History, provided an assortment of facts about the natural resources program.

The Form 135s (which identify the contents of records and the date they were transferred to WNRC, Suitland) were consulted at the office of the Chief of Engineers records manager. Eight boxes of Buildings and Grounds Branch office files, dated 1954-1961, that had been retired to WNRC were identified. Of these, four boxes yielded useful material and four were not found and believed to have been destroyed. The destroyed files were accession numbers 57-374, box 225; 58A-1075, box 313; 60A-1169, box 319; and 63-1553, box 18. These boxes reportedly contained land management and woodland management plans by installation, reforestation reports, and general administrative files for the 1950s.

The main office of the Wisconsin-based American Society of Agronomy (ASA), in which B&G staff members have participated, was contacted to determine whether papers relating to military land management were available. An ASA staffer, Richard Dinaur, stated that they were not. A few papers written by Army employees for presentation at ASA events had been saved by former employees and were made available for this history. Proceedings of Soil Science Society of America seminars held during the 1950s and 1960s were perused at the Library of Congress and not found to be relevant.

On the recommendation of a former employee, selected U.S. Department of Agriculture Yearbooks for 1948 through 1965 were examined. The only useful material was found in the 1958 yearbook, which contained an article on wartime military land management.

Annual reports of the Repairs and Utilities Division during 1951-1986 were seen at the Chief of Engineers Library but contained only fiscal data.

A handful of promising titles listed in The U.S. Army

Corps of Engineers and Environmental Issues in the Twentieth Century: A Bibliography were investigated, but they did not directly bear upon the topic.

The following selected bibliography lists the sources that directly contributed to this history.

Published Sources

Becton, Wendell R. "The Third Army's Forestry Program." Forest Farmer (April 1972): 29-30.

Brown, J.E. "Warriors and Wildlife: The Odd Couple." National Wildlife, 12, No. 2 (February/March 1974): 22-27.

Joselyn, G. Blair. "Wildlife Management on Military Installations--A Critique of Army Policy." Journal of Wildlife Management, 29 (January 1965): 215-223.

Kelly, Orr. "Trees: An Army Success Story." The Evening Star, Washington, DC, 6 May 1969, sec. A, p. 4.

Oren, Eugene A. "Army Conservation Pays Off." Army Digest (January 1970): 31-33.

Government Publications

Department of Agriculture, Forest Service. Effective Multiple Use Forest Management for Second U.S. Army Woodlands. Washington, DC: Government Printing Office, 1964.

Department of the Army. Facilities Engineering: Natural Resources--Land, Forest, and Wildlife Management. Army Regulation 420-74. Washington, DC: Government Printing Office, 1977.

Department of the Army. Facilities Engineering: Natural Resources--Land, Forest, and Wildlife Management. Pamphlet 420-7. Washington, DC: Government Printing Office, 1977.

Department of the Army. Facilities Engineering: Pest Control Services. Army Regulation 420-76. Washington, DC: Government Printing Office, 1971 and 1978.

Department of the Army. Facilities Engineering: Pest Management Program. Army Regulation 420-76. Washington, DC: Government Printing Office, 1980.

Department of the Army. Guides and Procedures: Repairs and Utilities. Technical Manual 5-600. Washington, DC: November 1945.

Department of the Army. Herbicide Manual for Non-Cropland Weeds. Technical Manual 5-629. Washington, DC: Government Printing Office, 1970.

Department of the Army. Installations: Development and Conservation of Wildlife on Military Reservations. Army Regulation 210-480. Washington, DC: Government Printing Office, August 1950.

Department of the Army. Installations: General Woodland Management. Technical Manual 5-631. Washington, DC: Government Printing Office, April 1963.

Department of the Army. Installations: Natural Resources--Management and Harvesting of Fish and Wildlife. Army Regulation 210-221. Washington, DC: Government Printing Office, July 1962.

Department of the Army. Natural Resources: Fish and Wildlife Management. Technical Manual 5-633. Washington,

DC: Government Printing Office, 1982.

Department of the Army. Natural Resources: Forest Management. Technical Manual 5-631. Washington, DC: Government Printing Office, 1981.

Department of the Army. Repairs and Utilities: Engineer Entomology Services. Army Regulation 420-76. Washington, DC: Government Printing Office, May 1961.

Department of the Army. Repairs and Utilities: Entomology Services. Circular 420-3. Washington, DC: Government Printing Office, August 1964.

Department of the Army. Repairs and Utilities: Grounds. Army Regulation 420-74. Washington, DC: Government Printing Office, 1958, November 1961, and March 1964.

Department of the Army. Repairs and Utilities: Insect and Rodent Control. Technical Manual 5-632. Washington, DC: Government Printing Office, February 1956.

Department of the Army. Repairs and Utilities: Natural Resources--Land, Forest, and Wildlife Management. Army Regulation 420-74. Washington, DC: Government Printing Office, June 1966.

Department of Defense. Military Entomology Operational Handbook. Technical Manual 5-632. Washington, DC: Government Printing Office, June 1965.

Fine, Lenore, and Remington, Jesse A. The Corps of Engineers: Construction in the United States. Washington, DC: Government Printing Office, 1972.

Lee, Alvin T.M. "Getting and Using Land in Time of War."

Land: USDA Yearbook of Agriculture. Washington, DC:
Government Printing Office, 1958, pp. 93-103.

Unpublished Sources

Archival Sources

Suitland, MD. National Archives. Record Group 77, Records of the Office of the Chief of Engineers General Correspondence 1918-1945.

Suitland, MD. National Archives. Record Group 92, Records of the Office of the Quartermaster General, Correspondence (Subject File) 1936-1945.

Suitland, MD. National Archives. Record Group 112, Records of the Office of the Surgeon General (Army), WWII Administrative Records ZI.

Suitland, MD. Washington National Records Center. Record Group 77, Accession numbers 64A-2124, 66A-3180, 67-4785, and 68A-1920.

Washington, DC. U.S. Army. Corps of Engineers. Buildings and Grounds Branch. Historical files assembled by Donald Bandel.

Washington, DC. U.S. Army. Corps of Engineers. Office of History. Department of the Army Annual Historical Summaries.

Washington, DC. U.S. Army. Corps of Engineers. Office of History. Wendell Becton papers.

Washington, DC. U.S. Army. Corps of Engineers. Office of History. Vance Mays papers.

Interviews by Authors

Andrews, John. Vienna, VA. By telephone. 6 April 1988.

Bandel, Donald. Washington, DC. 23 March 1988.

Becton, Wendell R. Gainesville, GA. 15 January 1988.

Cole, Donald. Washington, DC. 23 March 1988.

Gangstad, Edward O. Springfield, VA. By telephone. 27
March 1988.

Kiltz, Burton F. Arlington, VA. 22 January 1988.

Mays, Vance W. Glenwood, MD. 29 October 1987.

Warren, Tom. Fort Carson, CO. By telephone. 7 April 1988.



EP 870-1-40
October 1989

US Army Corps
of Engineers