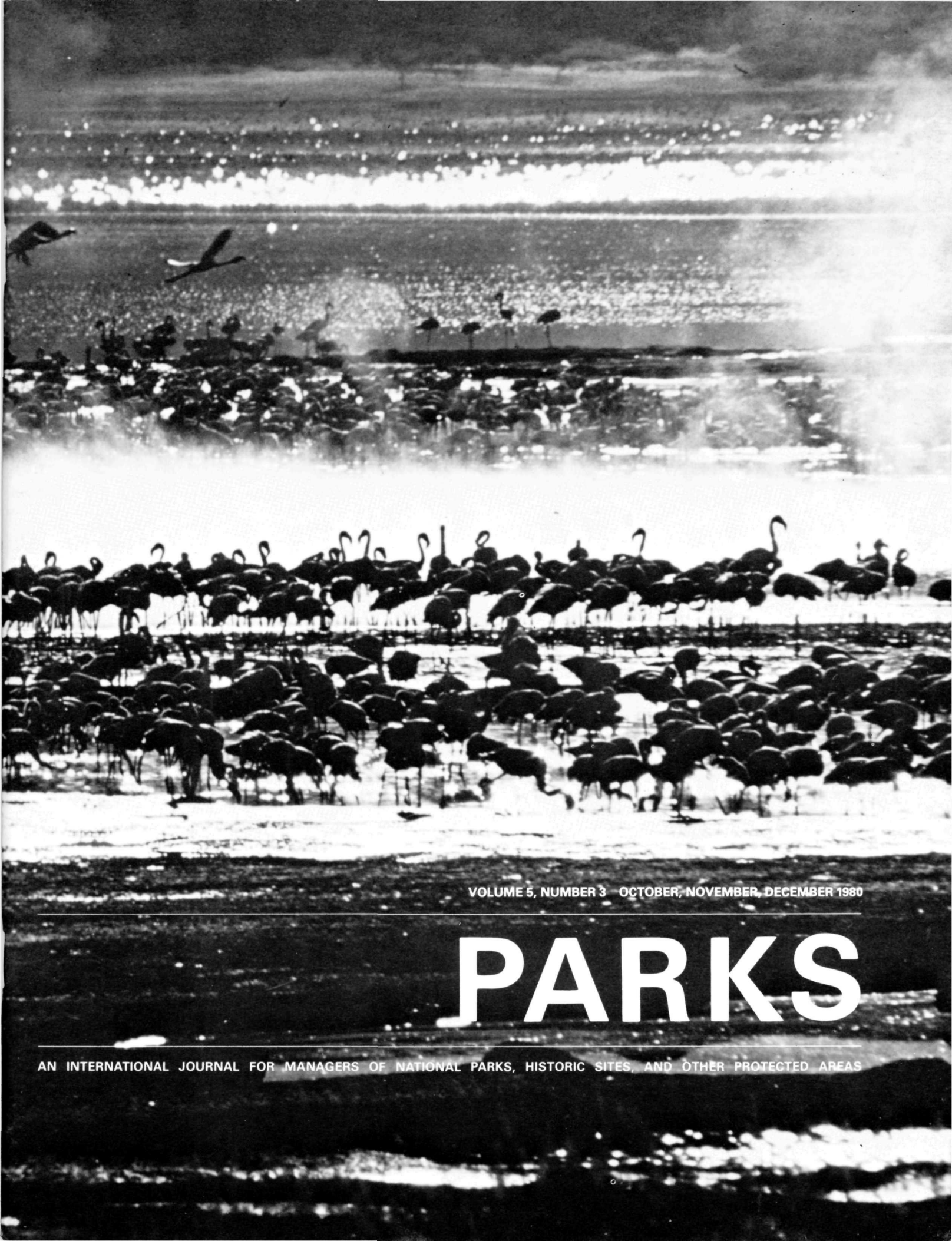

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PARKS

AN INTERNATIONAL JOURNAL FOR MANAGERS OF NATIONAL PARKS, HISTORIC SITES, AND OTHER PROTECTED AREAS

PARKS

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Covers: Flamingos at dawn among the hot springs on Lake Bogoria (formerly Lake Hannington) in Kenya's Rift Valley. Lake Nakuru, another famous wetland haven for birds, is located in the same valley. Photo: David Keith Jones

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J. D. Ovington and Allan M. Fox

Wilderness — A Natural Asset

Before people appeared on earth, the dynamic processes of nature had already produced a vast and fluctuating diversity of plant and animal species and had assembled these into natural communities and ecosystems of great complexity.

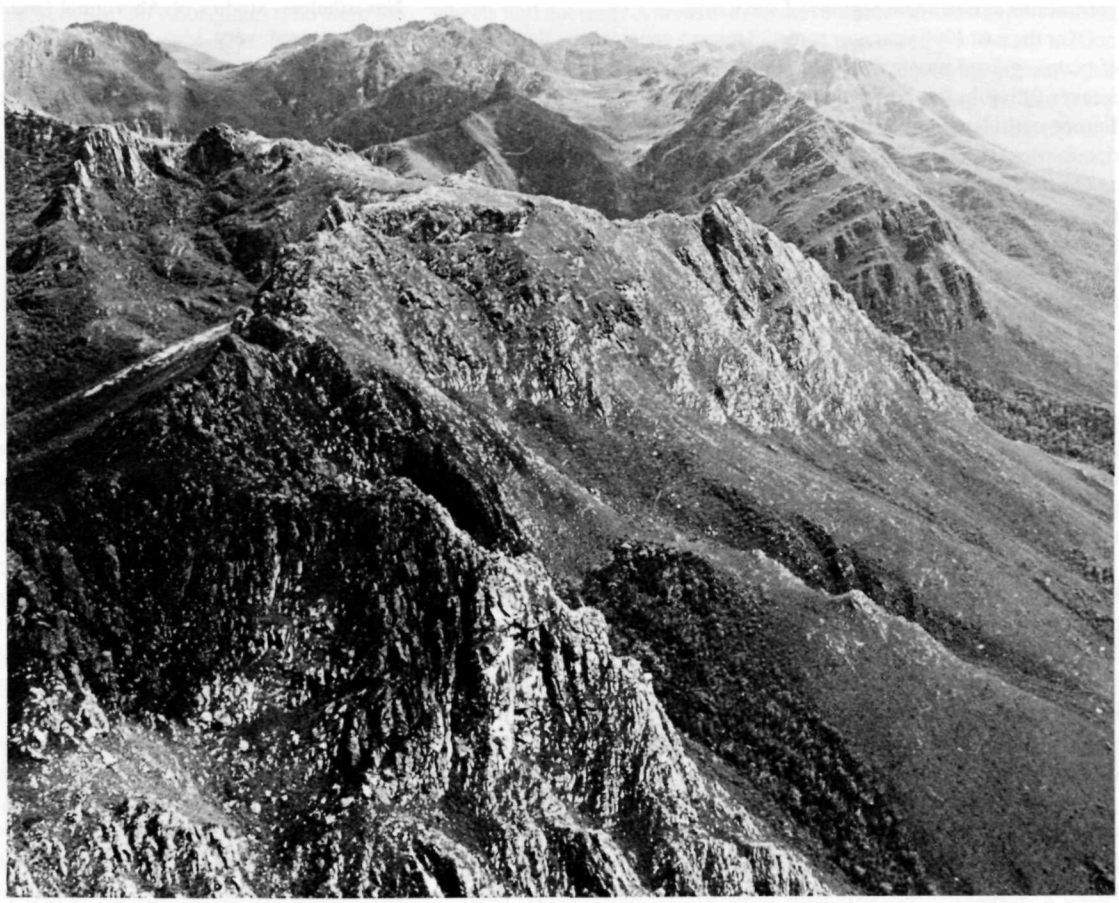
Mangrove forest, rainforest, savanna, grassland, alpine, desert and coral reef communities are just a few examples of this vast wilderness continuum of biological ingenuity. The particular pattern and species composition of communities were broadly dictated by latitude, altitude, landform, continental location and geological history.

Geological history helps to explain differences between the assemblages of species. Thus the savannas of Australia differ from North American savannas, not in form but in species due to the tectonic history of the continental plates, those great rafts of rock which transported plants and animals hither and thither.

Each species depends on the ecosystem in which it lives and as part of it becomes a modifying agent, affecting energy and nutrient supplies and the climate nearby. Every community is a special assemblage of species and, like species, is a product of progressive evolution over the ages. Conditions were never static, wilderness was always in a state of change reacting to changing ecological conditions.

With the appearance of human species, a new and powerful ecological factor for change was introduced. The impact of people on wilderness varied greatly. The different political, social and economic systems of nation states were created to allow our species to maintain itself within different natural circumstances. These are the creations of human intellect, imagination, memory and communication.

For many hundreds of generations people lived as gatherers and opportunistic hunters, depending upon the surrounding wilderness to supply their wants. Their impact on other organisms and the environment was constrained. In some places where the climate was relatively mild and natural resources abundant, less than four hours of work a day was necessary to keep people supplied with a healthy diet and adequate shelter. Elsewhere life was much harder and the need to change the environment more pressing.



Southwest Tasmanian wilderness–rugged heathlands and cool forests of the Arthur Range. Photo: Eric Wadsworth

Growing mental prowess and ability to perform increasingly complex feats of communication gave the human species an immense advantage over other species. At first leaps in technology were few but nevertheless some had important consequences in the long term. For instance, about 20,000 years ago, Australian Aboriginals made one of the earlier advances which proved of great significance; they produced ground-edged stone tools.

Technological changes generally led to the greater clumping of peoples into villages and later cities. In regions such as the Middle East, town dwellers and the supporting agricultural systems were becoming more and more divorced from their "natural" habitat. People discovered that hard grains could be stored and that animals could be domesticated. The abandonment of nomadism allowed the accumulation of possessions. Resource sharing was replaced by barter which for convenience was replaced by systems of trade by tokens. Wealth could be stored and traded. The tokens—cash or credit—represented resources and mankind shifted from being land members to land owners.

Some people retained a close relationship with nature. To the Australian Aboriginal, "wilderness" did not exist as a separate entity. There was no place where the "hand of man had not trod" because the landscape was fully "peopled" and displayed evidence of the former presence of the ancestors. For perhaps 3,000 generations these people had evolved a pattern of customary behaviour and an extremely rich ritual and psychic life to create a relatively harmonious membership of the Australian ecosystems.

Elsewhere the growing populations of urban and rural people were disassociated from their natural habitat and nature became the unknown with wilderness a thing to be feared. Such perceptions were reinforced by religions which set man above and beyond nature and later by the stories of travellers who roamed the Earth. Wild, untamed nature was perceived as something to be conquered and native peoples were to be "shown the light of the true faith." This change in the perception and conception of wilderness, of nature, appears to have happened about 300 human generations ago in some regions of the world.

Over the past 1000 years, or some 33 human generations, the mobility of people gained momentum. Waves of people moved over the Earth, forever filling in the population gaps. The explorers and settlers from Europe considered any land not peopled by Europeans to be empty and ripe for development.

The amassing of wealth began the historic eras of rapid development and exploitation of wilderness. These achieved deeper significance with the industrial revolution which was fuelled on a scale never encountered before by raw resources accumulated over the ages by natural processes under wilderness conditions.

In early phases of human expansion, the pioneer settlers rarely adapted themselves readily to the new environment. Always it was nature that had to adapt.

Time was an essential element. Until the industrial revolution the changes were usually slow enough for the natural systems to reach a new dynamic balance with the impinging forces. With the industrial revolution the capacity for rapid and extensive landscape change was greatly enhanced.

If not too much damage was done to the natural environment by the first generation of colonizers, the perception of place and activity by their children were all of the new land, albeit influenced by parental attitudes. Nevertheless the new landscape became imprinted with incidents, happy and sad associations, and with the experiences of life. In effect the landscape was becoming personalized and with this personalization people's attitudes to it changed. Russell Ward (1970) in *The Australian Legend* describes this process very well.

So long as people have access to rural and wild landscapes and are motivated to want to understand them, then with each generation personalization becomes more complex and identification more deeply rooted.

Clearly, wilderness is a conception of the individual mind. As such it is a changing, dynamic concept, influenced by human history, culture and social and economic conditions.

In the case of the Australian Aboriginals, identification after two or three thousand human generations is so complete that they do not separate themselves from their environment. They see themselves as part of the landscape not apart from it. The role of the Aboriginal within the environment is built on traditional behavior—the question of why things were done or happened never arose, they were simply facets of the immediate natural surroundings.

Once people are taken out of close contact with the natural environment which sustains them, the perception of dependence fades. The notion that the ultimate source of food, shelter, new crops, new drugs and new materials ultimately must come from the Earth loses force in this change of perception.

The result of a multiplying and more demanding human population has been and is an accelerating reduction in the wilds of finite Earth. Inevitably this has meant that wilderness has become more remote and less a part of human life and culture. Diversity has been reduced and wild-places have been subjected to human control and management.

In lands, such as Britian, which have seen a steady growth in resource use technology and with it a concomitant growth in population over some thousand or more years, there has been until the past hundred years or so a fairly harmonious wedding of landscape with technology, producing a pleasant and homely landscape liberally splashed with cultural modifications. Nevertheless, while retaining a landscape of softness and charm, all of the ecosystems were greatly modified and many species were lost or endangered by this domestication.

By contrast in Australia, despite the presence of people for perhaps fifty thousand years or more, the landscape remained dominated by natural processes. Over the whole continent the human population in all that time probably never numbered more than half a million. The one tool Aboriginals used which was capable of modifying wilderness was fire. Nevertheless, studies of Aboriginal land use in Arnhem Land indicate fire was used very sensitively, maximizing diversity and protecting certain natural systems. No single great conflagration, if it could be avoided, was allowed and as the months of the dry season marched on from May a varied use of fire was made. This has been going on for so long that in these monsoon lands this activity can be seen as part of the natural process.

However, even where people are apparently living in a relatively harmonious relationship with nature, the wilderness was still subject to change. For some reason, as yet not understood, a number of native Australian species, some of relatively large animals, became extinct after having successfully lived out many hundreds of generations of Aboriginals. Paintings of thylacines are common in the Aboriginal art galleries of Kakadu yet thylacines are no long found in mainland Australia.

Imagine the shocks to these finely adjusted Australian wilderness systems following 1788 and the first European settlement at Port Jackson but six to eight generations ago. First imported disease ripped across the continent and within four years more than half of the Sydney Plain Aboriginals were gone, victims to measles, smallpox and later to venereal diseases. Exotic animals—sheep, cattle, pigs, goats, camels, horses, donkeys, foxes, rabbits, cats and dogs—multiplied. The ground became hard under the hooves of domestic stock which ate the vegetation selectively, converting scrublands and shrublands to grassland, and perennial grassland to ephemeral grassland. Some introduced animals preyed on native animals and others destroyed their natural shelter. Certain introduced plant species ran wild, e.g. prickly pear and blackberry. In some instances the introduced species spread rapidly, fanning out ahead of European settlement.

At the same time the establishment of permanent water, ground tanks and bores every 10 kilometers or so released some native species which had been held in bondage by the permanent drought of the arid and

The arid central Australian wilderness. Photo: Allan M. Fox

semi-arid lands. Typical of the native species to benefit were the red and grey kangaroos. By their multiplication they duplicated domestic stock and rabbits in eliminating ground cover so essential for the survival of the small marsupials and native rodents.

The Aboriginal people were profoundly shocked as they saw the wild natural landscape which they regarded as extensions to their persons being dismembered and destroyed by these various agencies. Some Aboriginal people adapted to the new circumstances, others were unable to do so. Thus within Australia there was a marked dichotomy of approaches to natural wilderness between the Aboriginals who were the first settlers and the more recent European settlers.

Today 83 percent of Australia's population lives in urban areas around the southeastern seaboard. Immigration programs have brought in many newcomers full of goodwill to Australia as a nation but with their personalized landscapes thousands of kilometers away. Today one in three Australian families are one generation or less Australian. In a purely ethnic sense this has produced a greatly enriched human resource but time is needed for these people to develop an understanding of the Australian landscape.

Public pressure is mounting to protect the near city bushland and coastal recreation resources for the urban population. The conservation of water, soils, forests and wildlife have become matters of popular interest and common debate.

To many Australians "taming nature" is being seen as an outmoded notion. Rather we should be thinking more of harmonious development. People are now better informed of the adverse consequences of conflict with natural processes. The news media reports on soil erosion, wildfire, increasing flood damage, dwindling species and dying landscapes (e.g. salting, dieback, dustbowls). Vocal conservation groups have proliferated and reaction to unwise developments can be swift and effective.

Nevertheless the continued enlargement of urban areas and the pupating of the majority of people behind the wood paling and brick fences of suburbia is of real concern. What kind of mental and emotional metamorphosis goes on in such a cocoon? What kind of landscapes are personalized now — the red brick villa, the corner telephone box, the individually nurtured garden, the city parks, perhaps a dog or a cat? Without the expansion of personal experience into nature what support for wilderness protection will these people be prepared to give?

Wilderness in Australia cannot be considered in isolation for international events will have repercussions on Australian wilderness. The Earth's population has passed the four and a half thousand million mark, the last thousand million increase occurring in just the past 15 years, half of one generation. The United Nations Organization has stated that three bad seasons of harvest would cause widespread starvation. So far as the non-renewable resources are concerned some wise person said of oil, 'as soon as the first gallon was used it began to run out.'

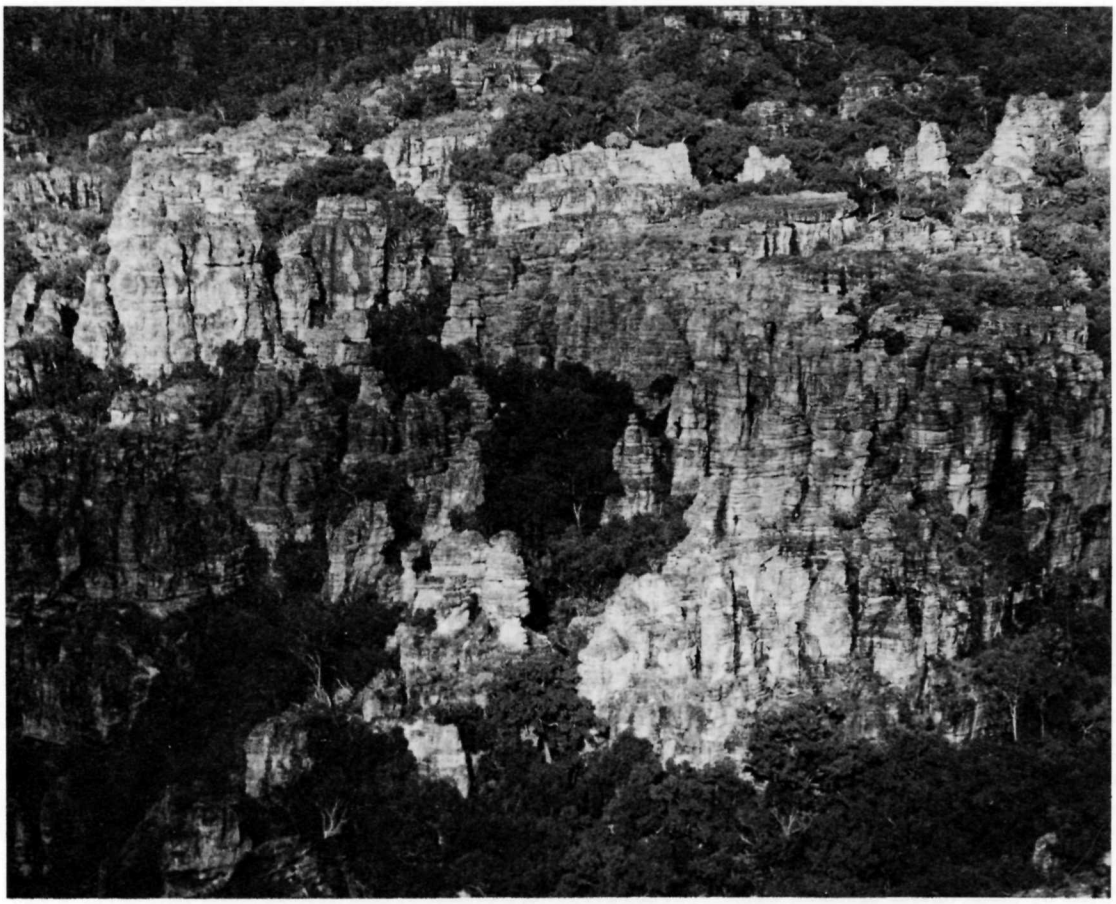
Food and power are just two of the essentials for living on 20th century Earth and we find we are critically short of both. How important is wilderness to people with empty bellies or to an industrial nation whose wheels will not turn? Alternatives to the resources in short supply will be sought. One solution suggested to the oil crisis is to put sixteen million hectares of semi-arid lands under plantations of *Euphorbia* plants which produce large quantities of hydrocarbons directly. However, like many alternative technologies, this one utilizes land more intensively and competes for land resources which may be in a wilderness condition.

It has been emphasized that the wilderness concept is a personal thing, established from precepts arising from earlier experiences and the end extreme of a spectrum of different land-uses. Clearly wilderness to an Englishman, an Egyptian or an Australian means different things. The very existence of true, untouched wilderness may be queried as pesticide and radio active materials have dispersed throughout the world.

To the person from inner-Sydney a visit to Audley and a walk up Kangaroo Creek in Royal National Park may produce an authentic feeling of wilderness. To other Australians the only real wilderness left in Australia may be the deep and almost unattainable fastnesses near the head of the East Alligator River, the salt-crusted glistening shores of Lake Amadeus or the rugged heathlands and wet forests of southwest Tasmania. Australians are more fortunate than other people in that some areas of untracked wild land are still available for the purest form of wild land use.

Wilderness as a concept is highly variable when measured in landscape terms and provides multiple benefits. In the extreme it generates a feeling of absolute aloneness, a feeling of sole dependence on one's own capacities as new sights, smells and tastes are encountered as the unknown is penetrated. The challenge and the refreshing and recreating power of the unknown are provided by unadulterated natural wilderness large enough in space for us to get "lost" in. Here it is possible once again to depend upon our own personal faculties and to hone our bodies and spirits.

Many other reasons have been identified for preserving a small



A Kakadu National Park wilderness of relict rainforests and intricately weathered sandstones. Photo: George Chaloupka

percentage of our resources in wilderness condition apart from the physical and mental health benefits to the individual human user. Space permits also a brief consideration of them.

Scientists see wilderness areas as natural assets in that they contain reserves of genetic diversity, the consequences of evolution in circumstances which can never be duplicated in time or space. Little is known of the properties of many plant and animal species and wilderness provides refuge for species of possible future use for human benefit. To duplicate this role in botanic and zoological gardens would be costly and probably impossible. Wilderness is seen also as providing habitat for species threatened with extinction by development or environmental change. Similarly wilderness can provide for the integrity of the evolutionary process of plant and animal associations. Within wilderness areas living examples of functioning natural ecosystems useful in research and education can be protected. Study of such natural ecosytems could assist in the development of new management systems for man-made landscapes.

What area of land are we talking about when seeking wilderness protection? Perhaps on average for all national park and nature reserve areas, 30-50 percent might be kept as "real" wilderness. Australia would lose much if it ripped up these last few areas.

The most effective fighters for wilderness protection will be those Australians who have been able to personalize the Australian landscape. They will want to preserve these final vestiges of nature because they will know they themselves are things of nature. Aboriginal people have no trouble in understanding this point of view because they have sustained their civilization continuously for perhaps the longest period ever, living as members of the natural systems.

At Kakadu National Park the Australian National Parks and Wildlife Service and the traditional Aboriginal owners are working together to conserve the area whilst permitting other uses in certain parts, the widom of traditional management is being recognized increasingly. It seems that in some respects the accumulated knowledge of local people may well exceed the outcome of millions of dollars of expensive research for years to come.

Inputs from traditional knowledge, contemporary management technology, modern research, and a sympathetic public are all needed to protect our common wilderness heritage. We make a plea here for all people to work together recognizing that in the end man and nature are indivisible.

The sword of Damocles hanging over man and natural wilderness is the shadow of the extra thousand million people born in the last fifteen years. In the long term the threat to Australian wilderness may depend on the ability of the international community to come to terms with population growth. The launching of the World Conservation Strategy this year is indicative of the changes in attitude that are taking place throughout the world. This recognizes that people are part of nature and the fragile life systems of our planet must be safeguarded if *Homo sapiens* is not to become another endangered species on the brink of extinction.

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Samuel E. Jorgensen

Some International Values of Wetlands

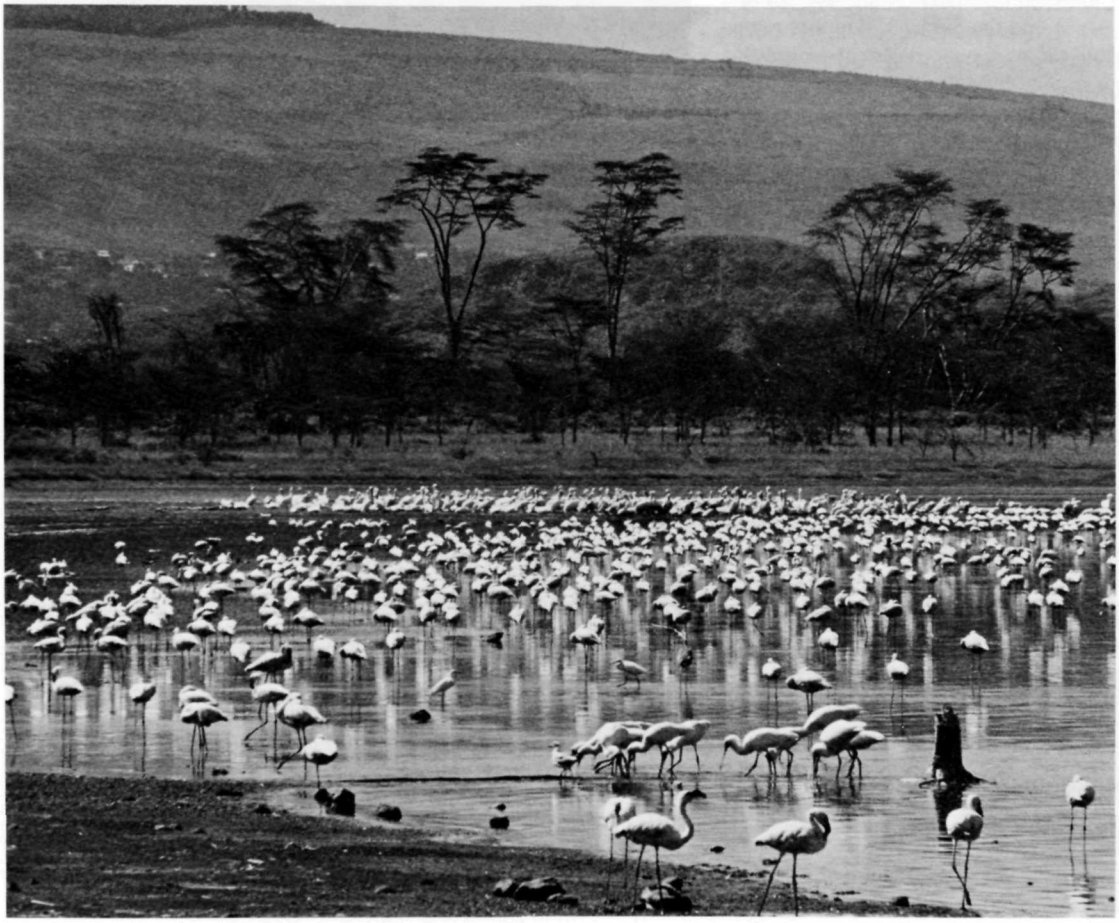
Nature richly endowed much of the inland and coastal surface of the earth with valuable wetlands. Until recent times most of mankind has failed to recognize just how tremendous these values really are, for even today wetlands are among the most seriously endangered of all biotic communities and ecosytems. Uncounted thousands of hectares of highly productive wetlands throughout the world are still being destroyed by drainage, dredging, filling, mining, pollution and other forms of degradation, and converted to other uses. Many were of great international value. Ironically, some of the drained areas could not be used for the intended purpose.

The International Union for Conservation of Nature and Natural Resources, Gland, Switzerland, defines a wetland as follows:

"Areas of submerged or water-saturated lands whether both natural or artificial, or permanent or temporary, and whether the water is static, or flowing, or fresh, brackish or salt. Water-dominated areas to be considered would include marshes, sloughs, bogs, swamps, fens, peatlands, estuaries, bays, sounds, lagoons, ponds, lakes, rivers, springs and reservoirs. Where marine or coastal waters are involved, waters up to a depth of 6 meters at low tide are included."

Beginning some 50 to 100 years ago conservationists in Europe and North America started the long and difficult struggle to protect and preserve wetlands from destruction. Prior to that time few voices were raised in opposition to extensive drainage, dredging, filling and conversion of wetlands to other uses. For example, it is estimated that originally there were 50,800,000 hectares of wetlands in the United States of America. These had been reduced to 32,000,000 ha by 1954. The area drained since 1954 is now (1980) being determined.

Unfortunately, in the early days of opposition to destruction of wetlands and continuing to some extent up to the present time, the principal argument espoused by conservationists in opposition to drainage was the value of wetlands to migratory birds and other wildlife, and in particular waterfowl — ducks, geese, and swans. Information was



In arid countries shallow lakes, sometimes brackish and sometimes seasonal, are a godsend for wildlife, and especially birds. These lesser flamingos, spoonbills and pelicans are at Lake Nakuru in Kenya. Photo: David Keith Jones

lacking or overlooked on many other values such as wetlands' role as nurseries for fin-and shell-fish production. Wetlands are multi-purpose in nature and are extremely high in biological productivity.

Opposing wetland destruction on the basis of their values to migratory birds usually failed. Fortunately in recent years other wetland values have been recognized, many of them on an economic or commercial basis. "Money talks," and these economic values resulting from the production of finfish, shellfish, fur animals, waterfowl, amphibians, reptiles and other animals and plants have been successful in slowing the destruction of some wetlands. However, wetlands destruction continues at an alarming rate.

At this point it is timely to discuss the tremendous economic values of one type of wetland — estuaries. The U.S. Fish and Wildlife Service defines an estuary as:

> "a semi-enclosed coastal water body having free connection with the open sea within which sea water is measurably diluted with fresh water drained from the land."

It has been determined that estuaries are often far more biologically productive than the best farm lands. They are of great value in the production of certain marine fishes, shellfish and other forms of life. In the U.S.A. studies have shown that some unspoiled estuaries have a capital value of up to $200,000 per hectare.

The Wadden Sea shared by Denmark, West Germany, and the Netherlands is an outstanding example of a tremendously valuable estuary producing fish and shellfish each year to the value of about US $140 million. Recent studies indicate that its future may be threatened by pollution, and industrial development.

That progress can be made in the struggle to save a significant part of the world's wetlands is shown by the interests currently underway throughout the world. This is illustrated by the Ramsar Conference convened by the government of Iran at Ramsar, in 1971 and sponsored or co-sponsored by some eight international conservation agencies. The governments of ten European nations, two Asian and three Middle Eastern countries, plus South Africa and the Soviet Union sent representatives to the Conference while six more nations sent observers and many international non-government agencies also sent observers. This conference drew up the "Convention on Wetlands of International Importance — Especially As Waterfowl Habitat."

The Ramsar accomplishments were the culmination of tremendous efforts over many years by the participants. The firm basis for the Ramsar Convention was laid in a series of preparatory meetings over a period of ten years held in France, Scotland, the Netherlands, Poland, Turkey, and the Soviet Union, with participation by many other States and agencies. Unfortunately to date, ratification of the Ramsar Convention by the world community of States has not been as high as expected.

(As of September 1, 1980, 27 States had ratified or acceeded to the Convention. Parties to the Convention will meet November 24-28, 1980, at Cagliari, Italy, to review progress and discuss possible changes.)

In 1976-1977 the Council of Europe adopted a Wetlands Campaign to focus attention on the necessity of action to save these unique natural features. Earlier, progress in North America in preserving wetlands was notable during the 1960s. This was given a great boost in 1961 when the U.S. Congress enacted the Wetlands Loan Act authorizing $105 million for wetland acquisition for conservation purposes. Since then the U.S. Fish and Wildlife Service has acquired more than an additional 700,000 ha of wetlands habitat in the prairie pothole "duck factory" region of the north central United States. Total cost has been US $165 million through 1970.

The Canadian government and the Canadian Provinces have major wetland preservation programs. Ducks Unlimited (Canada), a private conservation agency, has an enviable record in acquiring lands via easements, then flooding them to create excellent wetland habitat in the major migratory bird production and habitat zone of North America.

In spite of these significant results, in North America wetlands continue to be destroyed at an alarming rate. For example, during the 1960s in the United States some 140,000 ha of wetlands in the northern prairies were drained. More than 800,000 ha of river bottomland overflow areas were protected from flooding and put into cropland in the Mississippi River delta and about 350,000 acres (141,645 ha) of extremely valuable coastal marshes and estuaries were destroyed by development for other purposes.

Coastal wetlands in tropical countries often are shrouded in mangrove jungles. Decayed leaves from these trees are nursery food for a host of marine species. Great tangles of mangrove roots and branches resist the sea and provide a relatively stable interface between the land and the sea. Photo: Allan Robinson

Worldwide, the many aspects of wetlands bring benefits to vast numbers of people. Tragically these many values are often not realized by landowners and others who may have little, if any, incentive to preserve them. Often this is because of the lack of knowledge of their intrinsic value as wetlands.

Following are some of the tangible and intangible values of wetlands. New values and uses continue to be discovered.

Tangible Wetland Values

1. *Recreational Values.* Wetlands, particularly coastal and estuarine, offer unequalled values in their diversity of life, scenery, esthetics, and opportunities for recreation. Hundreds of millions of people worldwide visit wetlands annually to study, observe and enjoy the natural life present. Undoubtedly, recreational values are equivalent to millions of

dollars annually. Examples of such areas are the Wadden Sea (Denmark, West Germany, and the Netherlands), Camargue (France), Parc National des Oiseaux du Djoudj (Senegal), Okeefenokee Swamp (Georgia, U.S.A.), Lake Nakuru (Kenya, East Africa).

2. *Production of Plant and Animal Life.*

(a) *Fish production.* Wetlands throb with life. Esturies serve as spawning, rearing and nursery areas producing finfish, shellfish, shrimp, lobsters, clams, and other animals.

(b) *Waterfowl production.* Every year wetlands produce or provide habitat for hundreds of millions of migratory birds including ducks, geese, swans, shorebirds, flamingos, etc. They serve as breeding, rearing, migration and wintering grounds on every continent. More than 160 species of birds are dependent upon wetlands for their existence in North America alone.

(c) *Fur animals.* Muskrats, beavers, mink, otters, nutria and other forms are directly dependent upon wetlands for their existence. These animals are valuable fur producers. The flesh of some is used as human food.

(d) *Amphibians and reptiles.* Wetlands in warm climates produce valuable crops in the form of frogs, alligators, crocodiles and related animals of great value for food and leather.

(e) *Upland wildlife and big game.* Wetlands provide nesting habitat for many species of game birds such as pheasants, grouse, partridge, etc., and are vital as roosting cover during winter. The presence of emergent vegetation in wetland areas provides escape and winter cover for white-tailed deer in the prairie regions of North America, and food for moose or other ungulates.

3. *Timber production.* Wetlands produce valuable timber such as cypress, hemlock, and poplar.

4. *Berry production.* Important foods for human consumption are produced in wetlands, including cranberries, blueberries, lingon berries, salmon berries and many other edible fruits. Wild rice is an extremely valuable crop.

5. *Boating.* Millions of persons pursue and enjoy boating, sailing, canoeing, ice boating, ice skating, swimming, water skiing and other sports on open-water wetlands. England's Norfolk Broads is an example.

6. *Water supply.* Wetlands help recharge underground aquifers; are important direct sources of water for domestic use, for use by livestock, for ice harvest, for transport by boat and sled, for irrigation, contribution to underground water supply, for industrial use.

7. *Forage and fuel.* Wetlands are important producers of plant material for forage, fodder, and bedding for livestock, for thatching roofs, for utensils, for contruction of homes, for insulating material, for construction of livestock shelters, Wetlands have produced billions of tons of peat, a most important source of fuel in many lands.

8. *Fire protection.* Wetlands serve as fire breaks and barriers to range and forest fires, and as sources of water in fire fighting.

9. *Water control and the hydrologic cycle.* Wetlands by their nature serve the important functions of water regime regulation and play vital roles in flood and erosion control. Estuarine wetlands serve as vital buffers to coastal storms. They keep water on the land where it serves man best. They serve as biological filters and recycle nutrients.

Intangible Values

1. *Scientific and educational.* Wetlands offer unequalled opportunities for scientific studies of ecosystems, biotic communities, biological productivity, and scientific research. They provide outstanding outdoor laboratories and classrooms for students. Examples are the Camargue in southern France; the Delta Marsh in Manitoba, Canada; the Wildfowl Trust properties at Slimbridge, Gloucester, England.

2. *Esthetic values.* Wetlands provide esthetic enjoyment to millions of persons from the urban areas who visit them for the pleasure and appreciation they get from these natural wilderness and primitive areas—where they can see, hear and feel mother nature at her best, where they can bird-watch and study and photograph nature.

Countless tiny lakes, ponds, sumps and swampy places, provide resting and feeding places for millions of waterfowl on the migration flyways across continental land areas. Unfortunately for the birds, thousands are being drained and filled to make more farmland. Photo: David B. Marshall, U.S. Fish and Wildlife Service

Wetlands are important in bringing visitors from many lands together to enjoy a common interest while promoting a better understanding among people. Significant attractions can be found in almost every country — even in arid lands where wetlands are relatively rare — and priceless! Lake Ichkeul in Tunisia is an example.

Saltwater wetlands such as the Chincoteague National Wildlife Refuge in Virginia, USA, are among the most biologically productive waters anywhere. This area is part of an enormous wintering ground for Canada geese and other waterfowl. Photo: Luther C. Goldman, U.S. Fish and Wildlife Service

3. *Endangered species.* Many wetlands support and provide the sole habitat for endangered animals and plants. Others serve as vital stepping stones on migration routes for endangered migratory birds. Some wetlands, if destroyed, would see the end of magnificent flocks of birds, i.e., the flamingos of Lake Nakuru, Kenya, and pelicans in the Rift Lakes of Ethiopia.

4. *Recycling values.* Wetlands as complete ecosystems are of great value in recycling nutrients and organic wastes, in recycling and rendering harmless certain toxic chemicals. Wetlands produce oxygen thus helping to maintain the supply of this vital element.

5. *Maintenance of Gene Pools.* Many wetlands are complete ecosystems and thus are vital in the maintenance of gene pools. Their genetic values cannot be ignored or overlooked.

From all of the foregoing it is clear that wetlands have important international values, many that should be protected through cooperative international effort. The Ramsar Convention serves this purpose, and states which have not yet become Parties to the Convention should do so. Instruments of ratification or accession should be deposited with the Director General of UNESCO.

Wetlands are vital links in the web of life. Their loss or continuing destruction—and the inevitable loss of species that always follows—will only make man and his societies much the poorer for it.

Samuel E. Jorgensen is a retired executive of the U.S. Fish and Wildlife Service, where he served as Chief, Office of International Affairs/ Endangered Species. For several years he was involved in the inventory and acquisition of wetlands in the north central part of the U.S.A. He served one year (1972-1973) with the International Union for Conservation of Nature and Natural Resources then at Morges, Switzerland, as a Wetlands Ecologist.

David J. Parsons and Susan A. MacLeod

Measuring Impacts of Wilderness Use

The increasing numbers of recreational users in many backcountry areas have caused widespread concern over consequent resource damage. Managers of wilderness and other natural areas often find themselves in a position of having to try to minimize impacts on physical and biological resources through a variety of backcountry rules and regulations. Wilderness use permits, trailhead or area quotas, campsite closures, one night camping limits, group size limits, designated campsites and limitations on wood fires are some of the restrictions which have been successful (Fazio and Gilbert 1974; Hendee et al., 1978).

One problem which wilderness managers have encountered in evaluating the long term success of such restrictions in reducing impact is the lack of quality baseline data. Effective wilderness management requires an understanding of an area's biological and physical resources, as well as specific data on visitor use levels, distribution patterns, and the resulting impact.

Several systems have been developed to record the extent of visitor impact on backcountry or wilderness areas (Hendee et al., 1976; Bratton et al., 1978). These have generally used campsites as the primary index of resource damage. Approaches such as the Code-A-Site system developed by Hendee et al. (1976) are well suited for wilderness areas with well defined or designated campsites. Such systems however, have often been found to be too time-consuming and logistically unwieldly (often requiring up to 20 minutes and the use of a separate form for each site) for application in large areas with numerous widely scattered, undesignated campsites. In Sequoia and Kings Canyon National Parks, in the southern Sierra Nevada of California, we found it necessary to develop an alternative system whereby campsite impact could be measured but that would be manageable over a large area (more than 348,000 ha) of rugged, remote terrain with numerous undesignated campsites.

This paper presents a method by which the extent and distribution of

camp area development, or impact, in the backcountry can be inventoried and quantified. This method, which is now being extensively used in Sequoia and Kings Canyon National Parks, provides a baseline against which to measure future change as well as a data base upon which to evaluate accumulated impact as a product of use level and vegetation type.

Campsite Impact

While trails and meadows are sensitive to and often sustain serious damage from recreational use (Dale and Weaver, 1974) campsites are the primary focus of most visitor activity and consequent impact. Recent studies indicate that wilderness users spend most of their time in the immediate campsite area. A relatively constant pattern of site evolution with increasing use has been described by Frissell (1978). He notes a gradual progression of increasing development, vegetation denudation, firewood consumption and soil damage with repeated use. In other studies, Merriam and Smith (1974) found that campsite impact tended to level off after two seasons of use in newly constructed sites, while Holmes and Dodson (1976) found that the extent of impact was related to party size. The specific effects of repeated use of vegetation and soil has been the focus of numerous investigations.

Occasional trampling resulting from light visitor use of a camp area often does not cause permanent damage to ground vegetation (Bell and Bliss, 1973). However, with intensive use, ground cover in an alpine ecosystem can be destroyed in one or two weeks (Willard and Marr, 1970). In the Sierra Nevada, low growing woody plants have been shown to be especially sensitive to increasing use (Holmes and Dadson, 1976). The distribution of visitation throughout the growing season is also significant in determining the level of use ground vegetation can withstand without sustaining permanent damage. Seasonal increases in soil moisture may increase the susceptibility of soft vegetation to damage by allowing for the destruction of underground parts in addition to the above ground parts usually affected by trampling. In other cases, certain perennial plants are more susceptible to trampling late in the season when they are past flowering and somewhat dried and brittle.

Changes in plant species composition caused by increased visitor use have also been documented in several backcountry areas (Liddle, 1975). Once severe damage has occurred, long periods of time may be required before measurable recovery of the natural vegetation is observed.

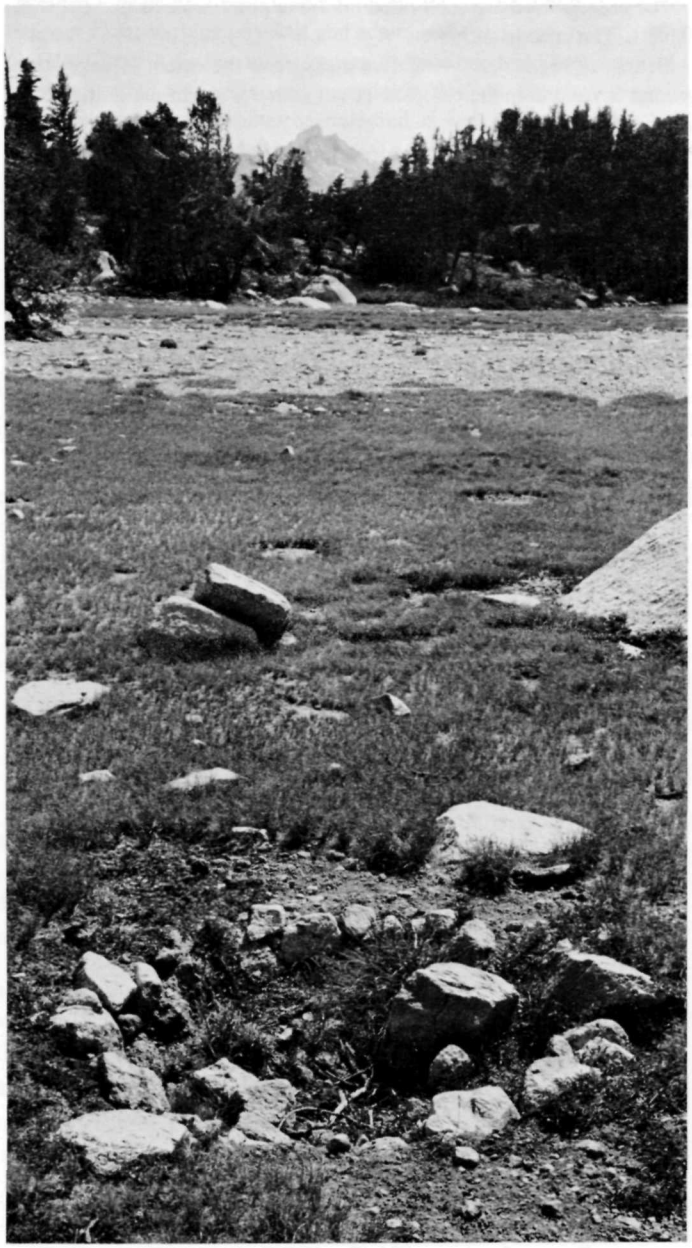
The soil condition within a camp area is closely related to the vigor of the vegetation. The absence of grasses and herbs in a campsite may result in an increase in surface runoff and resulting erosion of organic and mineral soil (Frissel and Duncan, 1965; Willard and Marr, 1970). Heavy use may also result in increased soil compaction and decreased soil moisture (James et al., 1979). Such changes can increase runoff as well as decrease chances of seedling establishment and root penetration.

Because soil and vegetation conditions in campsites are so susceptible to injury from concentrated visitor use, they are important elements in any system for evaluating the extent of backcountry impact. Additional criteria, such as developments (fire rings, wind breaks, tables, etc.) and mutilations (carvings or ax marks) are important visual indications of a developed campsite, but are not as sensitive to different use levels since they can be drastically affected by a small number of users as well as by local management actions.

Inventorying Wilderness Campsites

In developing a system with which to measure visitor impact in wilderness campsites we first defined a campsite as any area showing evidence of overnight use. Such evidence might include fire rings or cleared areas where tents or beds were used. Where areas were so well developed that

Class 5 campsite showing large barren core, campfire rings and mutilation of trees.



Twenty-year-old campsite showing slow recovery in dry sedge meadow.

individual sites could not be distinguished, sites were delineated on the basis of whether on any given night separate parties would be likely to camp in each site, or in the case of large sites, whether or not different portions appear to regularly receive independent use. Campsites in the Sequoia and Kings Canyon backcountry are undesignated. They have evolved over up to a hundred years of repeated use and minimal management. They are thus widely dispersed and of vastly differing size and character.

Visually based rating schemes for assessing campsite damage have been developed and successfully used in several National Park Service and Forest Service wilderness areas (Hendee et al., 1976; Bratton et al., 1978; Frissell, 1978). The Camp Area Inventory system designed in Sequoia and Kings Canyon National Parks uses eight visual criteria to quantitatively evaluate the level and extent of impact in each backcountry campsite. The criteria reflect vegetation and soil damage, as well as the degree of campsite development, without requiring detailed mapping or measuring of each site. While not an exhaustive list, experience indicates that these eight factors, along with measures of site crowding and the distance to water, represent an effective measure of campsite-based backcountry impact.

The criteria used are each rated on a five point scale as presented in Table 1. The criteria include:

Density of Vegetation: A relative measure of the extent of vegetative ground cover within the campsite as compared with similar unimpacted areas outside the site.

Composition of Vegetation: A measure comparing the species composition and relative abundance in the campsite to surrounding unimpacted areas.

Total Area of the Campsite: An estimate of the total area affected by trampling directly associated with use in and about the site.

Barren Core Area: An estimate of the area which due to trampling has been completely denuded of vegetation. This usually corresponds to the central activity area of the site.

Campsite Development: A descriptive rating reflecting the amount of man-made "improvements" in the campsite. (This rating is often disproportionately low in areas where backcountry rangers are actively maintaining or managing sites.)

Litter and Duff: Applied only in forested areas, this measure indicates the relative amount of pulverization and removal of organic debris (needles, cones and twigs) as a result of trampling and other use.

Social Trails: A measure indicating the amount of concentrated trampling of surrounding vegetation as reflected by the formation of access trails to nearby destinations such as water sources, other campsites, main trails, etc.

Mutilations: A measure to document the number of permanent marks on the campsite such as carvings, ax marks, and nails in surrounding trees.

On the five point impact scale (Table 1), level five represents maximum impact, or diversion from natural conditions. Level one represents minimal impact. Each campsite receives a rating for each of the applicable criteria. These values are summed and divided by the number of criteria used. The resulting mean value constitutes the campsite's overall rating or "campsite class." With experience, a site can be given a class rating, briefly described, and located on a sketch map of the area in a couple of minutes.

Using this system, a class one campsite would usually be no more than a small sleep site and possibly a fire ring with little or no vegetative change or trampling evident. At the other extreme, a class five site would be a large, heavily used, barren area. Often such sites have numerous leveled sleeping sites in addition to several large and often unsightly fire rings and rock walls.

In addition to the campsite impact class, descriptive information on the overstory and understory vegetation, including percent of cover, is recorded for each site. The distance to water and the number of class three, four or five sites within 100 ft. (30.5 m), a measure of campsite crowding, are also recorded in each case. Recommended management actions, if any, as well as the potential for each site to accommodate large groups are also noted. All sites are located on a freehand map showing major geographical features, potential camping areas, and compass direction. Figure 1 shows a sample completed data sheet for the Evelyn

Table 1. Criteria and Rating Factors Used for Camp Area Inventory.

Density of Vegetation

(with respect to surrounding vegetation):

1—same as surroundings
3—moderately less dense than surroundings
5—considerably less dense than surroundings

Total Area of Campsite:

1—less than or equal to 20 feet^2 (2 m^2)
2—21-100 feet^2 (2-9.3 m^2)
3—101-500 feet^2 (9.4-46 m^2)
4—501-1,000 feet^2 (46.1-93 m^2)
5—greater than 1,001 feet^2

Campsite Development;

1—windbreaks and paraphernalia absent; trash and seats minimal; fire rings absent or scarce
2—trash, windbreaks, seats and fire rings minimal; paraphernalia absent
3—trash, windbreaks, seats mostly moderate; fire rings mostly minimal; paraphernalia minimal
4—trash, windbreaks, seats, fire rings, and paraphernalia mostly moderate, some heavy
5—trash, windbreaks, seats, fire rings, paraphernalia mostly heavily developed

Social Trails:

1—none
2—1 trail discernible
3—2 trails discernible
4—1-2 trails well developed, or 3 or more trails ± discernible
5—3+ trails well-developed

Composition of Vegetation
(with respect to surrounding vegetation):

1—same as surroundings
3—moderately dissimilar
5—significantly dissimilar

Barren Core:

1—absent
2—5-50 feet^2 (.50-4.6 m^2)
3—51-200 feet^2 (4.7-18.6 m^2)
4—201-500 feet^2 (18.7-46 m^2)
5—greater than 501 feet^2

Litter and Duff:

1—trampling discernible; some needles broken, scattered cones
2—moderately trampled; needles broken; compacted; few cones
3—heavily trampled; clumped; pulverized; cones absent
4—litter ± absent; pulverized; ground into soil
5—litter and cones and duff completely absent

Mutilations:

1—none
2—1-2
3—3-5
4—6-10 or 1-2 highly obtrusive
5—11+ or 3± highly obtrusive

AREA DESCRIPTION — Date 7-10-78

Segment EVELYN LAKE — Zone 98, HOCKETT — Elevation 2,988 M.

Landform LAKE BASIN

Capability Potential: 30%

Currently Used: 30%

Overstory/Cover RED FIR - 40% LODGEPOLE PINE - 30%

Meadows INSIGNIFICANT

Fuels Rating ABUNDANT

Comments MANY FIRE RINGS -- NEEDS MANAGEMENT

Campsite Number (on map)	Campsite Class	Ecological Type Overstory	Ecological Type Understory	Site Pot.	Dist. to H_2O	Crowding 3,4,5's	Comments
1	3	LP-RF	—	OK	3	—	—
2	2	RF-WWP OPEN	RIBES	OK	3	—	—
3	3	LP-OPEN	HERBS 10%	OK	4	—	—
4	2	RF-OPEN	CHINQ-FRINGE	OBL	4	—	TOO CLOSE TO WATER
5	2	RF-OPEN	WILLOW-FRINGE	OBL	4	—	TOO CLOSE TO WATER
6	1	LP-OPEN	ROCK	OK	4	—	—
7	1	LP-OPEN	GRAVEL	OK	1	-	—
8	4	RF	CHINQ-FRINGE	OK	4	5,5	4 FIRE RINGS
9	5	RF	BARREN	LG	3	4,5	TRASH
10	5	RF	CHINQ-FRINGE	OBL	2	5,4	SERIOUS VEGETATION DAMAGE
11	3	RF-OPEN	VACCINIUM 20%	OK	1	—	—
12	2	RF-OPEN	—	OK	1	—	—
13	3	RF-OPEN	SANDY	OK	1	—	—

Key:

Ecological Type -
LP = Lodgepole pine
RF = Red fir
WWP = Western white pine
CHINQ = Bush chinquapin

Site Potential -
OK = Acceptable
OBL = Obliterate
LG = Large group site

Distance to Water -
1 = 100 feet (30.5 m)
2 = 50 - 100 feet (15 - 30.5 m)
3 = 25 - 50 feet (7.6 - 15 m)
4 = 0 - 25 feet (0 - 7.6 m)

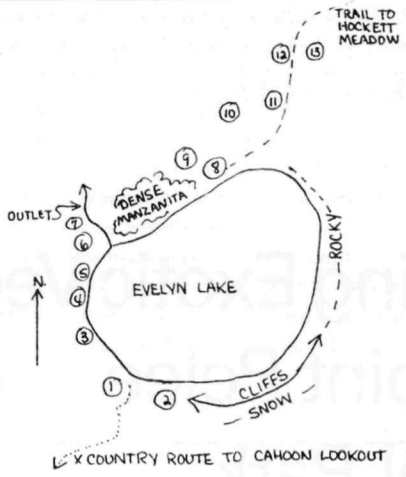
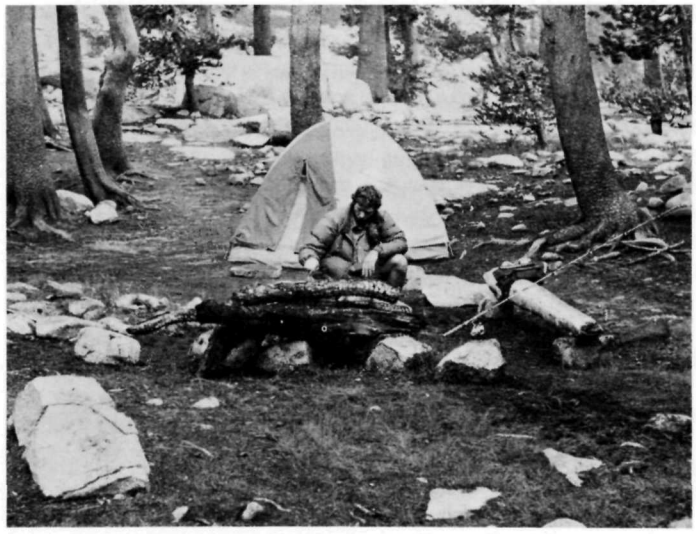


Figure 1. Field data form and sketch map showing location of campsites at Evelyn Lake.

Lake area in Sequoia National Park. It should be noted that the individual impact rating scales as well as codes for other site factors (such as distance from water) have been developed through considerable experience in the southern Sierra Nevada. They may require adjustment or refinement to be applicable to other areas. Similarly, depending on the local environment, additional criteria may be found to be more applicable. There is no reastriction on what or how many criteria are to be used in rating the sites.

For each group of campsites, information characterizing the overall area is noted (see Fig. 1). This includes vegetation type, elevation, trail access, land form (i.e., lake basin, river valley, etc.), and an estimate of the percent of the area that could potentially accommodate camping. Such information can be collected as applicable to specific management needs in any wilderness area. Since the factors to be recorded as well as their breakdown (specific landforms, forest types, etc.) would vary with the area studied, we have not attempted to list all the alternatives in this paper (see Fig. 1 for examples).

Data on the campsites of a given management area (a lake basin, valley or other readily definable management unit) can then be summarized to reflect the total number of sites, the number in each impact class or such parameters as the relative crowding or proximity to water. When analyzed together with the other types of data collected the impact ratings



Occupied campsite in lodgepole pine forest.

provide a basis for understanding the nature and distribution of visitor impact under varying physical and ecological conditions.

The Camp Area Inventory system as developed and implemented in Sequoia and Kings Canyon has proved to be flexible enough to be applied to the various types of sites encountered as well as to all of the Park's varied ecosystems. To date over 7,400 campsites have been inventoried covering 310,231 hectares of backcountry. These include camp areas located in chaparral, giant sequoia, mixed conifer, subalpine forest and alpine vegetation types.

Application to Management Problems

The Camp Area Inventory system described here presents a manageable approach to collecting, summarizing and analyzing data on recreational impact in wilderness camp areas. The system is especially well suited to large backcountry areas with numerous, undesignated, widely dispersed campsites. The data may be analyzed in a number of ways so as to

Social trail leading to lake from nearby campsite.

provide both a defendable basis for immediate management decisions as well as a baseline of data against which to evaluate future changes. In addition to a detailed description of impact in the area, the data provide a valuable basis upon which to relate campsite impact to visitor use levels, elevation, vegetation type or any other measurable variable. The data also provide valuable input for using computer models to simulate backcountry recreational use and consequent impact (Shechter and Lucas, 1978). Such analyses should provide the manager with an improved predictive capability of estimating the effects of changing use levels or restrictions before they occur.

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Removing Exotic Vegetation from Point Pelee National Park

The Exotic Vegetation Problem

Introduced or exotic plant species can seriously effect native vegetation. These species, depending upon their success and visibility, can cause irreversible changes in the structure, composition, physiognomy and ecology of naturally occurring vegetation communities. It is understandable that in national parks and nature reserves dedicated to the preservation of functioning natural ecosystems, removal or control of exotic plant species is desirable. Parks Canada's Policy (1979) states that "non-native species of plants and animals will not be introduced into a national park and, where they exist, efforts will be made to remove them" using "techniques that duplicate natural processes as closely as possible."

Point Pelee, a sand spit formation on the north shore of Lake Erie, is the most southern land in Canada with almost 20 kilometers of beach and several square kilometers of fertile soils surrounding a large fresh water marsh. Due to its proximity to the cities of Detroit and Windsor (Map 1), it was a very popular cottage area and supported several vegetable farms and orchards when it became a national park in 1918. The arrangements made at that time did not include purchase or expropriation of the many privately owned parcels of land within the Park boundaries. As a result, planting and nurturing of ornamental plants, and continued use of the orchards and agricultural fields, increased the number of exotic plants found in the Park (Battin, 1975). During this same period Parks Canada's policy on exotic species was evolving and not yet formally stated. It seemed quite reasonable for the park managers of the day to plant exotic species to provide shade in visitor areas, to help control shoreline erosion, to encourage forest cover in abandoned fields and to re-establish species thought to have been native in the park or which were of general botanical interest. Little thought was given to the long-term consequences of this approach to vegetation management in a national park. (Parks Canada, 1978).

In the late 1960s, over 90 percent of the original 400 cottages were finally acquired and removed. Removal of the buildings did not include removal of the exotic vegetation surrounding them. However, this reduction of private residences within the park made systematic removal or control of exotic vegetation a practical management objective.

By 1973 the sheer visibility and success of many of the introduced species brought the need for an exotic vegetation removal program to the attention of the park managers. Day lilies covered stretches of roadside with their orange and yellow flowers, large silver poplar dominated the

skyline at the Nature Centre while Lombardy poplar did the same at the Administration Building. Tree-of-heaven and black locust were the most successful regenerating trees in some abandoned fields. Lilacs were becoming taller and wider and English ivy had covered over a tenth of a hectare around several trees.

Two spectacular examples illustrate how the exotic vegetation problem was brought to a head in 1976.

Eight silver poplar were treated with cacodylic acid in 1973 then cut down in 1974. The chemical treatment did not kill the trees and by 1976 eight-tenths of a hectare were covered with hundreds of suckering shoots, some over 100 meters from the parent trees (Fig. 1).

The thick tangles of English ivy, which had only reproduced vegetatively in the past, underwent a morphological change which indicated fruit would be produced in 1977. This had never been reported before in Ontario. But in British Columbia the English ivy is a severe problem because birds feeding on the berries have helped disperse the species throughout suitable habitats (Fig. 2—fruiting bodies circled).

Planning Removal of Exotic Vegetation

The first step in systematically removing or controlling exotic vegetation was to precisely identify and map the species involved. Park managers contracted a University botanist experienced with the Park flora to work with their staff on an inventory of the exotics. Astonishingly, 20 percent of the over 600 plant species found in the Park could, technically speaking, be considered exotic (Parks Canada, 1977). Clearly, the effort required would not be feasible if all these species were to be designated exotic. However, the lists and maps generated did provide an academic basis for the next step in planning exotic vegetation removal.

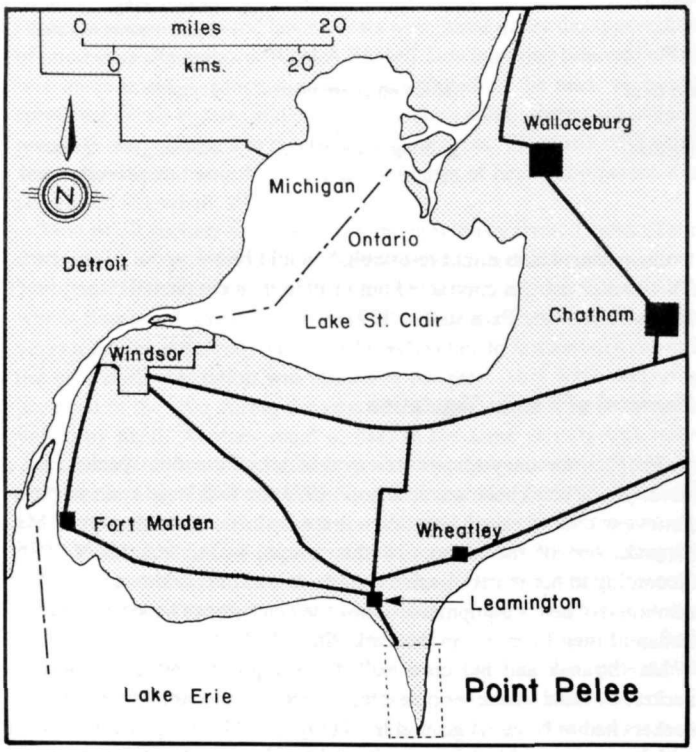
It is part of the job of natural resource managers to adapt scientific data and tested methods so that realistic courses of action that satisfy Park objectives can be implemented. Justifiable criteria to reduce the list of theoretical exotic plant species were required. Stratification of the list occurred in several stages.

The University botanist was reconsulted to identify species that were pioneers or adventives, ubiquitous or whose ranges were expanding. A number of introduced plants were found to be common in old fields, roadsides and disturbed situations which had not been purposely introduced and which had entered by a variety of pathways and for a number of ecological reasons. Thus such plants as orchard grass (*Dactylis glomerata*), dandelion (*Taraxacum officinale*), bouncing bet (*Saponaria officinalis*), quack grass (*Agropyron repens*), garlic mustard (*Sisymbrium alliaria*), burdock (*Arctium minus*), tall brome grass (*Bromis inermis*), tall fescue grass (*Festuca arundinacea*), mouse-eared chickweed (*Cerastium vulgatum*), and others were removed from the list of exotic species.

Only 60 species remained but this, too, was an impractical number to consider for removal or control as exotic vegetation. These remaining species were then examined to determine their exact status in the Park.

It was suspected that many of the species were represented by only single or scattered individuals while other species were not reproducing successfully or were actually in states of decline. It was thought that natural processes would be likely to eliminate these species as time passed. This turned out to be the case for apricot (*Prunus armeniaca*), horse chestnut (*Aesculus hippocastanum*), Kentucky coffee tree (*Gymnocladus dioica*), mock orange (*Philadelphus caronarius*), peach (*Prunus persica*), Norway maple (*Acer platanoides*), Norway spruce (*Picea abies*), paper birch (*Betula papyrifera*) and a number of other species.

Some species could be judged as seasonal, or they were well hidden from the visitors' view. Obviously these species had to still be regarded as exotics but until they became more visible, or began spreading and



Map No. 1. The location of Point Pelee National Park.

Fig. 1: Suckering silver poplar dominate the foreground and shade the sumac which naturally invade the edges of abandoned fields.

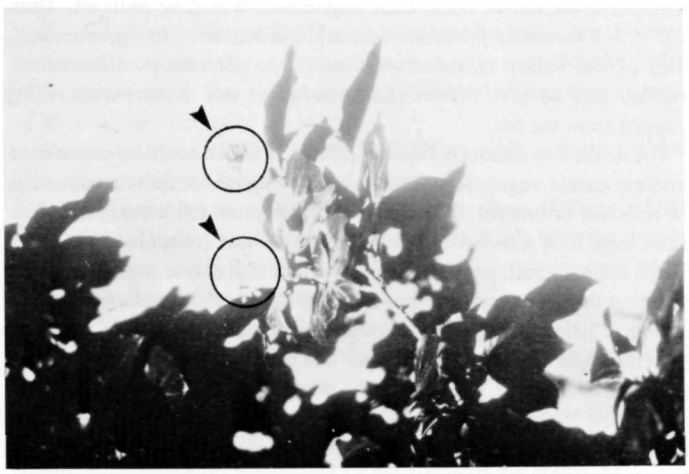


Fig. 2: Developing fruiting bodies (never before found in Ontario) were observed in a profuse growth of English ivy on a hackberry tree.

TABLE 1: SUMMARY OF EXOTIC VEGETATION REMOVAL AT POINT PELEE NATIONAL PARK

Priority Exotic Species		Status in 1976	Removal Priority	Removal Practice	Removal Success
Apple	*Pyrus malus*	static, but widespread	immediate	bulldozing, pulling up entire plant, cutting	complete (variable suckering)
Black locust	*Robinia pseudoacacia*	spreading and widespread	immediate	bulldozing, pulling up complete plant, cutting	unsuccessful (chemicals are being tested)
Box elder	*Acer negundo*	static and localized	long term on identifiable plantings	natural elimination	permanently established
Catalpa (2 varieties)	*Catalpa speciosa*	static and localized	immediate	bulldozing, cutting	complete
Chinese elm	*Ulmus pumila*	static and localized	immediate	bulldozing, pulling up complete plant, cutting	complete (suckering for three years)
Cypress spurge	*Euphorbia cyparissias*	static and localized	long term	no practice selected	no removal undertaken
English ivy	*Hedera helix*	spreading but localized	immediate	digging	partial
Honey locust	*Gleditsia triacanthos*	native but plantation	long term on identifiable plantings	no practice selected	no removal undertaken
Jack pine	*Pinus banksiana*	static and localized	long term	natural elimination	gradually failing
Japanese barberry	*Barberis thunbergii*	static and localized	short term	pulling up entire plant	complete
Japanese honeysuckle	*Lonicera japonica*	static and localized	short term	pulling up entire plant	complete
Japanese knotweed	*Polygonum cuspidatum*	spreading but localized	short term	pulling up entire plant	complete
Lilac	*Syringa vulgaris*	spreading and widespread	immediate	bulldozing, pulling up entire plant, using hand tools	complete to partial (where possible bulldozing best)
Lombardy poplar	*Popular nigra italica*	spreading but localized	immediate	cutting	complete to partial
Day lilies (orange and yellow varieties)	*Hemerocallis flava*	spreading and widespread	immediate	digging and soil shifting	partial to unsuccessful (most vulnerable in open areas)
Periwinkle	*Vinca minor*	spreading but localized	short term	digging and flower removal	complete
Privet	*Ligustrum vulgare*	static and localized	short term	pulled up complete plant	complete
Sweet briar rose	*Rosa elentaria*	spreading but localized	long term	no practice selected	no removal undertaken
Silver poplar	*Populus alba*	spreading but localized	immediate	cutting	complete (after 6 years of suckering; chemical stump treatments after cutting required)
Tartarian honeysuckle	*Lonicera tartarica*	static but localized	short term	pulled up entire plant	complete
Tree-of-Heaven	*Ailanthus altissima*	spreading and widespread	immediate	girdling, bulldozing, cutting	partial (girdling after the foliage breaks best)

dominating the native flora, their importance would be reduced. Thus daffodils (*Narcissus pseudonaricissus*), garden iris (*Iris germanica*), lilies-of-the-valley (*Convallaria majalis*), snowdrops (*Galanthus nivalis*), and several willow (*Salix serissima and s. purpurea*) were dropped from the list.

The result was a list of 23 species (Table 1) which could be considered problem exotic vegetation. These species required active management for removal or control. The removal practices which would be undertaken were then selected and implementation was scheduled.

In a national park environment it was felt that exotic removal should not occur during the main visitor season so the work was planned for the autumn. Chemical methods, although recognized as extremely effective for certain species, were not selected. Our basic philosophy opposes their use in parks. Further, there would be potential difficulties in controlling application so that desirable species would not be affected. The use of heavy machinery such as bulldozers, while recognized as effective for the removal of large trees, would be minimized. Labor intensive practices relying on hand tools were selected. Removed vegetation that would not reroot would be strewn around the removal sites while material from species which might re-establish would be taken out of the Park. The work itself was contracted out in 1976 then conducted under direct supervision of the Park staff in 1977.

Removal of Exotic Vegetation

Although some unsystematic removal of specific exotic species (e.g., silver poplar) had been undertaken in 1973 the first large scale effort to remove or control exotic vegetation in the Park was by contract with Ms. Stranak, one of the authors of this article, in the autumn of 1976. According to her terms of reference she was to hire a crew and, using a minimum of heavy equipment, remove selected priority species based on a map of their locations in the Park (Stranak, 1976).

Ms. Stranak and her crew pulled silver poplar and tree-of-heaven suckers by hand whenever possible, but some of the larger three year old suckers had to be cut at ground level (Fig. 3). All stumps were covered with heavy-gauge black plastic sheets held down with soil. In the small areas covered by the plastic, the suckering ceased, but in the remainder of

the area, where it was impractical to use the plastic sheets because of the need to regenerate desirable native plant species, suckering continued. Each subsequent year suckers have been pulled by hand by Park staff and suckering has been reduced to about 5 percent of the initial post-cutting crop.

After the completion of the sucker-pulling the contracted crew turned to other problems. Lilac clumps with stems up to 7 cm in diameter were cut at ground level, and the stubs were again covered with dark plastic sheets held down by soil. During the following winter drawbacks at some locations became noticeable. Dead branches from surrounding trees fell during strong winds and punctured the plastic sheets. Careless park visitors and deer hooves also contributed to the perforation of the covers. During the next growing season the lilacs sprouted through the perforations. A few of the sheets remained unperforated, but nonetheless lilacs suckered around the perimeter of the sheets — in one case, four years later.

The day lilies were then dug up by hand, and the soil was sifted. All roots and tubers were sorted from the diggings and bagged, then transported to refuse grounds outside the park (Fig. 4). It was impossible however to get at all the roots. Often the lily roots were protected from removal by the larger roots of desirable trees and shrubs. The only way to achieve total eradication of the lilies would have been to imperil all the vegetation in the area. In the treated areas the lilies are now much reduced, spreading diminished, and native species have had a chance to take hold. English ivy and periwinkle were also treated using the manual technique, and similar problems were encountered.

Apple trees were widespread throughout the park, even in areas that were remote from former residential or cultivated properties. Ms. Stranak's crew cut them down and most of the stumps dried without suckering. The suckers that did occur died out within three years.

Finally a highly visible Chinese elm at the southern tip of the park was cut down and it suckered moderately for the next three years. The suckers were pulled several times each year since, and there has been no suckering during 1980.

It became clear after the contracted work in 1976 that removal or control of the priority exotic species in Point Pelee National Park was a larger and more costly activity than originally envisioned. Rather than continue using contracted labor, crews were hired under the supervision of another of the authors, Warden Russell Dowhan, and renewed effort was made in 1977. Emphasis was again placed on the most visible or spreading exotic species and on supplementary work where suckering or regrowth was observed in the 1976 removal areas. Since the 1977 work was under direct control of the Park more use of heavy equipment was permitted. (Dowhan, 1977).

First of all suckers were pulled in the previously treated areas. Then work began at the narrow tip of the park and progressed northward.

A small bulldozer was used to uproot two large solid stands of lilacs which flourished among large hackberries near the tip. After all the vegetation was removed, the ground was levelled to former contours and the now dead vegetation was strewn in the area. Very little suckering occurred in the area during the next two years, and these suckers were pulled by hand. Another stand of lilac in the same vicinity was interspersed with hop-trees and mulberry. This stand, with stems up to 10 cm in diameter, was removed by hand tools so as to leave the hop-trees and mulberry unharmed. The protection afforded by native species to the roots of the lilac resulted in profuse suckering. Sucker pulling during the following two years reduced the lilac in this area to a few sprouting stems by 1980. Several smaller clumps of lilacs along with most of their root systems were pulled up by chain and bulldozer in other areas of the Park with minimal suckering afterwards. However there are still some stands of lilacs to be removed in locations where hand tools must be used.

Three tree-of-heaven 8, 10 and 15 cm diameter at breast height were girdled. The 8 and 15 cm trees died with only a few suckers, but suckering was profuse for the next two years near the 10 cm tree. Two tree-of-heaven of about 30 cm in DBH were uprooted by bulldozer and these have suckered minimally each year to date. A large tree-of-heaven of 90 cm in DBH was cut down. Suckering is still overwhelming for a diameter of 30 m in the vicinity of the stump.

Fig. 3: Silver poplar suckers were pulled by hand from among the sumac and piled previous to disposal by burning.

Fig. 4: Workers found it necessary to dig up areas of day lily and sift the soil to remove roots and tubers.

Six catalpa trees of 30 to 80 cm in DBH were cut with only a little suckering during the following two years.

Lombardy poplars were cut down in two areas. Trees of 40 cm in DBH or less did not sucker, but the larger trees sprouted freely from the stumps, with moderate suckering from the roots. Continuous removal of the suckers has been necessary ever since.

Five Chinese elms were pulled out entirely and all sprouted minimally from the root remnants during the first two years. Two other trees which were bulldozed are still suckering sparsely today.

A stand of quince in a dense stand of Drummond's dogwood of about equal size was chopped out below ground whenever possible. Suckering occurred, but is being suppressed by the shade of the dogwood.

A variety of other exotic species such as the barberry, two species of honeysuckle, Japanese knotwood and the privet were pulled out with

complete success whenever they were in visible locations.

Black locust was and still is the most widespread undesirable tree in the park. Hundreds were pulled up with chain and bulldozer; a few dozen of the larger trees were bulldozed down; and a few were cut because of their locations near desirable trees. Several specimens with dense grape tangles in the crown were left standing for further observation. No matter how these trees were removed, extreme suckering resulted. The root systems of this species are closer to the surface than the roots of the other species mentioned and suckering appears to contribute more annual vegetative mass than would the standing tree itself. The mature black locusts were surrounded by hundreds of seedlings of various ages, and some of these seedlings were producing seed. The removal of the fruiting trees and seedlings may not have reduced the vegetative mass in the areas treated but it has reduced the spread of the species by seed dispersal. Moreover, the thick stands of suckers will undoubtedly be thinned to more manageable proportions by intraspecific competition.

Following Up Exotic Vegetation Removal

As shown in the previous sections the complexity and cost of conducting an exotic vegetation removal program at Point Pelee National Park was much more than originally anticipated.

There were many more species that could be designated exotic than were expected, which increased the costs of identifying and mapping each of their distributions in the Park. It was necessary to compromise the thoroughness of the program in the early planning stages by deleting species that were far too common to be effectively handled, and further deleting species which were being slowly but naturally eliminated or which were seasonal or of low visibility. Finally, the need to select removal practices in keeping with the national park philosophy meant that costly and sometimes inefficient methods had to be used.

Nonetheless the intensive efforts in 1976 and 1977 resulted in a significant reduction of spreading and highly visible exotic vegetation. But these intensive efforts alone were insufficient. Park staff have had to regularly monitor the sites where species such as apple, Chinese elm, day lilies, silver poplar and tree-of-heaven were removed to combat suckering. For species such as English ivy and lilac no end to this regular follow-up removal can be seen. In the case of black locust the preferable mechanical approaches were totally unsuccessful. At the present time experiments in cooperation with a nearby agricultural research station to determine the most effective type and application of chemical control has been initiated. And, of course, many of the species deleted from the list during planning must be monitored in case their status changes and active removal or control becomes necessary.

Point Pelee National Park has become aware that a program such as exotic vegetation removal cannot be a single-shot effort but must be ongoing. Documentation of the rationale, the methods and the priorities must be thorough and ensure continuity of funds and responsibility. This has been confirmed in the Park Management (Master) Plan (draft, 1980) where the guidelines for natural resource management state that:

> "Due to the potential of non-native plants to spread and eliminate native plant species and communities, a revised exotic removal program will be continued. This will primarily consist of monitoring and follow-up of previously implemented programs. More extensive exotic removal may be required in connection with the maintenance of certain old fields."

and that:

> "Non-native plant species will not be introduced. Only native-plant species will be used for landscaping or rehabilitation. Operational practices will be modified (as necessary) so that creation of desirable habitats for non-native species is reduced."

There were two major sources of exotic vegetation in the park: introduction by private landowners and introduction by park managers. Acquisitions of properties has eliminated the former, and changed perceptions have eliminated the latter. The need for approaches to removing or controlling exotic vegetation have been formalized and the work is now a part of day-to-day park operation.

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W. R. Stephenson is a Natural Resource Management Specialist at Parks Canada responsible for planning and implementation of all natural resource-oriented projects at several national parks, historic sites and recreational waterways including Point Pelee National Park. Russell Dowhan is a Warden at Point Pelee National Park and he is responsible for continuing work on exotic vegetation removal. Marion Stranak is now an Interpreter at Point Pelee National Park, but previously she held a contract to undertake the removal of many of the Park's exotic species. All three authors can be contacted through the Park in Leamington, Ontario, Canada.

PARK TECHNIQUES

Gravelling Trails By Helicopter *Ken Erdman*

Mt. Assiniboine Provincial Park in British Columbia, Canada, is a wilderness mountain region adjacent to Banff National Park. There are no roads. Visitor and staff access is exclusively by trail or helicopter.

Trail riding was historically the main method of transportation but it has been restricted due to the heavy erosion problems that were generated. Hiking and backpacking are now the dominant recreation activities and means of access. This foot traffic also contributes to deterioration of the trail system and, in addition, develops new trails by the simple passage of hiking boots on the fragile subalpine terrain.

The average elevation of the Park is about 2300 m. It is a wet area due to its location on the Continental Divide and the resultant heavy precipitation. Trails would develop wet sections from snowmelt and summer rainfall. Rutting and erosion usually followed. A natural tendency of people was to move to one side or the other and walk or ride by these problem sections, often on or over the adjoining vegetation. The result was a rapidly growing string of braided trails.

The Park staff tried to solve the problem using different techniques: barriers, 'Trail Closed' signs, bridging, and special drainage devices on the wet sections of trail. Good results were attained in many cases but a broader, more positive approach was the decision to upgrade the key routes to a level that would ensure the trail itself was the most attractive route. It was perceived that people would remain on a high quality gravelled trail that did not turn to mud in wet weather.

Our first experiments with gravelling were successful but there were limits to the amount of trail that could be upgraded using manpower alone in such inaccessible country. However, having a helicopter based a 20-minute flight away in Banff led us to consider using it to fly in gravel on a larger scale. Clean, flat shale gravel was readily available in many areas from dry streambeds or lakeshores. This gravel source was suitable because removal would have little negative impact on the park environment. Furthermore, the gravel was easy on hikers' feet.

Transport of the gravel by helicopter utilized a simple oil drum slung underneath the aircraft. Drums were reinforced and specially modified in the district shop with a solid, easily released trap-door on the bottom of each drum. Dumping of the gravel could be accomplished by pulling a lever or rope as the load was accurately positioned from above. The trail bed was prepared beforehand, usually by removal of some mud and rock, and sometimes plastic sheets were laid out to protect the vegetation bordering the dumping stations.

In our initial attempt a total of 920 m (3,018 ft.) of trail was gravelled in three hours with 58

A specially modified common oil drum slung beneath the helicopter can carry 450 kg of fine gravel for maintenance and upgrading of trails.

Braided trails are a common problem at high elevations. They result when horse or foot travellers take alternate routes to avoid mud or water.

A lakeshore at low water, a handy source of gravel. Removal of relatively small amounts had virtually no environmental impact.

Gravelling mountain trails: one Ranger guides the helicopter pilot into position, then his partner releases the load of gravel.

loads. A full study of costs and comparisions with other methods proved it to be cost effective. Since then, the efficiency of the operation has been increased. As one barrel is flown in, two others are speedily filled by the crew with shovels. The gravel was dumped in preplanned piles; it was spread later because helicopter time was so valuable.

The trails sometimes require a great quantity of gravel to build up the trail bed and to provide moisture drainage. But the results are worth the effort: decreased maintenance problems, and protection of the flora by reducing braided trails. The trails are also much more pleasant to walk on, especially in wet meadows, and after rainfall.

Additional information and specifications can be requested from District Manager, Parks and Outdoor Recreation Division, Attn: Chris Sadleir, Box 118, Wasa, British Columbia, Canada VOB 2KO.

Ken Erdman was a Ranger in Mt. Assiniboine Provincial Park in British Columbia for three seasons. He is now employed with the Operations Branch, Alberta Provincial Parks, Edmonton. Photos are by the author.

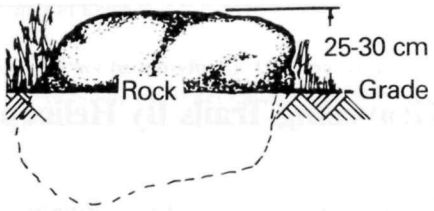
Protect Fragile Shrubs with a Rock Barrier

Canada's Department of Natural Resources shares this idea for protecting shrubs that lie near roads or walkways by placing rock barriers strategically in front of them.

Use the largest rocks you can handle practically and set them in a natural, irregular pattern rather than a straight line. Each rock should project at least 25 cm above the ground; but only about ⅓ of the rock should be visible, the rest should be buried. For a solid, natural appearance and to prevent removal, set the rocks on their natural bed, avoiding sharp corners and points above the ground.

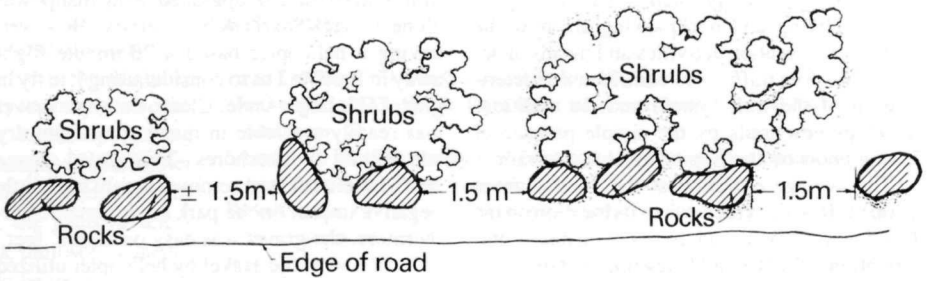
It is recommended that the rocks not be painted and that their naturally weathered appearance be preserved.

This item was taken from *Grist* (July-August 1980), a publication of the Park Practice Program of the Heritage Conservation and Recreation Service, U.S. Department of the Interior, and the National Recreation and Park Association.



ELEVATION OF ROCK SET IN GROUND

PLAN FOR SETTING ROCK BARRIER



Mowed Walkway

Masses of rhododendron cover the gentle hillside around the Countryside Commission for Scotland's buildings at Battleby in the village of Redgorton near Perth. In the spring when these plants are covered with large colorful blossoms they are highly attractive to visitors.

To accommodate this very seasonal traffic the Countryside Commission mows a path through the weedy grasses and around the plant clusters — a thoughtful convenience for sightseers and photographers who want to get close to the displays of color. — *R. I. Standish. Photo: William A. Worf*

A Trail for All People *John J. Palmer*

"We must ready ourselves and our parks for the arrival of older people, of urban people, of non-English speaking and physically and economically handicapped people. We must work to remove all barriers that keep people out of the parks, for parks must not continue to be exclusive."

WILLIAM J. WHALEN
Superintendents Conference, October 1977
(Director, US National Park Service, June 1977-May 1980)

Looking up at the stately red columns, the gray-haired lady exclaimed, "My, aren't these trees simply magnificent? Is this tree really over 2,000 years old?"

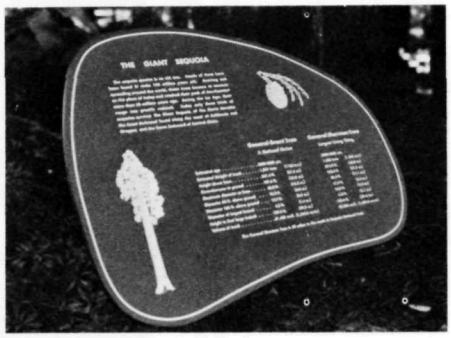
The ranger nodded his head and launched into an explanation of the giant sequoias' remarkable longevity. Not so different really than a thousand other occasions when he was asked the same question. Yet, *this* situation was different. The gray-haired lady who asked the question was seated in a wheelchair, at the base of the General Grant tree, in the middle of a giant sequoia forest. She was visiting Kings Canyon National Park, California, with her brother and was becoming acquainted with the natural history along the "Trail for all People."

This unique trail wanders for about .6 of a mile (1 km) thru the heart of one of the most famous groves of giant sequoias in the parks. Completely paved to a width of about eight feet (2.4 m), it was designed to accommodate everyone from the handicapped with their special needs to the average park visitor.

The trail was originally thought of as a trail for the blind with texts in braille. But it was soon learned from talks with the American Foundation for the Blind, California State Department of Rehabilitation and others that facilities should not be set aside or designated for the enjoyment of one special group. Thus, from the original concept, grew the idea that here, with a little work and innovation there could truly be a "trail for all people."

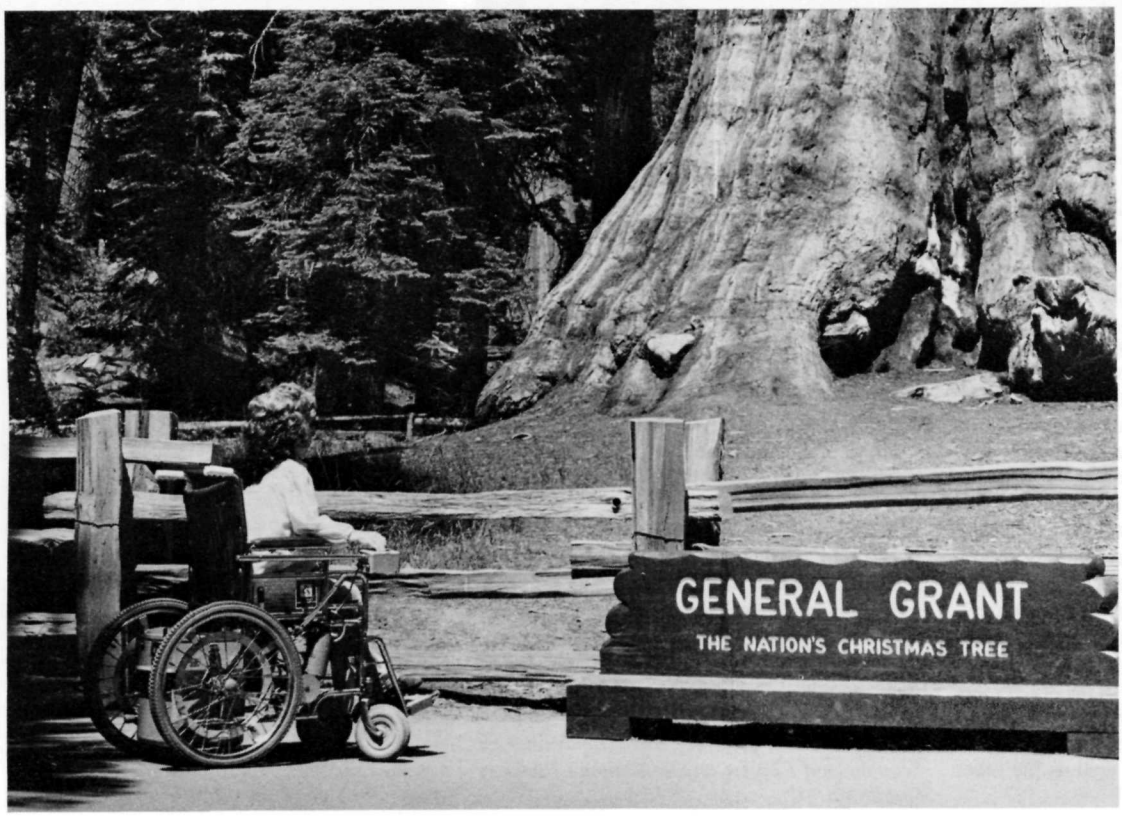
Using volunteer labor, with an assist from park maintenance forces, the trail quickly took shape. A majority of the work was accomplished by the Youth Conservation Corps, which each summer has some 40 boys and girls in the park working on various conservation projects. Church groups, school groups and other organizations also assisted in the work. Because of the terrain, and because of the shallow roots of the sequoia trees it was impossible to keep the grade of the trail below 5 percent. Nonetheless, the trail can be safely negotiated by a person in a motorized wheelchair, although those using other than power wheelchairs require assistance. We know, however, that most people visit national parks with family members or friends so as to share the beauties and recreational aspects of the area. We have discovered this also to be true for the handicapped, be they blind, confined to wheelchairs or in some other way physically impaired. So, while the grade of the trail is somewhat above that for unaided use by those in wheelchairs, access and use has not been a problem.

Both sides of the trail are completely fenced. The split-rail fence serves to keep visitors on the trail and helps reduce impact on the more



Two types of interpretive signs are in use along the trail. This large routed wood sign is easily read from a distance.

Smaller interpretive signs, using wood and etched aluminum, are placed just outside the fence at a height where they are legible to all visitors.



With the completion of The Trail for All People, the General Grant tree, a giant sequoia and a national shrine as well as the "Nation's Christmas tree" can now be visited by everyone regardless of handicap.

Fencing helps preserve the resource and at the same time helps to channel park visitors.

fragile areas. With almost 1,000,000 visitors using this trail each year it is extremely important to direct and channel visitor flow if the resource is to be protected and preserved.

Restroom facilities already existed along the trail. These were modified by park maintenance forces in conformance with the American National Standards Institute design criteria.

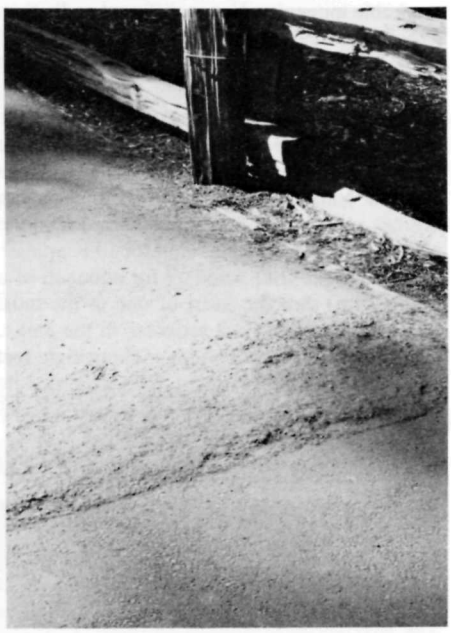
Because less than 10 percent of the blind read braille, it was decided to use taped messages as the primary interpretive method for the blind. The tapes, in five languages, (French, German, Japanese, Spanish and English), are available free of charge to any blind person along with a tape reproducer. Other visitors pay a nominal fee of fifty cents (US $.50) for rental of the tape machine. The Sequoia Natural History Association manages the accounting and rental of the tapes and the resulting revenue helps replace tapes and tape machines.

There are 20 stops along the trail. Each of these is marked by a change in pavement surface and a numbered post. Signals on the tape, the sound of a bell, tell the blind person to shut off the tape player and to proceed to the next stop, marked by a change in the trail surface texture. The tape machine is then started and the next message is heard. In this manner, the blind can use the tape player to go from one stop to the next as can the sighted person using the numbered posts.

A special exhibit consisting of bark specimens from the more common trees was placed in a locked box adjacent to the trail. The box has a plexiglass window so that sighted visitors can see the specimens and read the labels. The key to the box is available on request so the blind person can open the box and feel the characteristics of the different barks. Other exhibits, explaining some facet of the sequoia story, were placed around the trail, at a height easily seen and read by those in wheelchairs. The sign print is large enough so that it can also be read by a standing visitor.

Instrumental in this portion of the project was the Central Valley Junior Womens Club of Dinuba, California, which donated funds to purchase the tape players as well as the other interpretive signs.

At 20 stops along the trail visitors may listen to taped messages telling them about the natural resources of the park which they have come to see. Interpretive tapes are available in five languages along with a small tape reproducer or player (indicated by arrow) without charge to any blind person. Other visitors pay a small rental charge.



A change in pavement texture marks the stop for blind visitors. A signal on the tape tells them to shut off the machine and proceed to the next stop.

The "Trail for all People" is now complete and in use. But it is only one of many steps to take as we strive to eliminate the architectural barriers that block access and prevent full enjoyment of these National Parks. Moreover, we must also work not only toward the elimination of architectural barriers but also toward the erasure of attitudinal barriers as well if we continue to say that parks are for *all* people.

John J. Palmer is Chief Park Interpreter at Sequoia and Kings Canyon National Parks in California.

Cones and bark of various trees are displayed in weatherproof exhibit cases. The transparent cover of the bark exhibit case shown here is open.

Install a Trailhead Register and Reduce Graffiti

Trail managers having graffiti problems might try this suggestion shared by James O. Stiles, park technician at Arches National Park in Utah, USA.

Stiles and other park employees were appalled to find so many visitors leaving their names all over the canyon walls along the Delicate Arch and Devil's Garden Trails. Since people have such a strong urge to immortalize their visits in this way, Stiles felt the solution was to provide them with a nondestructive means of doing so. Accordingly, he suggested placing registers at the trailheads.

Besides offering visitors an acceptable way to record their presence, the registers can serve as a useful park record. Stiles points out that many parks that have installed such a register have found it to be effective in substantially reducing graffiti.

This useful item also was taken from *Grist*, July-August 1980.

Save Weeding and Tree Roots

When seeding lawn areas, Daniel Tommins, a gardener at Independence National Park in Philadelphia, Pennsylvania, recommended placing heavy plastic covers over tree wells to prevent seed from landing in peat moss around trees.

If allowed to grow in tree wells, sod can be very difficult to remove and the process may damage the roots. This preventive measure saves trees, money and most importantly, man-hours of unnecessary work.

From *Grist*, January-February 1976.

Lifelines for Rescue, Not Thieves

Lifelines on rescue station buoys all too often prove to be temporary installations—too attractive for thieves to resist. Bill Warren, a park technician at Platt National Park, suggested tying a figure eight knot every 15 cm or so for the entire length of the line. The knots make the lines less attractive for other uses, thus, less attractive to thieves.

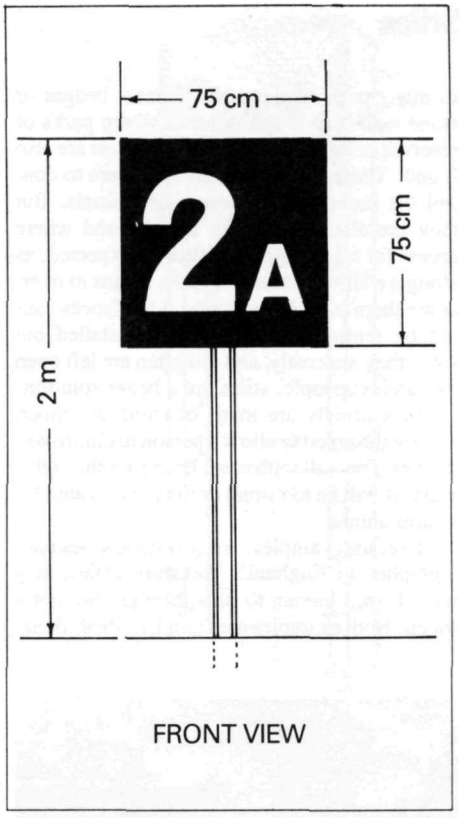
From *Grist*, January-February 1976.

Locating an Emergency

When rescue operations are underway, those who call for help often have difficulty pinpointing their location. Billy Blackman and Robert Wilson, employees at Lake Meridith Recreation Area suggested putting up identification reflectors along lake shorelines, in coves and canyons. When an emergency arises, it is easy to identify the location where help is needed.

For this suggestion, the men were given awards.

This item was adapted from *Grist*, January-February 1976.



Guide Rails

It doesn't take much to keep visitor traffic on the right path in flat or hazard-free country. At Loch of the Lowes, a Scottish Wildlife Trust reserve near Dunkeld, simple peeled softwood logs do the job adequately and very inexpensively.

Erected at hand height, these rails could also steady a tottery visitor but they are designed to guide rather than guard and not built to withstand a heavy lateral load as a guardrail must be. —*R.I. Standish*

Stiles

In many parts of the world fences, hedges or stone walls are found in areas where parks or reserves or lands set aside for public use are also found. These barriers usually are there to control the movement or access of animals. But they are also barriers for people, and where access for hikers or park visitors is expected, as along a trail, for instance, some means to overcome them must be provided if the fences cannot be removed. Gates can be installed but since they are costly, and too often are left open by careless people, stiles are a better solution.

Stiles usually are made of stone or timber, and are designed to allow a person to climb over the fence or wall with ease, or to pass through a gap that will be too small or too complicated for a farm animal.

Here, for examples, are two stone stiles photographed in England's Yorkshire Dales; they will allow a human to pass through, but not a sheep. Both examples are from Elisabeth Beazley's practical handbook on countryside facilities, *Designed for Recreation,* (1969, Faber & Faber, London).

Here are examples of timber stiles. The five designs following are from *Guide to Walkway Construction and Maintenance,* a recent publication of the New Zealand Walkway Commission.

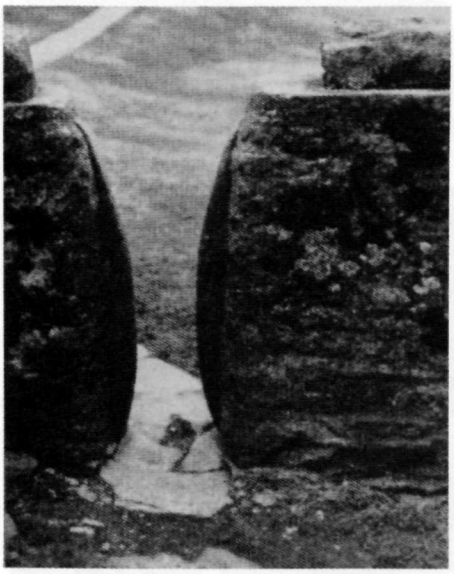
The two timber stiles on page 23 also are from *Designed for Recreation.*

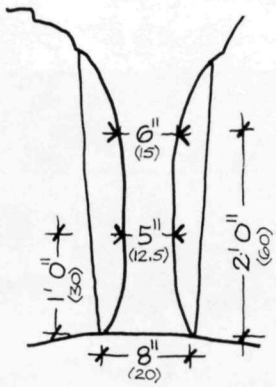
For all stile designs that permit one to climb over a barrier, it is important that a handhold at the crossover be provided as a safety measure. This can be simply an extension of one of the timbers used in the construction, or it can be a separate post.

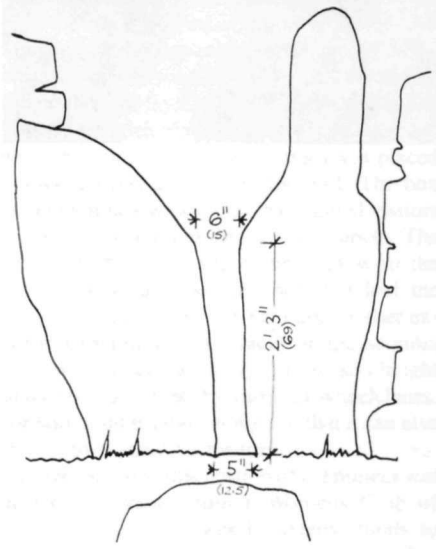
Where timbers are set in the ground they should be treated against rot.

A stone slab or several kilograms of gravel worked into the ground at the threshold of the stile will prevent formation of a scuffed depression — frequently a muddy puddle.

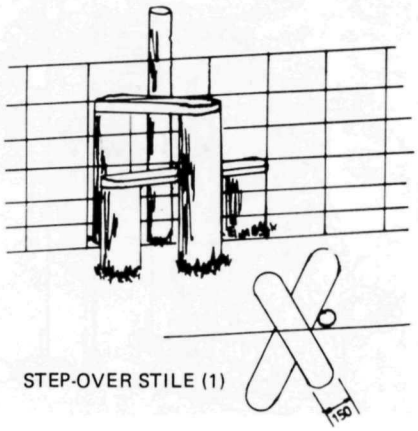
Rough stone slabs or even concrete blocks or slabs cast at the site or brought in can be used instead of timber to construct stiles. In areas where it is important to preserve the natural appearance, native stone is probably the best solution. — *R. I. Standish*



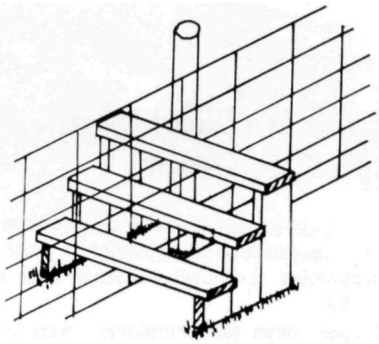




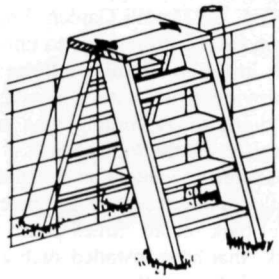
Stone stile photos: Miss Hartley and Miss Ingleby



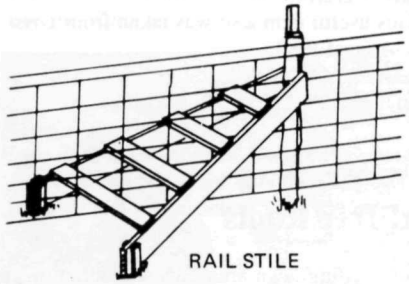
STEP-OVER STILE (1)



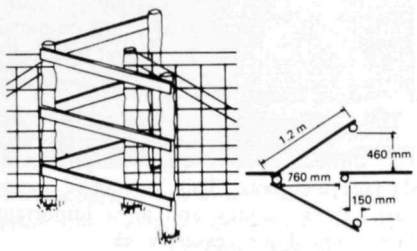
STEP-OVER STILE (2)



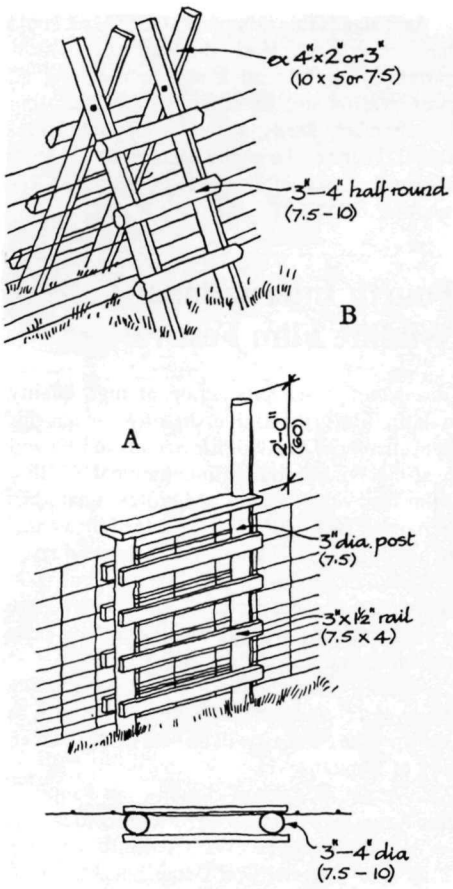
PORTABLE STILE



RAIL STILE



WALK-THROUGH STILE



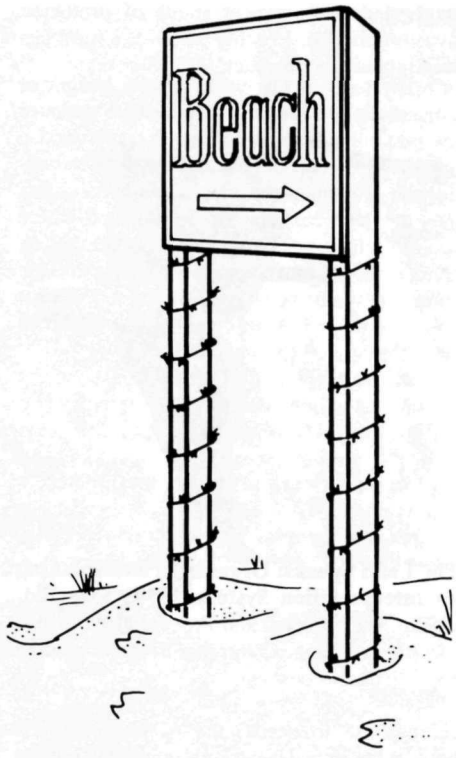
Protecting Signs in Places Where Animals Graze

Maintaining signs in areas where cows, horses, elk, or other animals graze can be difficult. The animals rub against the signs and their posts; this results in bent or tipped signs that look bad and are hard to read.

Now Richard L. Jackson, sign maker at Point Reyes National Seashore, California, offers a simple solution to this problem. Wrap barbed wire around sign posts or other posts that are placed in pasture areas. And place the sign higher than the grazing stock that use the area.

Fasten the barbed wire to the post with fence staples, starting at the top and winding down. Leave approximately 10 X 15 cm between wraps and be sure to wear gloves to pull the wire taut. For the posts, Jackson recommends rough redwood 10 X 10 cm. Jackson has used signs like these in large fields where 20 to 30 head of horses run and has found them successful. As an added bonus, the barbed wire also deters vandals from tampering with the signs. This idea not only improves the appearance of an area and assures that visitors can read essential messages and directions, it also saves the government the cost of replacing defaced posts and bent signs.

This item originally appeared in *Grist*, July-August 1980.



A PROTECTED SIGN

BOOKS AND NOTICES

United Nations List of National Parks and Equivalent Reserves. 1980. Harold K. Eidsvik, compiler. International Union for Conservation of Nature and Natural Resources, Gland, Switzerland. pp 121, US $7.50, plus postage.

The United Nations List of National Parks and Equivalent Reserves is compiled by the Commission on National Parks and Protected Areas (CNPPA), one of the six Commissions of the International Union for Conservation of Nature and Natural Resources (IUCN). The Commission was formerly called the International Commission on National Parks; its name was changed in 1975 to reflect the broader concept of protected areas.

This List includes national parks, nature reserves, biosphere reserves and World Heritage sites. The criteria for selection are explained in a section; in future editions of the List, reporting will be based on these criteria and their related categories.

The present List follows the format and is an updating of the 1975 edition based on comments received from governments and the review of consultants' reports prepared by IUCN.

In the List, the realm, the biogeographic province and biome have been added in line with the definitions provided by IUCN Occasional Paper No. 18, "A Classification of the Biogeographical Provinces of the World," 1975. Data to provide similar information for all areas in the List were not available. It is planned to extend this aspect of the List in future editions.

In 1978 and 1979 the Commission began a major re-structuring so that it could be in a position to provide more precise data on the status of the world's protected areas. This system was implemented in early 1979. The work of this group is not reflected in this List but it will be reflected in future editions.

Only areas of 1000 hectares or more have been included. Islands which are protected have been included generally without regard to size. Where such reserves were numerous they have not all been individually noted.

The List of National Parks is relatively complete but State or provincial parks have not been included in this edition because the data available were totally inadequate to provide a representative picture of the global situation. The List of Nature Reserves is of mixed quality because it has been difficult to determine to what extent many of these areas are multiple use forest management areas. The World Heritage List and the List of Biosphere Reserves are complete as of October 1979.

According to the compiler, all marine parks have not been specifically noted because of a lack of data at the time of printing. A revision of G. Carleton Ray's report on Marine National Parks (1976) was received in September 1979. The revision notes 302 existing marine reserves, 354 proposed reserves and 928 island and coastal terrestrial parks.

The assistance of readers in providing accurate data on the name, area, date of establish-

ment, and management status of protected areas is solicited. For this purpose, a form has been included at the back of the book.

The Land Speaks: Organizing and Running an Interpretation System. 1979. Yorke Edwards. The National and Provincial Parks Association of Canada, Toronto. 87 pp. Canadian $5.00 includes postage.

In response to needs, the publisher of this booklet has issued occasional books and reports on matters of special importance to park and related reserves. This booklet is in this series. It will be of special interest to park managers and administrators who are serious about the business of interpretation and how this often misunderstood term may apply to them and the protected properties in their charge.

The author is Director of the British Columbia Provincial Museum, and formerly served the Canadian Wildlife Service in Ottawa. He is well-known in the interpretation field, with some 20-years' experience across Canada and abroad. His special ability to cut through the fog that often enshrouds such subjects when treated by some others will delight the reader. He can be understood, as, clearly, he should be. "If everyone really understood grass," he says — reducing the matter to its simplest terms — "they would understand enough of the world to solve most of its man-caused problems." We all could say "aye" to that.

The book is organized in a straightforward way, dealing with the whats, whys and wherefores a manager should know about the subject.

An appendix by V.E.F.Solmon of the Canadian Wildlife Service, entitled "What Interpretation Should Be Like," concludes the book — an essay, or speech, perhaps, that in itself is worth the price of the booklet.—*R. I. Standish*

(The drawing of Canada geese in flight is one of the excellent division sheets used in the book)

An Introduction to Conservation of Cultural Property. 1979. B.M. Feilden. United Nations Educational, Scientific and Cultural Organization.

At last someone has set down in writing the basic concepts of the preservation of cultural resources. The author, who is Director of ICCROM, the International Centre for the Study of the Preservation and the Restoration of Cultural Property, has approached this task with the recognized handicaps that historic preservation — or conservation, which is becoming the preferred term — is a developing field whose philosophy and technology is evolving rapidly, and that there is no agreement on terminology among the practitioners.

The reviewer now learns that this booklet is indeed an introduction, a draft produced in 1000 typescript copies by UNESCO for criticism and comment. Nevertheless, this introductory work of 102 double-spaced pages has succeeded in stating and explaining, in simple and precise terms, the concepts of conservation, and at the same time provides a concise statement of the philosophy of preservation. Though a European, and writing from that perspective, Dr. Feilden's concepts are recognizable and applicable, no matter the reader's geographical location.

He writes about the knowledge and skills the preserver needs to bring to the task — "scientific knowledge of the causes of decay" and "the understanding of the nature of the component materials of cultural property." The fundamental principle is to fight the causes of decay; but before treating a structure, analyze the problem and record conditions. The best way to preserve a building is to use it. These are all known and accepted truisms among knowledgeable preservationists. Why then set them down?

The answer, of course, is there are young preservationists coming along who need this fundamental information early in their training. There are a lot of experienced architects beginning to work on historic structures who have no idea of these fundamental precepts of conservation or the philosophy of historic preservation.

The author advocates a scientific approach to preservation which is one of the newer concepts that has evolved among architectural conservators. He advocates a continuing maintenance program for cultural resources, and in this connection he makes a simple but profound statement:

> "curiously it is difficult for a centralized administration to keep gutters and drainpipes clean, a small thing in itself which can cause buildings to collapse, but easy for it to initiate a major restoration programme of National importance."

Though much of the discussion in the book is devoted to structures, the author does discuss objects and museum collections. Generally he feels that the principles of the preservation of historic structures can also be applied to artifacts or vice versa.

A more complete version will be coming. The author says more will be included on landscape architecture, more on positive aspects of town planning and conservation, more on libraries and archives. Also more stress will be given to rehabilitation.

This preliminary version is published also in Finnish, Serbo-Croat and Spanish and no doubt this will facilitate comments for the final version.

As it stands this thin preliminary book could have many uses; clearly the final work will be extremely useful and I recommend that all preservationists, whether of the fledgling variety or old hands, watch for its publication. It will, I believe, become a basic text.—*F. Ross Holland, Assistant Director for Cultural Resources, USNPS.*

Fourth International Wildlife Film Festival

To encourage the production of high quality wildlife films, the University of Montana student chapter of The Wildlife Society in 1981 will host the Fourth Annual International Wildlife Film Festival. Amateur and professional films pertaining to wildlife will be judged by a panel of highly qualified biologists and film makers.

March 14, 1981 is the deadline for submission of applications and films. All entries must have a predominantly wildlife theme and have been produced and released in 1980.

Judging will be held prior to the early spring Festival at which the winning films will be shown. The Festival will be held at the University of Montana.

Information, rules of eligibility, and application forms may be obtained by writing to the:

Wildlife Film Festival, Wildlife Biology Program, University of Montana, Missoula, Montana 58912/USA

PARKS to be Offered on Paid Subscription Basis

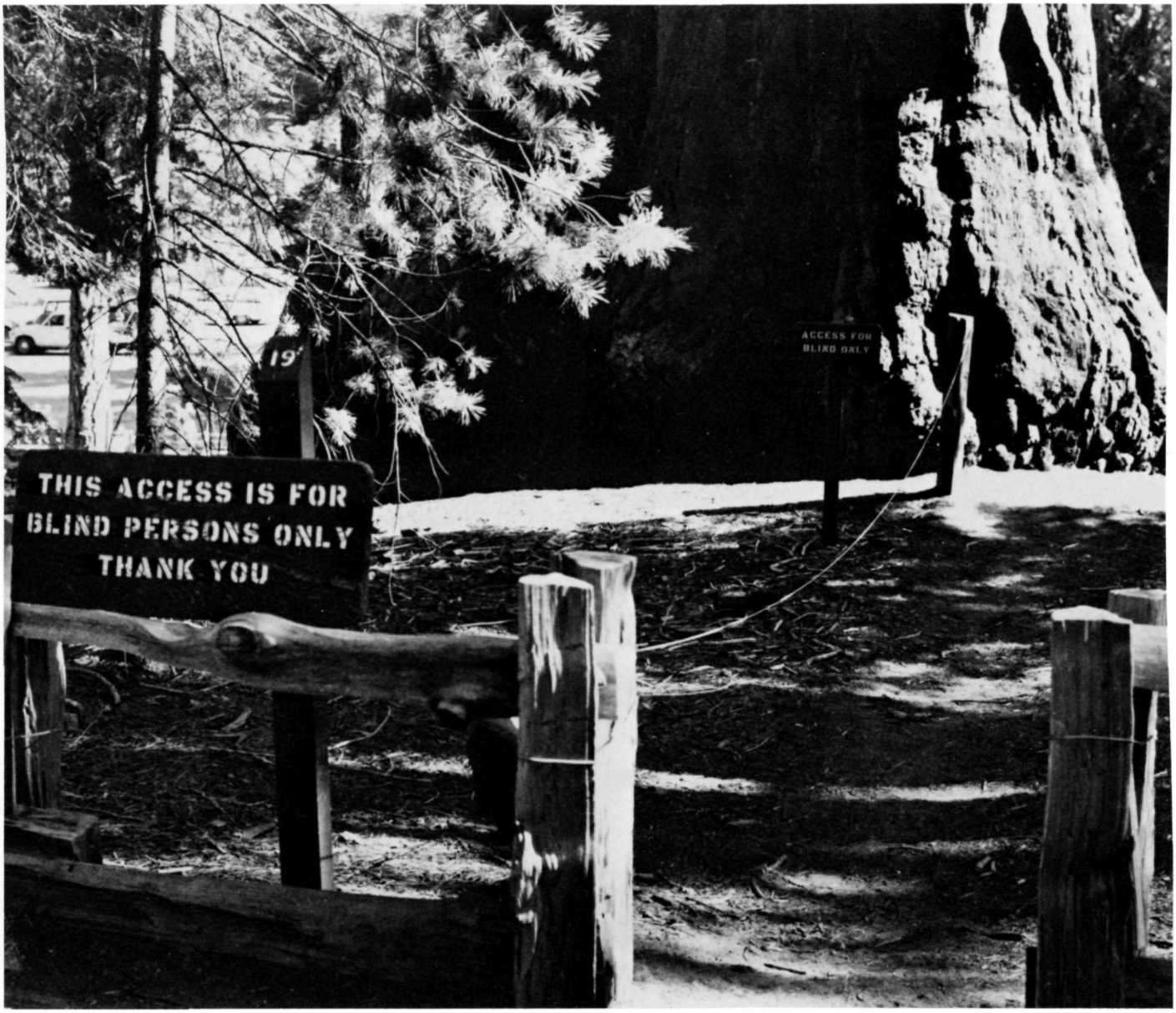
Beginning with Volume 6, Number 1 (April-June 1981), PARKS Magazine will be available on a subscription basis in North America, Europe, Japan, South Africa, Australia, New Zealand and probably a few other countries. Annual subscription fee will be US $10.00.

Agents in North America will be: UNIPUB, 345 Park Avenue South, New York, NY 10010.

Agents for Europe and other parts of the world will be Bowker Publishing Co., P.O. Box 5, Epping, Essex CM16 4BU, England, UK.

More details will be published in the next issue of PARKS. Information may also be obtained by writing to the agencies.

Distribution to park officials and other concerned readers in most developing countries of the world will continue to be on a non-paid basis.



A little extra effort by a park's staff can make a world of difference in the values perceived and enjoyed by visitors. For example, if you were blind and never had seen a giant redwood tree, Sequoiadendron giganteum, *imagine what your impression would be if you were able to actually feel your way around the giant. Photo: James E. Warner, USNPS*