

**A Summary of the
NATURAL RESOURCES
MANAGEMENT PLAN**

YOSEMITE

NATIONAL PARK

CALIFORNIA

**UNITED STATES
DEPARTMENT OF THE INTERIOR
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NATURAL RESOURCES MANAGEMENT PLAN

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Prepared by

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NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR

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INTRODUCTION

This is a summary of the Natural Resources Management Plan for Yosemite National Park. The plan is a long-range, action document that deals with all management and research proposed for the natural resources of Yosemite. Since its major emphasis is natural resources management, it does not include backcountry visitor-use management, which is covered by the approved Yosemite Backcountry Management Plan. It does, however, cover research related to backcountry visitor use.

While this summary covers only the Natural Resources Management Plan, the full document also includes an environmental assessment of proposed actions. An addendum to this plan is entitled Management Program, and deals with the specifics of each management project or study.

The primary objective of resources management is the perpetuation of the natural processes which have had a dynamic influence on the development of the Park's ecosystems. This will be accomplished by restoring altered systems as nearly as possible to the conditions that they would be in today had ecological processes not been disturbed and, when practical, by reintroducing species which have been eliminated from the natural systems. In heavy use areas, such as Yosemite Valley and other developed sites, additional management programs will be utilized to simulate natural processes, restore natural settings, and provide protection for the visiting public.

This, then, is a plan for the restoration and maintenance of the total environment rather than the piecemeal protection or management of selected features or species. As such, vegetative management represents the prime thrust of this plan, since vegetation, primarily a product of climate and soil, largely determines the composition and density of the dependent animal resources. As vegetative communities depart from the natural or pristine, so also are the animal resources altered.

VEGETATIVE RESOURCES MANAGEMENT

1. General: The most pervasive influence of man on the vegetation of the Park has been the suppression of naturally occurring fires. The presence of fire in past centuries in western forests is well-established. Surface fires were a common occurrence in the Sierra Nevada Mountain Range of California, and forests were quite open compared to their present condition.

Attempts to suppress fires began before Yosemite National Park was established, and by 1910, an effective suppression program was emerging. This has led to an increase in the density of the understory trees and a shift in the botanical composition of the vegetative mosaic away from the more fire-resistant species. This effect is most pronounced in the mixed-conifer forests where ponderosa pine, sugar pine, and giant sequoia are being replaced by incense-cedar and white fir. Similarly, black oak woodlands are being progressively invaded and replaced by conifers.

The management program is designed to recreate the vegetative mosaic which would have existed today if the unnatural influences of modern man had not intervened. Various fire management and other techniques will be employed to accomplish this objective.

2. Prescribed Burning: This program will be accomplished in two phases. The first or intensive phase will concentrate on unique ecosystems and areas of high visitor use. These areas comprise approximately 10,000 acres and include the Mariposa, Tuolumne and Merced giant sequoia groves, stands of sugar pine in the Rockefeller, Grant, Yosemite Valley, Wawona, and areas adjacent to main Park roads. Good accessibility and the opportunity to use roads to divide areas into small burn units and operate fire apparatus render them easy to burn. The second or extensive phase will be designed to treat the remaining acreage, approximately 270,000 acres, and will employ various ignition and burning patterns. This phase will be initiated after burning in the unique ecosystems and areas of high visitor use is being handled on a routine basis.

With proper prescriptions and burning techniques, the resulting low intensity fires will reduce the highly flammable, dead fuel layer and kill small, understory trees. Such fires are normally confined to within three or four feet of the ground and have no tendency to "crown", i.e., run through treetops. Accordingly, their effect on large trees is minimal over the short-term and beneficial over the long-term.

Known locations of all proposed or designated threatened or endangered plants have been mapped. Before any burn plan will be approved the Superintendent must be assured that the burn presents no threat to any such plants.

3. Natural and Conditional Fire Management: At elevations above the mixed-conifer forests, plant communities with the exception of meadows, have been much less altered by man and respond to more

passive management. Here, the ecological roles of fire can be restored simply by delineating Natural Fire Units and allowing naturally occurring fires to burn. Unit boundaries have been determined by natural barriers, so there is little chance for fires to burn outside designated areas.

Conditional Fire Management is an intermediate type. Units generally lie between the Natural Fire and Prescribed Burning Units. During the regular fire season, all fires are suppressed. However, between fall and spring, when certain prescribed conditions are met, naturally occurring fires are allowed to burn. Within these Units, management also has the option to ignite fires and allow them to burn when the interval between fires has been unnaturally long as a result of suppression activities. As in Natural Fire Management Units, control or suppression of these fires can be undertaken at the discretion of management.

4. Wildland Fire Control: Wildland fires are fires in vegetation originating from natural or man-caused ignitions that serve no management purpose and constitute a threat to public safety and property. While fires of natural and Indian origin constituted no serious threat to resources during the pristine period, today wildland fires can seriously damage the natural environment due to fuel accumulations resulting from 80 to 100 years of fire suppression. Accordingly, Wildland Fire Control, though reduced in scope, is still an important activity in the lower elevational belt that coincides with the area devoted to prescribed burning. In addition, it is seasonally applied to Conditional Fire Management Units and all developed areas.
5. Giant Sequoia Restoration: In giant sequoia groves specific objectives are to check and correct unnatural shifts from the pristine, open grove condition to that of the present, dense, white fir-dominated understory. Historical photographs will guide the work. Techniques to be used will be cutting, piling, and burning, followed by use of prescribed fire.
6. Black Oak Woodland Restoration: The restoration of a relatively open condition is the primary objective of the program in Yosemite Valley. Photographs show how the forests of the Valley floor have extended their boundaries and how the open stands of the California black oak have been over-topped by the conifers. Prescribed burning and direct removal techniques of cutting, piling, and burning will be used to accomplish this objective.

7. Exotic Plant Control: The exotic plant control program will entail elimination of all uncultivated, non-native, woody plants such as the black locust and American elm; limiting the extent of, and where feasible, eliminating exotic herbaceous plants and prohibiting the introduction of any non-native plants in the future. The only exception to the above would be the preservation of exotic woody plants of recognized historical significance, such as the Lamon Orchard near the Curry Stables in Yosemite Valley.
8. Threatened and Endangered Plants: The known habitats of 13 plants proposed for threatened or endangered status are recorded, and mapped. These habitats will be rigidly protected. A study to upgrade this information will be carried out and will guide future protection and management.
9. Fomes annosus And Hazardous Tree Removal: For the past 20 years between 600 and 850 diseased, structurally weakened or dead trees have been removed annually in developed sites and along roadsides. Hazardous limbs have been removed from an additional 200 trees annually from such sites. These trees die or become structurally weak as a result of Fomes annosus, Armillaria mellea and other native fungi, mechanical injury, flood, avalanche, lightning, windstorms and old age. Such dead or weakened trees are subject to failure especially during storms, and constitute a serious hazard to people and property in developed areas.

Within the last few years, tree failures have killed and injured visitors, destroyed and damaged expensive buildings, tents, cars, powerlines and blocked roads. Organized control work began here about 1935. Since then, almost 16,000 hazardous tree conditions have been corrected. Recent research on Fomes annosus indicates a need to remove as many as 230 additional trees in Yosemite Valley annually. This will increase the total number of trees to be removed Parkwide to between 830 and 1,080 annually.

10. Plant Propagation And Revegetation Program: All trees and shrubs eventually die. In the wildland environment replacement is governed by natural processes and is generally assured. In developed areas this is not necessarily true. Here the departure from natural conditions is due to the concentrated level of human use; land preempted by development; soil compaction, and other influences. The total of these effects frequently prevent or greatly inhibit vegetative reproduction, and as trees and shrubs die, they are not

replaced. The long-term forecast for such impacted sites is a loss of woody vegetation, and these losses eventually render sites undesirable for their selected use. To avoid such impacts and the alternative ones of abandoning or relocating developments, a revegetation program is needed. Seeds, seedlings and cuttings of native species will be collected in the Park and cultivated in nurseries in or near the Park. Vegetation so obtained will be planted in man-altered sites as needed. Protective fencing, fertilization and watering will often be required during the early stages of growth.

11. River Clearing: Fallen trees are frequently picked up by the Merced River during high water periods and form logjams that threaten Yosemite Valley's low bridges and some other facilities. To alleviate this problem, sporadic log clearing has been carried out for many years and has been a regular activity since 1965.

Most logs, stumps, and large tree debris will be removed from the Merced River between Happy Isles-Mirror Lake and the Pohono Bridge. Also, trees along the bank in imminent danger of falling into the river will be removed.

12. Vista Clearing: Accelerated growth of vegetation due to long-term fire suppression has permitted woody vegetation, especially conifers, to encroach and occupy a tremendous acreage formerly occupied by meadow, brush, and black oak woodland. On certain sites, which formerly afforded significant scenic views, encroaching vegetation will be mechanically removed to restore vistas. However, the ultimate objective is to restore the natural regulation of these ecosystems to the extent that there will be no need for vista clearing. It is, therefore, only a transitional measure.

13. Grazing Management: Most horse and mule use within the Park occurs close to developed areas with stock being held in corrals overnight and fed without any grazing taking place.

The legitimate grazing which does occur results from horses, mules and burros used to transport people and equipment to distant backcountry destinations. Although stock users are encouraged to pack complete rations for all animals it is not required, and considerable grazing takes place. However, all

such grazing must be incidental to a recreational trip in the Park or, in the case of the Government, necessary to carry out trail and general maintenance, protection patrols and resource surveys and work.

Since stock use represents only 1.4 percent of the total back-country use and grazing is distributed over several thousand acres, it has little adverse effect today. However, in those few places where grazing is concentrated due to area popularity, damage to vegetation, soil and water does occur, and requires corrective action.

Surveys to inventory, set grazing capacities and monitor programs will be required. Proper resource utilization requires removal of a number of drift fences which confine stock to overused areas and the maintenance and/or relocation of other such fences. Grazing adjacent to the Park requires 4 1/2 miles of boundary fencing in selected areas to prevent livestock trespass.

Meadow damage and soil movement also results from improperly designed and/or located trails and inadequate maintenance. Corrective measures will include approximately 9 1/2 miles of trail reconstruction with annual maintenance and soil stabilization and abandonment of several stretches of improperly located trails.

Past grazing has resulted in some local resource degradation and unnatural invasion of meadows by lodgepole pine. Remedial measures include erosion control with check dams in gullies, removal of invading pines, and installation of regulatory signs.

FOREST PEST CONTROL

1. Bark Beetle Control: Native bark beetles of the genus Dendroctonus, attack and kill pine throughout the tree's range. In all but developed sites, this is viewed as a natural process requiring no control. However, in the latter sites, infested trees sustain beetle populations that can and do attack adjacent healthy trees. Upon death, all these trees become hazardous by virtue of location. Control consists of identification and felling of infested trees, and treating the bark with an approved chemical to kill beetles, larvae and eggs.

2. Lodgepole Needleminer Control: Vast forests of lodgepole pine in the upper watersheds of the Merced and Tuolumme Rivers support the lodgepole needleminer, a native moth. Because these forests are almost exclusively composed of lodgepole pine, needleminer infestations periodically increase to peak proportions, killing lodgepole pines over extensive areas.

If future infestations should threaten to kill all or most mature lodgepole pine within the Tuolumme Meadows and Tenaya Lake developed areas, several alternatives will be considered. These range from taking no action to closing and/or relocating campgrounds and other affected facilities; employing acceptable chemicals to control the needleminer in, and in one case, near the developed areas; biological control with an acceptable agent; revegetating developed areas with nonsusceptible native conifers and combinations of the above. Outside of developed sites no control work would be undertaken.

WILDLIFE AND FISHERIES MANAGEMENT

1. Black Bear Management: Yosemite has an estimated population of 220 to 350 black bears, a number believed to be somewhat greater than the pristine population. This increase in population and distribution along with an alteration in habits is attributed to the former practice of dumping garbage in open pits and the former, inadequate, solid waste, collection program. Though now greatly restricted, access to camper-supplied food stuff continues to attract bears and leads to their learning to raid food sources in camps and automobiles. Property damage and personal injuries are occurring with such frequency that some bears must be destroyed and many relocated each year.

Management objectives are:

- a. To restore and maintain the natural integrity, distribution, abundance, and behavior of the endemic black bear population.
- b. To provide for the safety of Park visitors by planning all development and use of the Park so as to prevent conflicts and unpleasant or dangerous incidents with bears.

- c. To provide opportunities for visitors to understand, observe, and appreciate the black bear in its natural habitat with a minimum of interference by humans.

To achieve these management objectives, a program consisting of five basic elements designed to prevent the causes of man-bear conflicts will be implemented: (1) public information and education; (2) removal of artificial food sources; (3) enforcement of regulations regarding feeding of wild animals and proper food storage; (4) control of problem bears; and (5) continuation of a research program on black bear population dynamics and ecology and monitoring of bear-human relationships.

2. Deer Management: The primary objective of deer management is to maintain and/or restore with the least form of artificiality, a mule deer population and range which is representative of pristine conditions.

A management project will annually monitor range condition and trend and herd productivity and survival. The other, a research project, will attempt to develop a reliable index to population levels, identify limiting factors, and evaluate herd response to plant succession and the fire management program.

The outgrowth of the two above programs will be the development of a long-range management program to ensure the perpetuation of natural populations and habitats of mule deer in the face of increasing land use and development outside the Park and changing use patterns within.

3. Restoration of Bighorn: The California bighorn was considered extinct in Yosemite after 1914. However, bighorn have been sighted in and near the Park on a number of occasions since then, the last authentic sighting being in 1974.

Remnant populations in and near the Park would provide the best stocks for eventual reestablishment of the species in much of its original habitat here. Before restoration can be undertaken, survey work now in progress is attempting to determine the size of any existing

population and the location and condition of the year-round habitat. Restoration efforts will concentrate first on management to increase any remnant population in or near the Park. Such a program would have to involve several agencies, since all suitable winter ranges probably lie east of the Park on National Forest lands.

However, there is a possibility that soon no remnant populations will exist. Should this occur, it would be desirable to reintroduce the bighorn from other suitable population sources. The best such sources are those in the southern Sierra Nevada, which are probably genetically and ecotypically closest to those that currently inhabit Yosemite. If such stocks are available, they would be vastly superior to any others for reintroduction purposes. Consequently, all avenues for securing animals from these populations would be exhausted before any other stocks are considered.

4. Threatened And Endangered Vertebrate Program: The American peregrine falcon and the southern bald eagle are Yosemite's only native species classified as endangered on the Federal list of Threatened and Endangered Wildlife.

The exotic Paiute cutthroat trout, discussed further in this plan, is the only threatened species found within the Park.

However, beside the California bighorn discussed above, there are an additional 20 species whose status here is undetermined. The objective of management is to preserve these species and if depleted, ultimately restore them to their pristine density and distribution in the Park. Therefore, routine population monitoring must be conducted to provide early warning of status changes, which if undetected and unchecked, could result in the local extinction of a species. Monitoring also provides an invaluable data bank for subsequent investigation.

5. Vector Control: On occasion, rodents transmit diseases or support parasites capable of transmitting certain diseases to man. The most important such vector (carrier) in Yosemite is the California ground squirrel, which on occasion, serves as a reservoir for plague. Fleas are the agents that carry that disease from squirrel to man. Control is required only in and near developed areas when disease levels are high or imminent, or when vector populations are high and in close contact with people.

Other animals, on occasion, harbor diseases transmissible to humans. Rarely a coyote or spotted skunk is found to be rabid. Suspected animals are collected and sent to laboratories for diagnostic determinations. Should large numbers of such animals become infected, actions would be taken to lower those populations to levels below which the disease could be readily transmitted in and around all affected areas.

6. Exotic Animal Control:

- a. Neither the golden beaver nor any other subspecies of beaver is native to the Sierra Nevada above the lowest foothills. However, in 1940 and 1944 this subspecies was introduced by the California Department of Fish and Game to sites adjacent to the Park. From these sites beaver moved upstream into the Park and became established in a limited area of Jack Main Canyon. Beaver cut streamside trees, and dam small streams. Such activities reduce trout spawning areas, and flood meadows and streamside environments. To prevent more widespread damage and distribution, existing populations must be removed and periodic control work carried out to prevent reoccupation by downstream populations.
- b. The bullfrog, though not native to California, became established in California between 1914 and 1920. A small population of bullfrogs exist in the Ahwahnee pond and a few other sites in Yosemite Valley. Recent studies indicate the bullfrog may be responsible for the disappearance of the native red-legged frog over much of the State and reduction in the range of the native yellow-legged frog.

An attempt will be made to remove the bullfrog from all Yosemite Valley sites. Other Yosemite habitats outside of the Valley will be checked for the presence of this exotic species, and where they exist, control action will be carried out.

7. Fisheries Management. Fish are native only to the lower reaches of the Tuolumne and Merced Rivers, waters above 4,000 elevation having been maintained in a barren condition by waterfalls formed during the period of Pleistocene glaciation.

- a. A management program to restore natural conditions by gradually phasing-out all fish stocking over a six-year period was initiated in 1972. However, objections to this program have resulted in a two-year resumption of limited fish stocking. During this period an evaluation of the biological, economic and recreational considerations of such a phase-out will be accomplished.

In the event that all fish stocking is terminated, a research project will study the effects of the phase-out on fish populations and determine where self-sustaining fish populations are being maintained. Whether stocking is resumed or terminated this study will also measure the effect of the exotic fishery and angler use on the aquatic and associated environments.

- b. In 1965 an exotic population of the "formerly endangered" Paiute cutthroat trout was established in Delaney Creek. This population was to serve as a gene pool for further transplants outside the Park until adequate self-sustaining populations could be established elsewhere.

Recent improvement in the status of the Paiute trout has resulted in the subspecies being redesignated to threatened status on the Federal list and its removal from formal state recognition.

The above, coupled with the fact that the Delaney Creek population has not increased as expected and is suffering serious competition with eastern brook trout indicates that preservation would be better achieved by relocating the remaining fish in another drainage. Therefore, the California Department of Fish and Game has agreed to electro-shock, capture and relocate the remaining Paiute trout in Delaney Creek to suitable waters outside the Park by fall 1978.

RESEARCH PROGRAM

The overall objective of the research program is the accumulation and synthesis of scientific information concerning the ecosystems of the Park that will permit effective management and interpretation and description of Park ecosystems, the evaluation of visitation on the natural resource base, and the ecological evaluation of management programs.

1. Classification and Description of Park Ecosystems: Basic to the management of any natural area is information concerning the ecosystems and their component parts. Much data already exists, although no systematic analyses have been made. Needed are inventories of resources, analyses of processes, and classifications of ecosystems.
2. Evaluation of the Visitor-Resource System: Since parks do not exist in an ecological vacuum, any analyses would be incomplete without considering the impact of human beings. An evaluation of the sociological and ecological characteristics of the visitor-resource system is essential for assessing the impact of human activities.
3. Evaluation of Management Programs: Research efforts will be directed to the ecological evaluation of management programs and toward the development of improved natural resource management techniques and methods.

In order to accomplish the above, the 40 Natural Science Study Projects now proposed, plus others subsequently would cover a broad spectrum of research on climate, soils, vegetation, animals, sociology, and visitor-use.

ALTERNATIVES

Besides the proposal summarized above, three other alternatives were described and analyzed in the Natural Resources Management Plan and Assessment.

Alternative 1 calls for no action or maintenance of the status quo. Thus, Park use and development would continue at current levels along with resources management programs currently in progress.

Alternative 2 places a greater emphasis on natural resources preservation and restoration than the proposal or any other alternative. In cases of conflict between resource protection and visitor use, decisions would favor resource protection.

Alternative 3 places a greater emphasis on visitor use than the proposal or any other alternative. Therefore, more manipulation of the resource would be undertaken to provide additional opportunities for visitor enjoyment, and conflicts would be resolved in favor of visitor use at the expense of resource preservation.

DOCUMENT AVAILABILITY

The Natural Resources Management Plan and Environmental Assessment and its addendum entitled the Management Program are available for public inspection and use in the following offices, institutions and libraries:

IN CALIFORNIA:

NATIONAL PARK SERVICE

Yosemite National Park, P.O. Box 577,
California 95389.

Western Regional Office,
450 Golden Gate Avenue, Box 36063
San Francisco, California 94102

Los Angeles Field Office,
300 North Los Angeles Street, Room 1013,
Los Angeles, California 90012

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828 "I" Street
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