WILDERNESS MANAGEMENT PLAN

YOSEMITE NATIONAL PARK

1989

Approved by: _____
Superintendent

Reviewed by: _____
Chief Ranger

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Park Historian

I. Introduction

A. Description of Yosemite Wilderness

The wilderness established in Yosemite National Park by the California Wilderness Act of 1984 is wide ranging. Its boundaries, shown in Figure 1 and fully described in Appendix A, run from the Lake Eleanor outlet on the north around the east side to Chiquito Pass on the south, defined by the headwaters of the Merced and the Tuolumne Rivers. The western boundary can generally be described as being 200 feet from the centerline of all public access roads and 100 feet from all existing development and development specifically proposed in the General Management Plan. In Yosemite Valley the boundary follows the 4,200 foot contour along the south wall until it comes within 100 feet of the Horse Trail to Nevada Falls, then follows 100 feet from the Mist Trail to the 4,200 foot contour before returning along the contour on the north wall. In the Wawona area the boundary follows the section lines around Section 35, excluding from wilderness the proposed water intake but including a part of the National Park Service lands in the northeast corner of the section. Of the park's 761,677 total acreage, 89% or 677,600 acres have been designated wilderness, and another 3,550 acres are potential wilderness additions.

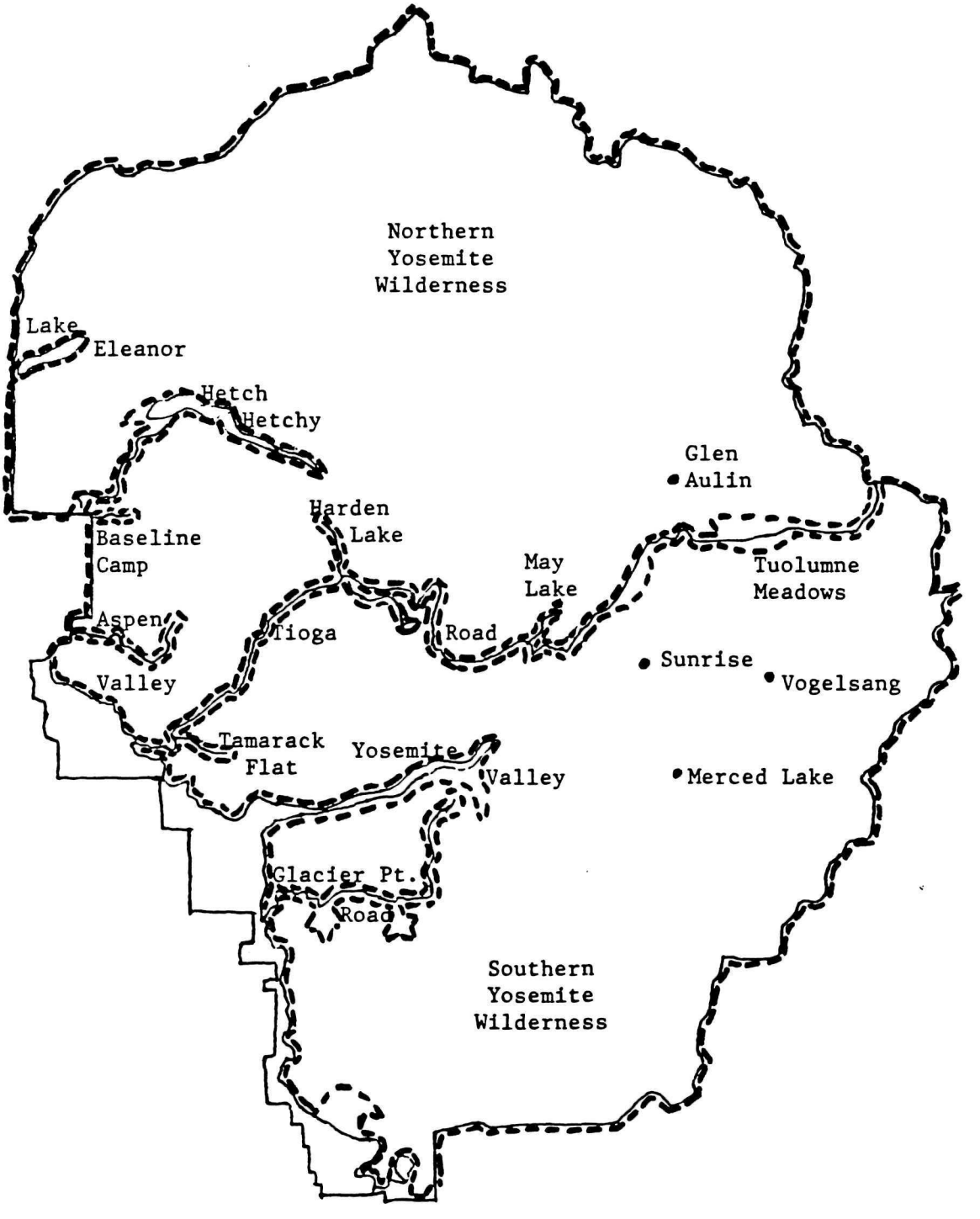
The lands within wilderness range in elevation from 2,900 feet where the Tuolumne River leaves the park to 13,114 feet on Mount Lyell's summit. The Tuolumne Canyon has a foothill ecology with related plants and wildlife. As one rises from the river through the forest belt, temperatures cool and vegetation changes significantly. Along the Sierran crest and the subalpine Cathedral and Clark Ranges are subalpine environments with their own specific plant and wildlife communities. Along the crest the subalpine community meets the sage and pinon communities of the eastern slope. Remnants of glaciers remind the traveller of a colder past.

Glaciers rearranged the watersheds, reforming and carving many lakes. There are over 350 lakes in Yosemite's wilderness and hundreds of lakelets and ponds. Wilderness includes hundreds of miles of permanent and intermittent streams, many populated by fish, flowing into the great canyons of the Merced and Tuolumne rivers.

Water flowing through wilderness lakes and streams can fluctuate greatly with the weather. Spring snowmelt fills creek banks with torrents, often trickling or dry by the end of August. The snow pack itself can fluctuate widely, from very heavy years with snow remaining on the ground in late summer and fall to drought years with little snow to feed the rivers and lakes. Average rainfall in Yosemite is 36.5 inches per year while the mean annual snowfall in the park is 74 inches.

Yosemite wilderness occurs in two large blocks north and south of the thin line of the Tioga Road. Access now is much like access when Yosemite National Park was formed: there are roads, trails, and cross-country routes. The old roads in wilderness are managed now as trails and are part of the roughly 800 miles of maintained park trails. Cross-country routes add several hundred miles more. The High Sierra Loop connecting the six

Figure 1. Boundaries of Designated Wilderness in Yosemite National Park.



High Sierra Camps is a major trail thoroughfare which includes part of the John Muir Trail. The Muir Trail, in turn, incorporates a section of the Pacific Crest Trail which runs the length of the park.

Camping is permitted anywhere beyond one mile from a road or beyond four trail miles of Yosemite Valley, Glacier Point, Wawona, Hetch Hetchy, and Tuolumne Meadows. Wood fires are not permitted above 9,600 feet to protect several species of subalpine trees. Campgrounds are designated in only 10 wilderness and potential wilderness locations: in Little Yosemite Valley, at Lake Eleanor, Miguel Meadow, and at five High Sierra Camps.

Wilderness use is affected by weather and accessibility. In years of heavy snow, early use concentrates longer in lower elevation parts of wilderness such as Little Yosemite Valley and Lake Eleanor or Kibbie Lake. Use of higher elevation wilderness is determined by the opening of the Tioga Road as well as the snow pack's melting rate. The greatest number of people come around the three major holidays of summer. Cooling temperatures and fall storms bracket heavy use later in the year as people, like the deer, move to lower country. Winter wilderness use, a small part of the whole, is concentrated within short distances of the road corridors.

Visitor use in Yosemite wilderness increased dramatically starting in the mid-1960's. Between 1968 and 1975 overnight use increased 250 percent while park use as a whole increased only 15 percent. Annual overnight use in wilderness peaked in 1975 at 219,000 visitor nights; since then it has dropped to nearly half that level. This drop is attributed to a decrease in popularity of backpacking in general and in Yosemite specifically. Although annual fluctuations in use are related to weather and snow conditions, the nine-year downward trend cannot be related to them. Use will probably continue to vary in the range from 100,000 to 150,000 visitor nights per year for the foreseeable future.

B. Yosemite Wilderness Through Time

The diversity of environments in Yosemite wilderness has contributed to a long record of human presence there. Current information indicates human occupation of the Yosemite region for around 5,000 years. Significant technological and cultural changes, including population replacements, have occurred during that time.

Situated in the middle of the Sierra Nevada range Yosemite straddles a major geographic and prehistoric cultural boundary between central California and the Great Basin. The differentiation of vegetation communities by elevation combined with seasonal shifts in plant and game availability and climate to draw Indian groups from both sides of the Sierra into higher country during the summer months in search of food and materials. This seasonal movement and variations in resource distribution helped develop complex trading networks with neighboring peoples. Trading of goods led also to trading of technological innovations.

The Central and Southern Sierra Miwok were the major ethnographic groups inhabiting the area now defined by the park, while other groups,

particularly the Paiutes from the Great Basin, were present seasonally. Ordinarily permanent villages occupied year-round were located below about 4,000 feet. Seasonal camps from 12,000 feet on the Sierra Nevada crest down to 2,000 feet in the river canyons were short-term occupation sites used to gather local plant and animal resources.

The gold rush brought abrupt changes to wilderness. Tensions between Indians and miners led to the formation of the Mariposa Battalion in 1851, which sought to remove the indigenous population to reservations. Pursuit of Indian groups led to the "discovery" of Yosemite Valley by the Battalion. Indian occupation of the Yosemite area continued after 1851 although Miwok populations declined sharply because of introduced European disease and disruption of indigenous economies.

Reports of the Valley brought the first tourists and, in turn, tourist facilities and publicity. The federal government reserved Yosemite Valley "for public use, resort, and recreation" in 1864 by granting the Valley and the Mariposa Grove of Big Trees to the State of California. The State organized a commission to manage the Valley and Mariposa Grove of Big Trees but provided little funding. Facilities were developed privately through permits from the state. Hotels and farm plots provided lodging and food. Toll trails built to prominent Valley viewpoints gave access out of the Valley, sometimes connecting with older trans-Sierra Indian trails used by packers to supply miners east of the Sierra.

The 1864 reserve boundary was roughly one mile back from the rims of Yosemite Valley. During the severe drought of the mid-1860's the trans-Sierra trails paralleling the Valley rims became routes for sheep driven into the high country away from the waterless heat of the San Joaquin Valley and from southern California. Thousands of sheep were herded into Yosemite wilderness overgrazing some high country meadows and bringing alien plants especially to lower elevations where they were often able to invade and replace many native grasses.

To John Muir these sheep were "hoofed locusts" destroying the high country. Accordingly, Muir and others used publicity and political ties to press for reserving as a park the high country surrounding Yosemite Valley. The Act of October 1, 1890, reserved lands including most of the modern park but also lands extending east to the Minarets and west past the South Fork of the Merced River. Lacking an organization to run the new park, the Secretary of Interior arranged for a troop of cavalry to patrol the park from their camp in Wawona. The cavalry mapped the park and slowly established a network of trails through the high country in the process of protecting the place from intrusion, especially by sheep and hunters.

In 1905, the park boundary was redrawn to correspond more with the headwaters of the Merced and the Tuolumne Rivers. Lands were excluded on the south and west because too many inholdings compromised park integrity but also because some economic interests pressed for the right to exploit resources there. In that year the state also ceded Yosemite Valley and the Mariposa Grove back to the federal government. In 1906 the recession was accepted by Congress, and the cavalry moved its base of operations for the

park as a whole to Yosemite Valley.

Until the recession of Yosemite Valley to the federal government, Yosemite had been truly a wilderness park. Addition of Yosemite Valley to the park and movement of park headquarters from Wawona to the Valley changed the focus of park administration. Pressures in the Valley were greater, more immediate and complex. The Yosemite Valley Railroad and then the All Year Highway opened the park year round. The appearance of the automobile brought "improved" and paved roads on which people travelled in increasing numbers. Each time roads improved, visitation made a corresponding leap to increase pressures on existing water, sewer, electrical, and communications facilities as well as on administrative functions.

To promote and protect the park by getting people to know it, the Sierra Club organized outing trips into the high country of Yosemite as well as other parts of the Sierra Nevada. The outings began small but grew in the early decades of the 20th century to large camps with organized activities and programs, long side trips by foot or horseback, and some scientific exploration as well. These large guided parties introduced many people to the mountains who would otherwise probably not have ventured so far or so long by themselves.

The National Park Service was established in 1916 to manage the several national parks and monuments. As a new agency, the National Park Service, like the Sierra Club before it, set out to protect parks by promoting them. The National Park Service extended the trail system developed by the cavalry, rebuilding and re-designing many miles of trail to make them wider, more easily graded, and directed toward the views people wanted to see. These trails were used mostly by horses and mules, the primary means people used to move around the high country. Stock parties reached their peak in the 1930's as did the number of pack stations using the Yosemite region.

While revamping park trails, the National Park Service also promoted access to the high country through a system of High Sierra Camps operated and supplied by park concessioners. Growing from a couple of camps before 1920 to six by 1961, these camps were separated by a day's travel and were connected by a trail that came to be known as the High Sierra Loop. Both trail and camp locations have become important routes and destinations for many more people than those with reservations at the camps. Greater accessibility than other well known trails has meant that the High Sierra Loop has carried a large percentage of high country travel.

The National Park Service promoted wilderness and the park without knowing very much about it. Even before the Valley had been set aside, the Yosemite region had been the subject of both public and private scientific investigation which continued sporadically into the Park Service period. Early study was aimed primarily at identifying and describing natural phenomena.

Service interest in natural history began with nature guiding and naturalist walks in 1920 to educate visitors about their surroundings. The

Service also developed its Wildlife Division, based in Berkeley, which made seasonal reports on park wilderness conditions and facilities. Lowell Sumner's October 9, 1936, "Special Report on a Wildlife Study of the High Sierra in Sequoia and Yosemite National Parks and Adjacent Territories" summarized wildlife observations as well as changes he saw occurring along the Sierran crest. He noted the ominous impacts of large developments, the extensions of roads and trails especially, on wilderness areas. The new Tioga Road, he felt, "illustrates the complex, irrevocable, and perhaps partly unforeseen chain of disturbances" set into play when any such project is authorized. To Sumner the impacts clearly demonstrated the need to preserve remaining wilderness. Sumner introduced the concept of recreational carrying capacity as the maximum use an area can receive consistent with its long-term preservation.

The foundation for what we now call "resources management" was laid by Park Forester Emil Ernst, whose various interests took him deep into the high country gathering information about both history and natural history. Ernst's studies of park meadows during the 1930's and 1940's were the first intensive long-term studies of vegetative changes, relating them to park history and practices. Whereas the focus of information for ranger naturalists tended to be educational services for visitors, Forester Ernst was able to gather information in Yosemite over a long period of time to mold policies for park forestry practices.

Ernst assembled a vegetation map of the park, studying the relationship between fire and meadows in the process. These separate studies led him in the 1940's to his studies of meadow carrying capacity. A blend of disciplines gave Ernst a perspective rare in park research. He concluded in his May 15, 1943, "Preliminary Report on the Study of the Meadows of Yosemite Valley" that "protection worked destruction" on the meadows. Fire had been a critical element in meadow livelihood, but fire suppression along with human impacts such as farming and lowering of water tables had severely affected meadow character and vegetation composition. His study not only of vegetation but of its historical use and change provided the grounds for his recommendations which the National Park Service took nearly three decades to adopt. Some of Ernst's work was later reevaluated, brought up to date and published by Robert P. Gibbens and Harold F. Heady as The Influence of Modern Man on the Vegetation of Yosemite Valley (1964).

Ernst did not confine his studies to the Valley but took what he learned there to the study of wilderness meadows. His "1948 Saddle and Pack Stock Grazing Situation of Yosemite National Park" (March 31, 1949) surveyed high country meadows and use. He focused on bottleneck areas and called for regulated grazing use and control of large party use. Using his vegetation map with information from ranger patrols, Ernst arrived at meadow carrying capacities and a pattern of rotated use in wilderness.

Outside the Park Service, Sierra Club outings and dual roles of some club members like Sumner led to other studies of high country, focusing on meadows because they were most obviously impacted. Sierra Club outings had grown to several hundred people and several hundred head of horses and mules by the 1930's; outings the club had started to protect the wilderness

were instead bringing increasing impact to it. In the 1940's, Lowell Sumner and Richard Leonard studied these impacts on meadows and their relation to trips. In "Protecting Mountain Meadows," in the Sierra Club Bulletin (May, 1947), Sumner outlined the effects he saw of grazing in Sequoia and Kings Canyon, pointing out that overgrazing greatly accelerated normal processes of transition. The degree of meadow damage and rate of meadow disappearance, he felt, were related to a meadow's importance as a stopping place. So the Sierra Club proposed changes in operating procedures for the outing trips to reduce meadow impacts.

Concerns about high country meadows led alpine botanist Carl Sharsmith to write "A Report on the Status, Changes, and Comparative Ecology of Selected Backcountry Meadow Areas in Yosemite National Park" (June 29, 1961). Sharsmith studied seven meadows in 1960, finding some long standing overuse and a clear correlation between ecological change and heavy use. Changes in plant succession and plant type, as well as the presence of introduced plants in lower elevation meadows, led Sharsmith to recommend grazing limits or exclusion for some meadows.

Park Forester George Briggs toured the backcountry in 1964 and 1965 to develop "A Report on Backcountry Conditions and Resources, with Management Recommendations." He anticipated several developments of the 1970's by proposing more thorough visitation measurements through campfire permits and outlining the need for a "Backcountry Coordinator" who would increase emphasis on resource protection.

While these studies focused on grazing, the explosion of interest in backpacking in the 1960's and early 1970's significantly changed levels and kinds of wilderness use in Yosemite. Stock use declined as pack stations failed or consolidated to offer different forms of stock use, such as spot packing backpackers. Numbers of people in the wilderness increased; they appeared most often on foot, and for a while, wilderness travellers were much younger than had been the case before. In addition, by the early 1970's women were using wilderness more frequently than in the past.

With publication of the Sierra Club Outing Committee's Wilderness Impact Study Report (September, 1972), the Sierra Club shifted emphasis from stock to human impacts, expanding their concerns to impacts of Sierra Club trips taken on foot as well as using pack stock and burros. A major difficulty in determining types, sizes, frequency and magnitude of human activity in wilderness, the study concluded, "rests in the decision as to how much alteration, or change, in natural ecosystems is compatible with club, park, and forest goals and objectives."

Those objectives, for parks at least, were defined in part by more recent carrying capacity studies done through university cooperation with the National Park Service. The "Ecological Carrying Capacity Research, Yosemite National Park, Final Report" (September 8, 1976), directed by Daniel O. Holmes of the University of California, Berkeley, resulted from research begun in 1972 on trampling, water pollution, meadow impact, and campsite impact. The study pointed out the need for continual monitoring

of vegetative change in wilderness to determine use limits commensurate with the preservation of both the vegetation and the wilderness experience. Information developed from this study was used with patrol records and wilderness observation to establish use limits in Yosemite in 1973. Later studies by Theodore Foin (Visitor Impacts in National Parks: The Yosemite Ecological Impact Study, April, 1977) and James Absher and R. G. Lee (Analysis of Sociological Carrying Capacity for Yosemite National Park, December 11, 1978) filled out the earlier carrying capacity studies and solidified Park Service policies on limiting use in Yosemite.

Trailhead quotas replaced zone limits in 1977 after sufficient study of carrying capacities established limits for use in park environments. Quotas were developed by the park's Research Scientist with a computer model of park wilderness. In places like Little Yosemite Valley where hundreds had camped each night in 1972, quotas brought numbers of campers down to relieve pressure on vegetation and soils as well as on park cleanup operations. By limiting people in heavily used areas, the quotas and wilderness permit system also helped to distribute people into other areas by using alternative routes and camp locations.

Wilderness use in the 1960's and 1970's prompted a rash of wilderness guide books and rapid change in the technology of backpacking. The search for faster routes to more desirable areas as well as an effort by many to avoid more crowded areas led to an increase of cross-country travel. That, in turn, produced more defined cross-country routes and some often serious off-trail erosion. At first encouraged officially to disperse use, cross-country travel is now discouraged officially and sharply limited as the unforeseen impacts of it have become apparent.

Wilderness maintenance rejuvenated with the increase of wilderness use. Trail crews had dwindled sharply by 1970. Those crews grew in the 1970's, redeveloped the older hand skills with native materials, and began the slow stabilization and reconstruction of the Yosemite trail network. By 1980, crews had covered perhaps a quarter of the trails and in doing so had built a core of experienced, skilled workers providing continuity to the operation. Changes in budget systems and priorities have prevented systematic refurbishing of park trails. Crews have been unable to keep up with the "official" network, much less to work on any of the cross-country route erosion.

The Resources Management Division of the park, however, has undertaken a thorough inventory of wilderness resources and conditions. Bringing Ernst's vegetation map up to date is a step towards measuring change in wilderness over the past 50 years. The inventory of trails and trail conditions also provides a means of monitoring changes and providing information for modifying practices and impacts in wilderness areas. Ideally, coordination of ranger patrols, research information, maintenance activities, trailhead quotas and wilderness permits, and further research will sustain the natural balance remaining in wilderness and allow an informed approach to redressing imbalances discovered there.

The 1984 California Wilderness Act brought the different threads of

wilderness work together. This plan is the last link in the legal process required by the 1984 Act to establish wilderness status for Yosemite.

II. Wilderness Managment in Yosemite

A. Legislation

B. Policies

C. Goal

D. Objectives

E. Procedures

II. Wilderness Management in Yosemite

Wilderness management in Yosemite is guided by a long tradition of legislative mandates and agency policies which together form a framework for specific goals, objectives and procedures.

As wilderness became scarce, cries for its protection increased, first to set aside areas where it could be preserved, and eventually to control its use and development. Wilderness management, although a contradiction of terms, became necessary. "Wilderness management should not mold nature to suit people," wrote one commentator. "Rather it should manage human use and influences so that natural processes are not altered. Managers should do only what is necessary to meet wilderness objectives, and use only the minimum tools, force, and regulation required to achieve those objectives." These are the principles guiding wilderness management in Yosemite.

A. Legislative Mandates

While the 1864 act granted Yosemite Valley and the Mariposa Grove to the State of California to be held "inalienable for all time," that act did not mention wilderness preservation as a specific purpose. Similarly, the 1890 act establishing the Park and the 1906 act accepting the recession to the federal government of Yosemite Valley and Mariposa Grove did not go beyond the requirement that timber, mineral deposits, natural curiosities, or wonders be retained in their natural condition. Wilderness preservation was of paramount importance to John Muir as he pressed for passage of the 1890 bill. To many of the bill's supporters in Congress as well, preservation of the region was a central purpose, though it was never spelled out in the final act.

The 1916 act establishing the National Park Service did little to solve the dilemma of balancing preservation and use. Although scenery, wildlife, and natural and historic objects were to be protected in their natural condition, the act also considered the enjoyment of present and future generations. Not until 1964 did an act of Congress specifically designate the preservation of wilderness as a national policy. This statutory protection was unprecedented and prevails today as the broad legislative mandate governing wilderness management in Yosemite. The Wilderness Act prohibits commercial enterprise and permanent roads and states that, except to meet the minimum requirements necessary to administer the area as wilderness, there shall be no temporary roads, no use of motor vehicles, no motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation.

The Wild and Scenic Rivers Act of 1968 was amended by the California Wilderness Act of 1984 to add the Tuolumne River to the national system and by the Merced River Wild and Scenic River Act of 1987 to add the Merced River and the South Fork of the Merced to the national system. The 1968 act provides that designated rivers shall remain in a free-flowing condition and protects the rivers and their immediate environments from degradation. Where designation coincides with wilderness, the more

restrictive provisions apply.

Fifty-one miles of the Tuolumne River, 34 miles of the Merced River, and 19 miles of the South Fork are designated as both wild and scenic and as wilderness. The wild and scenic river planning requirements for these segments are satisfied by the provisions of this wilderness plan which establishes the following wild and scenic river planning guidelines: 1) All river segments within designated wilderness are classified as "wild". This includes the segment from the U.S. Geological Survey gauging station to the park boundary that was proposed for "scenic" classification in the Tuolumne River Wild and Scenic River Study. 2) The boundaries for these "wild" segments coincide with the wilderness boundaries as delineated in this plan. 3) Within wilderness a specified wild river corridor is unnecessary and will not be specified. The wilderness management plan applies to all adjacent park wilderness as well as the river vicinity, insuring that the values for which the river was designated will be protected. 4) The City and County of San Francisco owns an 80 acre parcel of land in Poopenaut Valley that extends across the Tuolumne River inside a river segment classified as wild. This parcel is designated as a potential wilderness addition by the California Wilderness Act and is a high priority for acquisition according to the Yosemite Land Protection Plan.

The California Wilderness Act of 1984 designated 677,600 acres as wilderness and 3,550 acres as potential wilderness additions. This act requires that potential wilderness additions, including the five High Sierra Camps, private inholdings and utility corridors, be managed as far as practicable as wilderness. It further provides that, when uses prohibited by the 1964 Wilderness Act cease, the Secretary of Interior may designate these potential additions as wilderness. All designated wilderness in Yosemite is to be managed in accordance with the provisions of the 1964 Wilderness Act.

The Committee Report accompanying the House version of the 1984 act, while not a legislative mandate, makes recommendations for managing the Yosemite Wilderness. The report states that the Secretary of the Interior should document baseline operational and environmental impact conditions of the High Sierra Camps and that, "if and when it occurs that the continued operation of these facilities in these parks at the then acceptable operational standards results in an increased adverse impact on the adjacent wilderness environment (including increased adverse impact on the natural environment within the enclaves themselves), the operation of these facilities will be promptly terminated, the facilities removed, the sites naturalized, and ... the areas promptly designated as wilderness." The report further states that helicopter use for routine nonemergency purposes associated with visitor use is a questionable activity and should be eliminated.

The 1987 Act on Minimum Altitude For Aircraft Flying Over National Park Units states:

> It shall be unlawful for any fixed wing aircraft or helicopter flying under visual flight rules to fly at an altitude of less than 2,000

> feet over the surface of Yosemite National Park. For purposes of this subsection, the term "surface" refers to the highest terrain within the park which is within 2,000 feet laterally of the route of flight and with respect to Yosemite Valley such term refers to the upper-most rim of the valley.

The administrator of the Federal Aviation Administration will provide notice of restrictions in FAA publications. Department of Defense regulations require that all nonemergency military flights maintain a distance of no less than 3,000 feet from any surface feature in national parks and monuments. Aircraft in violation of legislation or standards should be promptly reported to the FAA through the Park Air Manager at Fire Dispatch. Date, Time, nature of the incident, fuselage number, and reporting person must be provided by written memorandom to the FAA for disciplinary action.

B. Agency Policies

Department of the Interior. Department guidelines for wilderness contain procedures and criteria used for proposing new areas for designation and for managing them once designated. These guidelines, written by Assistant Secretary Nathaniel P. Reed as Secretarial Order No. 2920, introduced the concept of the "minimum tool" for uses necessary for the health and safety of wilderness travelers or the protection of the wilderness area. The manager must use the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objective, with economics considered the least important of the three criteria. Minimum tools include, but are not limited to, patrol cabins, pit toilets, fences, and hydrological devices. In special or emergency cases involving the health and safety of wilderness users or the protection of wilderness values, aircraft, motorboats, and motorized vehicles may be used.

National Park Service. The Management Policies of the National Park Service include a chapter on wilderness preservation and management, introduced with the statement that

> The National Park Service will preserve an enduring resource of wilderness in the National Park System, to be managed for the use and enjoyment of wilderness values without impairment of the wilderness resource.

"Public purposes for which park wilderness shall be managed," state the Policies, "relate to recreational, scenic, scientific, educational, conservation, and historical use." The Policies state further that "the preservation of wilderness character is the prime administrative responsibility of the Service." The Policies encompass the minimum tool guidelines of the Department and further require that specific approval be obtained for the nonemergency use of motorized or mechanized equipment, the installation of new facilities or the modification of existing facilities in wilderness. National Park Service Policies specifically prohibit permanent roads, heliports, helipads, airstrips, chalets, concessioner camps, and picnic tables.

The policies on wilderness use specify that the Service will limit or disperse use if necessary to preserve wilderness character. That point has been reached for Yosemite wilderness, and a trailhead quota system is used to limit use.

With regard to visitor use and facilities, the Policies state:

> The visitor must accept wilderness largely on its own terms. Modern conveniences are not provided for the comfort of the visitor; and the risks of wilderness travel, of possible dangers from accidents, wildlife, and natural phenomena must be accepted as part of the wilderness experience.

Beyond notifying and warning of obvious or hidden hazards, the National Park Service leaves wilderness users to assume most of the responsibility for their own safety.

Western Region. The Western Region has proposed a policy on use of aircraft in national parks that addresses administrative flights in wilderness. This policy states that within designated wilderness, flights are prohibited except for emergency purposes and management of wilderness in accord with the "minimum tool" test or in cases when the reduction of impact to park resources by the use of aircraft clearly outweighs the potential aesthetic impacts of the aircraft.

Yosemite National Park. The 1980 General Management Plan for Yosemite gives only broad guidance for managing wilderness. General statements limit the types and levels of use or development to those that do not significantly impair natural, scenic and cultural resources or that are necessary for visitor use and enjoyment. For wilderness the Service is directed to provide for a quality wilderness experience, allow natural systems and processes to follow their courses with minimal human intrusion, and limit the number of visitors to levels which do not significantly affect natural environments. The plan further directs that abandoned roads in wilderness will be restored to a natural condition and that no new development of facilities will be allowed. Should existing developments be removed, there will be no reconstruction of facilities.

C. Goal

In Yosemite wilderness the Service seeks to preserve an environment in which the natural world along with the processes and events that shape it are largely untouched by human interference. Visitor use and enjoyment of wilderness are encouraged as long as such use does not result in levels of human impact that seriously compromise the wilderness values the National Park Service is mandated to protect. Specifically, ecosystems - including plant and animal species and populations along with unpolluted air and water - are protected in a natural state free from human structures, disturbances, and technology. Wilderness visitors encounter outstanding opportunities for solitude, for physical and mental challenge, for inquiries into various fields of biological and physical science in an

environment largely free from modification, and for interacting with fellow human beings in a spirit of equality and friendship. The wilderness provides a sense of freedom, inspiration, contemplation and tranquility.

D. Objectives

Human-induced change. The Service will impose limits on human-induced change and will manage impacts to insure that intrusions from civilized and technological society will not be allowed to slowly but steadily erode wilderness values. The Service will establish maximum use levels and quotas and may close or restrict certain areas to entry or camping to accomplish this objective. Trails, campsites, and other impacts will be systematically monitored to determine when changes approach unacceptable levels and to aid in planning.

Wilderness experience. Visitors can find a variety of wilderness experiences in keeping with traditional use patterns and can select the degree of crowding, solitude, or human impact they wish to experience. Visitors have differing desires and expectations and should have the opportunity to have them met. Regulatory restrictions will be minimized to allow as much freedom as possible consistent with wilderness resource objectives. Opportunities are available for both foot and stock travel.

Wilderness values. The Service will provide educational and interpretive media and programs to facilitate greater understanding and appreciation of wilderness values and to help visitors minimize resource impacts. These services will address the concept of wilderness, human uses of wilderness, and the history of the wilderness idea. These services will promote minimum impact techniques, proper food storage, and wilderness safety. Both formal frontcountry and informal wilderness interpretation will be provided by the service.

Minimum tool. The Service will use the minimum tool necessary to carry out management and research functions. These tools will be primitive and non-mechanized whenever possible. The tools in Appendix B are the only ones that are approved for use in Yosemite wilderness. Exceptions must be approved in advance in writing by the Superintendent.

Aircraft use. Aircraft will not be used in Yosemite wilderness other than flights in response to emergencies dealing with fire suppression, search and rescue, medical assistance, or law enforcement. The Superintendent must approve each nonemergency administrative flight in wilderness. Nonemergency administrative uses of aircraft subject to approval are listed in Appendix C.

Resource impacts. Problems with natural and cultural resource impacts will receive management priority based on their severity and will be corrected wherever they occur in wilderness either on or off trail, in frequently or seldom visited areas. The erosion and destruction of a seldom visited meadow in a remote area is as inimical to wilderness principles as a similar event in a frequently visited area near a trailhead.

Wilderness facilities. Facilities in Yosemite wilderness will be limited to those currently present or specifically proposed in this plan. They include safety railings; food storage devices; designated camping sites with food lockers, toilets, and agency constructed fire rings; drift fences; hitching racks; trails; patrol cabins; trail bridges; hydrometeorological devices; and radio antenna. Except for trail junction signs, existing place name signs, temporary emergency and resource signs, all signs for wilderness will be concentrated at trailheads and boundaries. The locations of administrative facilities are listed in Appendix D and food storage devices in Appendix J. There will be no additions to these facilities except the proposed hydrometeorological devices. Further facilities would compromise the National Park Service's responsibilities in wilderness management.

Visitor facilities. The Ostrander Lake Ski Hut and the five High Sierra Camps at Merced Lake, May Lake, Sunrise, Glen Aulin and Vogelsang, are overnight visitor facilities in potential wilderness additions. No additional facilities will be built and, should increased adverse impact on adjacent wilderness environments result from the operation of existing facilities, they will be removed.

Management activities. The Service will provide information and enforce regulations by means of ranger patrols and informal wilderness interpretation. It will enhance public safety through the use of safety warnings and provide appropriate and effective search and rescue response. It will not remove hazard trees except at designated campsites; trees can be expected to fall occasionally. There will be no environmental modification in the wilderness to minimize rockslides, avalanches or other natural phenomena except as approved along the Tioga Road at Olmsted Point and Spring Hill. Naturally ignited fires will not be suppressed or contained unless they pose a danger to life or property or threaten to leave the natural fire zone.

Research and monitoring. The Service will encourage and conduct research on wilderness resources and use to ensure that natural processes continue unimpaired. Wilderness resources will also be monitored to provide an information base for determining trends and to ensure that impacts are managed appropriately.

Abandoned roads. Numerous abandoned roads exist in Yosemite wilderness. In most cases trails will be maintained on the old roadbeds and drainage controlled to prevent erosion. Some roads have been nominated to or are on the National Register of Historic Structures. These roads will be preserved and protected from further deterioration by using those maintenance techniques which minimize long term environmental impacts from the roads' establishment while stabilizing the road structures for trail use and historic preservation. The remaining roads will be allowed to return to a natural state once detrimental drainage problems are corrected. The disposition of each road is listed in Appendix E.

Utility lines. Underground utility lines are located in the roadbed of the Old Glacier Point Road between Chinquapin and Glacier Point, the Old Wawona

Road between Wawona and Yosemite Valley, and the Old Tioga Road between Yosemite Creek Campground and Tuolumne Meadows. In addition a telephone cable is located in Indian Canyon between Yosemite Valley and Porcupine Flat. Portions of these lines are in wilderness and will not be maintained using mechanical means. No new utility lines will be installed in wilderness, and existing lines will not be extended or enlarged. The overhead power lines between Yosemite Valley and Glacier Point and between South Entrance and the Mariposa Grove are in potential wilderness additions. When these lines are replaced they will be put underground along non-wilderness road corridors or replaced by radio or similar technology. Once the old equipment has been removed, those potential wilderness areas will be added to Yosemite wilderness.

E. Wilderness Management Procedures

The management of Yosemite wilderness necessitates use limits, zoning, and resources impact monitoring. Within wilderness there is a variety of settings, ranging from heavily used campsites close to trailheads to remote trailless canyons. All these areas will be managed to maintain or enhance the current state of natural conditions and balance there, to prevent any further degradation of those conditions, and to restore areas already degraded. Since an area can only sustain so much use before unacceptable degradation occurs, the concept of use limits has been applied. To implement zoning and use limits, the minimum regulation necessary has been applied.

Use zones. Zoning in Yosemite wilderness has evolved over the years as facilities were developed and use increased. The development of trails created concentrated use zones as well as trailless zones. As more visitors used wilderness, de-facto high use zones developed, and campsites were designated. The first formal zoning occurred in 1972 when travel zones were established to record and distribute use in conjunction with wilderness permits. Since then zones have been established where no camping is allowed, no wood fires are allowed, and where special visitor use management actions are required.

The no camping zones include all areas within one mile of public access roads and within four trail miles of Yosemite Valley, Glacier Point, Hetch Hetchy, Tuolumne Meadows, and Wawona. These zones were established to eliminate the impact of camping on wilderness resources and experience in heavily used areas closer to roads. The watersheds of Parker Pass Creek, Dana Fork of the Tuolumne, and Gaylor Creek are also in no camping zones to protect the Tuolumne Meadows drinking water supply.

The no wood fire zone includes all areas of the wilderness above 9,600 feet in elevation and Lost Valley on the Merced River Whitebark pines are unable to produce enough dead wood each year to sustain any fuel wood collection. Since the species ranges down to 9,400 feet in the north of the park and to 9,800 feet in the south, an average elevation of 9,600 feet was selected for ease of management. A small no wood fire zone is located on the top of Half Dome because of the heavy use and lack of fuel wood there. Figure 2 delineates the no wood fire zones.

Use limits. Service managers became concerned in 1972 that no information was available about the amount of use occurring in wilderness or describing resource and social impacts associated with that use. Field surveys that summer found trampled vegetation in the most popular areas, eroded and multiple trails throughout wilderness, and up to 200 people camped at alpine lakes on weekends. These unacceptable impacts led to the decision to limit use by requiring wilderness permits. Public use limits have been established for Yosemite wilderness to protect environmental and scenic values, protect natural and cultural resources, and allocate use equitably.

Public use limits are administered through a system of trailhead quotas. The first step in the process of establishing quotas was to set capacities for the 52 travel zones in wilderness. These were based on numbers of acres in a zone, the number of miles of trails per zone, and ecological fragility. The acres and miles were multiplied by desired campsite and trail densities to determine the maximum number of people to be permitted in each zone each night. These values were then adjusted downward by an evaluation of the capability of the zone to withstand use. Trailhead quotas were designed so that average use in a zone would not exceed the capacity set for that zone. Adjustments are made for differences between anticipated trips as recorded on the permits and actual trips. Trailheads which contribute significantly to a zone are adjusted upward or downward depending on impacts in that particular zone. The resulting quotas are reviewed annually by wilderness rangers and resource managers and altered based on their knowledge and experience. Current quotas are listed in Appendix F.

Impact monitoring. The final step in establishing quotas is the monitoring of resource impacts along trails and at campsites to provide data for defining acceptable levels of change to wilderness resources. Monitoring data also provide baselines for evaluating future changes and trends. Site, trail, and travel zone impact assessments are then used to adjust trailhead quotas and travel zone capacities as well as to make recommendations for wilderness maintenance priorities.

B. Wilderness Maintenance

The primary goal of the Maintenance Division in wilderness maintenance is to ensure a relationship between facilities and environment compatible with requirements of wilderness legislation and the Yosemite Wilderness Management Plan. It is also a goal of the Maintenance Division to provide maintenance of a quality and frequency to existing essential facilities sufficient to minimize adverse impacts by those facilities on surrounding environments. All work and planning by the Maintenance Division will be accomplished within legislative and administrative guidelines. Wilderness legislation and environmental concerns will take precedence over economic priorities. Work projects will comply with archaeological, cultural, natural resource and public requirements. Maintenance crews in wilderness will adhere to established guidelines of group size, campsite selection and maintenance and restoration, and public information and interpretive requirements. All work will be accomplished with the minimum tool necessary as outlined in the appendices of this plan. Exceptions must be approved by the Superintendent. It is also a goal of the Division to limit any new facilities in wilderness, and to contain facility impacts by repair and maintenance of facilities in existing impacted locations rather than by relocation.

To support these goals the Wilderness Maintenance Office will follow a number of guidelines to achieve short term objectives:

1. Wilderness Maintenance plans for the season will be submitted to all park units for review and comment and for coordination with the wilderness activities of other divisions.

2. Wilderness trail and other maintenance standards will be developed for clarity and continuity in the work of maintenance crews.

3. Unless emergency work is required, trail work will be scheduled with the seasons with crews working accessible lower trails early and late while concentrating on higher trails in summer and early fall.

4. To carry out Wilderness Maintenance operations in keeping with the guideline to use the minimum tool, Wilderness Maintenance uses approved mechanized or motorized tools as the minimum tools for particular kinds of operations. The Wilderness Maintenance Office will seek to minimize or reduce the motorized or mechanized tools used in wilderness by searching for workable hand tools and techniques compatible with wilderness environments when possible. Excepted minimum tools used by Wilderness Maintenance are listed in Appendix B.

5. Wilderness Maintenance will accomplish its goals by the use of ground-based transport. Helicopter supply will not be used without specific written approval of the Superintendent. Ground-based alternatives will be thoroughly considered before the use of aircraft.

6. Wilderness Maintenance will strive to log and to perform maintenance on each and every maintained trail segment in Yosemite at least once each

year. It is a Wilderness Maintenance goal to provide major rehabilitation on each maintained trail segment at least once every ten years and more often as impact, erosion, and use require. Trail maintenance priorities are a) correction of serious safety hazards, b) logging, c) maintenance of rehabilitated trails, and d) rehabilitation of trails, and (e) protection of threatened cultural or natural resources. Trail crews will do the minimum amount of trail construction or elaboration required to keep impact on the terrain within desired guidelines, avoiding excessive rock work and trail widening beyond what is absolutely necessary. Cross-country routes will be monitored and decisions for appropriate environmental maintenance made on a case by case basis.

7. Wilderness Maintenance camps will be established and work accomplished as unobtrusively as possible in keeping with wilderness and environmental concerns. Camp locations will be approved and monitored by the Wilderness Unit Manager.

8. Barring unusual weather or snowpack, the Half Dome cables will be in operation prior to the Friday of Memorial Day weekend each season and will not be taken down before the second week in October.

9. It will be the responsibility of the Visitor Protection Division to implement opening and closing of park trails and other wilderness facilities. It will be the responsibility of Wilderness Maintenance to assess, repair, and sign these closures.

10. All maintained park trails will be logged at least once a year, funding and weather conditions permitting. Logging standards for trails will be strictly followed. Every effort will be made to operate chainsaws only between 8 a.m. and 5 p.m. except in unusual or emergency situations. Saws will be used with the comfort and esthetic concern for visitors and the environment in mind.

11. Bridges will be inspected biannually for condition. Bridge replacement will occur only where long tradition and high hazard to wilderness visitor safety requires them. Bridges will be of wood design and packed in. Other bridges will not be replaced after damage or washout. Structures and beams of damaged or obsolete bridges will be removed or obliterated or camouflaged. Wilderness trail bridges are listed in Appendix D.

12. It is the objective of the Maintenance Division to remove all chemical toilets from wilderness and from potential wilderness additions. These toilets may be replaced by facilities appropriate in wilderness settings.

13. Utility systems in proposed wilderness additions will be compatible with environmental and wilderness concerns.

14. The Corral operation will be managed within the guidelines of both the Wilderness Management Plan and the Park Horse and Mule Operations Plan. Exceptions may be made administratively with the Superintendent's written authorization.

Wilderness maintenance activities vary widely from trail work to sign and cabin maintenance to sewage disposal. All maintenance work on Park Service facilities in wilderness or potential wilderness is carried out through the Wilderness Maintenance Office as funds become available from benefitting accounts. Wilderness Maintenance, directed by Assistant Facilities Manager, Roads and Trails, includes the Trails Office under the Trail Supervisor, the Corrals under the Animal Packer Foreman, and Sanitation under a Utility Systems Foreman.

Logging crews, usually a packer and a sawyer, open and clear the trail system each year as permitted by weather, snowline, and funding. Opening the trails concentrates use on the maintained tread, confining impact to relatively narrow corridors through the mountains. Without logging, multiple trails and greater trail erosion would quickly develop.

Trail crews are larger and less mobile than logging crews. The goal for trail crews is to work frontcountry trails in the spring, follow the receding snowline from lower elevations in the spring to higher elevations in the fall, then return to lower country to prepare frontcountry trails for the ensuing winter. Though this goal of trail work would provide fairly regular maintenance over the whole park trail system, the facts of limited funding, long distances, short seasons at high elevations, and lack of trained employees have all prevented regular attainment of that goal. Because trails disrupt drainage patterns to cause erosion, the main goal of wilderness trail work now is restorative - to stabilize erosion problems while slowly reworking the entire trail network to make minimum impact trail maintenance possible. Considerations of safety for the public and safety of the environment have shaped this goal. To accomplish both the restoration and ongoing maintenance of the trail system, crews vary from five to twenty-five people each, the latter being the maximum size for all overnight groups on established trails in Yosemite.

Camps are located in accordance with Service wilderness policies for group size, sanitation, water quality, and wood fires. Locations are chosen to balance the impact of large or long term camps with the production they are able to achieve toward the ultimate goal. Chosen to provide water, wood, and pasture, camp locations are best where the impact of the work camp is eliminated in a winter's time. Primitive facilities and lack of permanent or fixed structures help accomplish this goal.

Transport for trail maintenance operations is by horse and mule. These animals carry the camp supply; they also move material for trail, sanitation, and wilderness maintenance work. The use of horses and mules constitutes one of those traditional skills and "minimum tools" on which Yosemite's wilderness maintenance operation is based. Innovation in the packing of materials has adapted the traditional skills to modern uses without compromising wilderness values. The use of horses and mules in park wilderness occurs within the guidelines of the Park Horse and Mule Plan as well as within the guidelines of this plan.

Wilderness sanitation, including sewage facilities, latrines, and water monitoring, has been consolidated into the Wilderness Maintenance Office

enabling these functions to be carried out as much as possible to preserve wilderness character. It is the Office's purpose and intent to develop workable sewage and water monitoring systems consistent with wilderness guidelines and U.S. Public Health Service and State of California regulations. Potential wilderness additions will be managed as much as possible as wilderness. The sewer mounding systems at High Sierra Camps are intended to restore water quality and the quality of the land around the systems. Having been designed to be compatible with elevation and heavy use in areas far from roads, these systems minimize mechanical devices and maintenance problems while supplying a long term solution to sewage disposal at these sites. Water quality is regularly monitored at the High Sierra Camps and at Vernal Falls, which have treated public water supplies.

The Wilderness Maintenance operation could not succeed without cooperating with other organizations also involved in wilderness management:

1. The Wilderness Unit is the office with which Maintenance has the most regular contact in wilderness management. Ranger patrols are regularly coordinated with maintenance activities and camp locations. Field communication between rangers and maintenance crews has been essential for effective wilderness management. The Wilderness Unit Manager approves and monitors Wilderness Maintenance camp locations.

2. Search and Rescue works with Wilderness Maintenance crews whose personnel are on call for assistance in emergency situations. SAR has provided field training in special techniques to some maintenance personnel. Others on the field crews have first aid or other training helpful in wilderness emergencies. Maintenance crews are always a ready source of organized people for emergency wilderness operations.

3. The Fire Management Office also works with Wilderness Maintenance, using backcountry personnel to locate and monitor wildfires or to help with emergency rescue operations. The Firehouse also uses Wilderness Maintenance personnel to help with Incident Command Center operations in frontcountry and wilderness.

4. Resources Management works with Wilderness Maintenance on occasion for assistance in monitoring use, soil, and vegetation. Resources Management has provided technical knowledge for wilderness maintenance activities such as meadow restoration and revegetation.

5. Interpretation gives programs on wilderness management, including the importance of maintenance functions and activities. The Division provides information to visitors on wilderness conditions and rules. Interpreters leading wilderness hikes communicate with Wilderness Maintenance on trail conditions and maintenance needs, rectifying problems observed as practicable.

6. The Park Archaeologist informs Wilderness Maintenance crews on wilderness archaeological resources and checks those resources to monitor and minimize impact from maintenance operations. Wilderness Maintenance

crews also try to provide the Archaeologist with information on wilderness archaeological resources.

7. The Research Scientist supplies information to maintenance crews on erosion, soils, and other environmental factors and problems. Maintenance crews also supply the Research Scientist with information and provide assistance when possible in information gathering to monitor wilderness impacts.

8. The Yosemite Park and Curry Company contracts with the National Park Service through the Wilderness Maintenance Office to maintain sewage systems and collect water quality samples at the High Sierra Camps. Cooperation between Wilderness Maintenance and the Curry Company in their High Sierra Camp operations has become smoother by consolidating Park Service wilderness maintenance functions into one organization.

9. The Yosemite Association's management of the Ostrander Lake Ski Hut, publication of trail information, and fundraising involve the Association in Wilderness Maintenance activities. While The Yosemite Association has operational responsibility for the hut, the Service has responsibility for maintenance and repair. Wilderness Maintenance also works with YA to support the organization's annual wilderness trip and to supply wilderness information for publication and fundraising efforts.

C. Natural Resources Management

The primary objective of the natural resources management program is the perpetuation of the natural processes which have had a dynamic influence on the development and maintenance of park ecosystems. All natural resources management activities are directed toward achieving this goal.

The Resources Management Division assesses and monitors the natural conditions of wildlife, vegetation, air, water, and soil in wilderness. The Division monitors impacts with an eye to restoring natural conditions. Division offices study and protect endangered species and work to reintroduce those now extinct in Yosemite but once important to the ecosystems. Natural fires are assessed and often duplicated by prescribed burns. Native insect populations, such as the lodgepole needleminer, are watched and assessed to understand their roles in wilderness and to support Service protection of natural processes in wilderness. The Division reviews environmental assessments for wilderness work to ensure compatibility with natural processes and the natural resources management program. Programs implemented by the Division in wilderness are described below.

Exceptions for motorized or mechanized tools or equipment used in wilderness by the Resources Management Division are shown in the appendices to this plan.

1. Wilderness Impact Monitoring

Wilderness impact monitoring programs collect information on human-caused impacts by identifying impact severity, causes, locations, and trends. Monitoring contributes to understanding of the condition of wilderness resources. Monitoring helps develop and test methods to reduce or prevent further damage and to help damaged areas recover.

Between 1982 and 1986, about 5,000 campsites were inventoried for area, number, location, vegetative alterations, obtrusiveness, sanitation, and developments. About 1,000 miles of maintained trails and cross-country routes were mapped and rated for width, depth, erosion, associated drainage problems, and multiple treads. Environmental factors such as vegetation and foundation type are also recorded. All inventory activities were accomplished within the restrictions of the Wilderness Act.

Resource managers are using inventory data to formulate a Resource Impacts Monitoring and Mitigation System. This system will provide data to help

a) define standards for acceptable levels of impacts on physical and visual resources;
b) identify all campsites and trails that presently fail to meet these standards;
c) adjust trailhead quotas or impose camping or wilderness travel restrictions to reduce resource impacts;
d) prioritize trail segments and camp areas for restoration and generate funding requests to support the restoration work;

e) develop and evaluate revegetation techniques and other trail and campsite restoration methods;
f) rebuild, repair or remove and revegetate trails so that they meet impact standards; and revegetate, repair, or remove campsites so that they meet impact standards,
g) at specified intervals, re-inventory campsite and trail impacts to evaluate the Resource Impacts System's success in mitigating unacceptable resource impacts.

A plan for implementing the Resource Impacts Monitoring and Mitigation System will be developed by the Resources Management Division during 1988. Recommendations will be implemented by interdivisional cooperative efforts by Resources Management, Maintenance, Interpretation, and Visitor Protection.

2. Human/Bear Management Programs

The human/bear management program has three objectives: 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 the development and use of the park to prevent conflicts and unpleasant or dangerous encounters with bears; c) to provide opportunities for visitors to understand, observe, and appreciate black bears in their natural habitat with a minimum of human interference. Capture and tagging operations, destruction of problem bears, installation of food storage devices, and wilderness patrols to monitor the bear population and collect pertinent data are all programs used to condition bears to a more natural behavior and integrity while minimizing human impacts on their population.

Wilderness food storage devices such as food lockers, bear poles, bear cables, and portable food storage canisters can help management eliminate artificial food sources provided by wilderness visitors. Food storage devices are available at designated campgrounds in wilderness. All other food storage devices will be removed from wilderness by 1989 and replaced with portable bear-proof food containers carried by wilderness users. Food storage devices are presently available at wilderness locations shown in Appendix E.

Wilderness bear capture and tagging operations enable the identification of problem bears and their movements. Wilderness bear capture is accomplished with free-ranging capture equipment such as Aldrich foot snares and syringe projector rifles with immobilizing drugs. Firearms may occasionally be required.

Release sites for relocating frontcountry-conditioned bears have been reduced by wilderness designation. No exceptions are requested for release sites now within wilderness, and helicopter release into wilderness has been eliminated as a management option. Future research on the bear population may require the use of radio telemetry equipment and low level overflights with fixed-wing aircraft to establish bear locations. The Division will request an exception for helicopter use for that study before

it is initiated.

3. Peregrine Falcon Management

The objectives of the Peregrine Falcon management program are to protect and promote Yosemite's breeding pairs of the endangered Peregrine Falcon, to restore the Yosemite breeding population to historic levels, and to establish a core breeding population to aid recovery of the species in the Sierra Nevada. Presently there are two known breeding pairs in Yosemite, the only known breeding pairs of Peregrine Falcons in the Sierra.

These objectives are accomplished by monitoring existing pairs and manipulating aeries. A hacking program to release captive-bred falcons will provide a floating population of replacement birds for existing breeding pairs and establishment of new aeries.

Nest augmentation - replacement of wild eggs with captive-bred hatchlings - is the primary method of ensuring the success of a peregrine aerie. Augmentation is accomplished with standard rock climbing gear.

A hacking program will involve the placement of 4'x4'x8' wooden hack boxes at several locations in park wilderness. Hackboxes will be dismantled and removed when hacksites are no longer needed. Firearms are sometimes necessary at hacksites to scare off or even kill potential peregrine predators. Prior approval by the Superintendent must be obtained before any potential predator is killed.

To help reestablish a viable Peregrine population in Yosemite, the Service will institute closures of air space, climbing routes, or other specific locations or uses to protect nesting pairs during the breeding season. Aircraft in violation of the 2,000 foot ceiling above Valley rims and land surfaces will be reported. Flight plans for administrative flights will be developed around nest locations with the advice of Resources Management. Blasting within two miles of the nesting pair will be scheduled with the advice of Resources Management; any emergency blasting near a breeding pair will be modified significantly to minimize shock waves and noise.

4. Bighorn Sheep Management

The bighorn sheep reintroduction program returned an important element of the ecosystem to the park. Bighorn sheep became extinct in the park in 1914 due to the influences of humans. Only in the southern Sierra did two remnant populations survive. The program aims to establish an additional, relatively large population that is geographically isolated from existing herds.

The first actual reintroduction of the sheep took place in March, 1986, on Forest Service lands adjacent to the park. Bighorn sheep are expected to be in Yosemite from June through October and may choose to winter on high windswept slopes. Additional sheep may be fitted with radio transmitters to monitor movement and herd welfare. Research on the herd will continue as the herd establishes itself. Occasional fixed-wing flights will be

necessary, with prior approval of the Superintendent, to monitor herd movements.

5. Deer Herd Management

The deer herd and range monitoring program has as its objective the restoration and maintenance of the Yosemite herd in healthy condition at its 1965 population level. The herd and range goals are a synthesis of the needs of the four government agencies having jurisdiction over the herd and are identified in the interagency Yosemite Deer Herd Management Plan. The deer herd and range monitoring program is coordinated also with prescribed and natural fire programs essential to provide habitat.

Deer herd composition counts, currently done outside the park on winter range, will be extended inside the park. Population monitoring and deer pellet group transects are conducted in accordance with wilderness designation. Vegetation transects done in conjunction with pellet counts are used to monitor deer range.

A deer research project has been requested to analyze deer movements and develop a statistically sound monitoring system. Deer would be captured on their summer range, up to 40 animals radio-collared, then monitored on foot, horseback, and by low level flights in fixed-wing aircraft. All other monitoring equipment is portable and non-motorized. The Division will request approval to make fixed-wing flights in wilderness for this program when the deer research project is initiated.

6. Fisheries Management Program

The objective of the fisheries management program is to restore the natural integrity of aquatic ecosystems while providing opportunities for recreational fishing in locations with naturalized fish populations.

At the time Europeans entered the Sierra Nevada, fish were native only to the lower watercourses, blocked from the high country by waterfalls. The existing high country fishery is a result of fish planting begun as early as 1877 and continued to present. Maintenance of an unnatural fishery through stocking in order to provide visitors with a sport fishing experience is in direct conflict with Park Service mandates to maintain the natural abundance, behavior, diversity, and ecological integrity of native animals. National Park Service Policies state, "Waters naturally barren of fish will not be stocked with either native or exotic fish species but will be allowed to remain in, or revert to, their natural state."

In order to restore more natural conditions in high country lakes and diminish the unnatural influence of exotic fish populations on aquatic plants and animals, the Service began a phased reduction in Yosemite trout stocking in 1972. Objections raised by the California Department of Fish and Game and sport fishermen resulted in a moratorium, and the Service was directed to continue stocking at the 1974 level. Lakes in the park without adequate spawning habitat that are not stocked are being allowed to return to a barren condition. Self-sustaining fish populations occur in 103 lakes

and in many park streams.

To comply with the directive to stock exotic fish in seven lakes annually the Service has identified 13 lakes to be stocked on a rotating basis. All but one of these lakes occur within wilderness. The fish stocking schedule is shown in Appendix K.

7. Great Grey Owl Management Program

The objective of the Great Grey Owl management program is to maintain the natural abundance, behavior, diversity, and ecological integrity of the Great Grey Owl in Yosemite National Park. The population of Great Grey Owls in and adjacent to Yosemite is the only population south of Idaho. While not on the federal list of endangered species, the Great Grey Owl is classified as "endangered" by the State of California. Research and monitoring are being done to evaluate movement, habitat use patterns, reproductive success, and the effects on the owls of visitor, concessioner, and Park Service activities. Such information is critical for evaluation of potential impacts of current development proposals on the species.

Long term monitoring can be conducted on foot using binoculars and a recording of the owl's call. Some research will require attaching transmitters to the birds. Monitoring of radio-transmitter equipped birds would be primarily on foot, but low level aircraft flights may occasionally be required late summer to early winter when greater movements of adults and dispersal of young occur. The Division will request approval from the Superintendent for each fixed-wing flight in wilderness for this program.

8. Vector Control

The objective of the vector control program is to minimize the potential for transmission of diseases important to humans through wildlife populations. Two diseases of consequence to humans have been detected in Yosemite historically and justify continued concern and management action: a) sylvatic plague, resident in rodent populations and transmitted by flea bites, and b) rabies, usually associated with bats, skunks, coyotes, and raccoons, and transmitted by their bites. Both diseases will spread most rapidly in animal populations that are at unusually high densities around developed areas in the park.

Impacts within wilderness will occur only at sites adjacent to developed areas with evidence of a disease outbreak. Activities are coordinated with the California Department of Health. No exceptions to the Wilderness Act are needed for these activities. If infections are detected, trapping and collecting of some animals in the area to determine the extent of the disease will take place. In the case of sylvatic plague, rodents and their burrows may be dusted to kill fleas.

9. Forest Management

The objectives of the forest management program are a) to detect exotic and native forest insects and diseases as early as possible, and b) to detect

and remove hazardous trees from one designated campground in wilderness at Lake Eleanor, three designated campgrounds in wilderness in Little Yosemite Valley, and from the five potential wilderness additions at the High Sierra Camps.

Weakened trees threatening to fall on people and property are identified and removed annually around High Sierra Camps, designated campgrounds, buildings, and park roads. Stumps are usually flushed when trees are removed.

The lodgepole needleminer is closely monitored because this forest insect has dramatic effects on lodgepole pine forests. Information gathered helps explain fluctuations in insect population and activity. That information is also used to support the occurrence of a natural forest process by allaying concerns of the scientific community and visitors over the apparent loss of large areas of lodgepole forest. No management actions against the needleminer are anticipated.

If control actions are necessary to mitigate alien insects and diseases, biological control agents will be used whenever possible. Control agents could be introduced into park wilderness. If biological control fails, pesticides may be considered as alternatives. Requests for exceptions for these programs in wilderness will be made on a case by case basis.

10. Natural and Prescribed Fire Management

The objectives of the fire management program are to reestablish fire as an element in perpetuating natural ecosystems, to preserve park wilderness integrity, and to protect historic cultural and archaeological resources, air quality, and threatened and endangered species.

National Park Service policy recognizes that fire is a natural process necessary to perpetuate certain plant and animal communities. According to policy, fires resulting from natural causes should be considered natural phenomena and allowed to burn without human interference as long as they achieve management objectives and remain within predetermined boundaries. Prescribed burning simulates the effects of natural fire in ecosystems substantially altered from their natural states by long-term fire exclusion.

Natural fires are allowed to burn in designated vegetative communities that have experienced minor unnatural successional changes as a result of fire suppression activities. Natural fires are allowed to burn any time of year unless they threaten human life, cultural resources, physical facilities, or endangered or threatened species. Human caused fires are routinely suppressed except where they pose no risk to resources or public safety and where the impact of suppression would exceed the impact of the fire. Where fire suppression in wilderness is warranted, a variety of means including confinement, containment, or control may be used. This flexibility will minimize impacts on wilderness.

Prescribed burning is used to reestablish more natural fuel and vegetative

conditions in chaparral, mixed-conifer, and meadow areas that have experienced significant unnatural changes in plant succession and fuel loading due to fire suppression. Phasing all wilderness areas into natural fire management is a high-priority program goal. To achieve this goal prescribed fires are ignited under specified conditions, seasons, and periodicity to simulate natural fire regimes and to minimize unnatural manipulations in wilderness areas.

Fire management actions and responsibilities relating to Resources Management and the Fire Management Office are described in detail in the Fire Management Plan (1987) for Yosemite National Park.

11. Air Resources Management

The objectives of the air resources management program are to conduct studies of park air quality to determine baseline air quality conditions and to evaluate changes in air quality. Under the Clean Air Act the Service is mandated to prevent any significant deterioration of air quality and air quality related values such as visibility below baseline conditions in park wilderness, a Class I area. This protection extends to vegetation, water quality, and wildlife if it can be shown that they are affected adversely either directly by air pollution or indirectly by such effects as acid deposition. Although the Service has technical authority to influence the management of air pollution sources outside the park, no effective way has been found to combat regional problems such as smog and acid deposition.

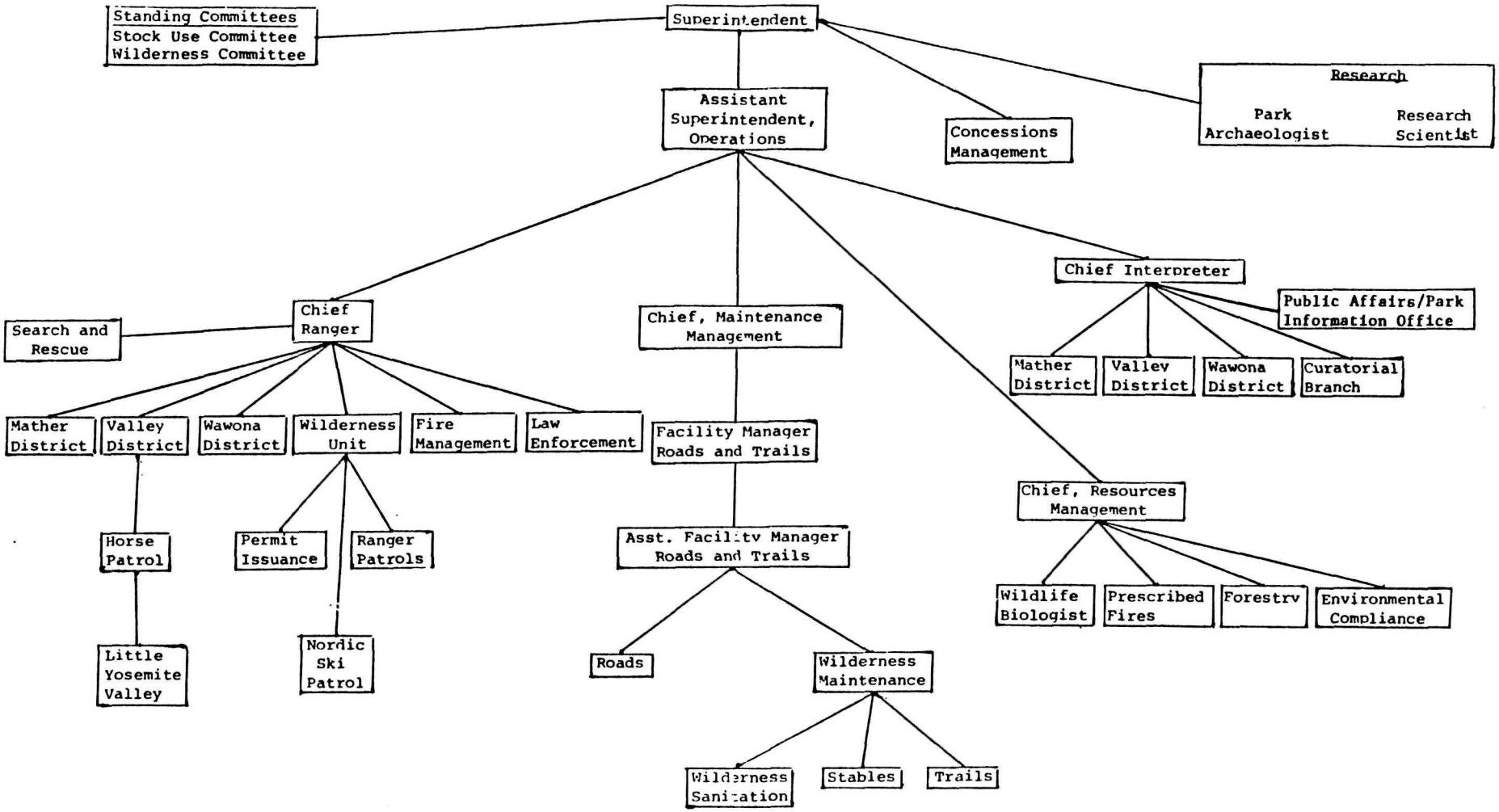
Visibility, total suspended particulates, and fine particulates are monitored in non-wilderness park areas to compile a record of baseline air quality control conditions. These use data are applicable to wilderness areas. Since 1985 ozone has been monitored in three non-wilderness areas, and surveys will be conducted to determine if ozone damage to vegetation is occurring in wilderness areas as well.

12. Water Resources Management

The objectives of the water resources management program are a) to identify and mitigate water resources management problems, b) to develop a park water quality monitoring system, and c) to classify all surface water by existing and proposed uses. Under the Federal Water Pollution Control Act and the Clean Water Act of 1977 the Service is obligated to collect more water resources data, develop a water resources management plan, and conduct routine water resources monitoring projects.
Limited water management operations currently conducted in park wilderness and potential wilderness include surface water quality monitoring, Giardia distribution and host research, and acid rain monitoring. Limited studies have been completed on surface water quality and Giardia lamblia. No future studies are planned.

The Service has maintained one acid deposition station in a non-wilderness area since 1981. Since data from this station will be applicable over a wide area, establishment of more such stations in wilderness appears

unnecessary. The Environmental Protection Agency, however, has proposed eleven lakes in park wilderness for inclusion in its National Surface Water Survey to gather baseline data on national surface water acidification. This survey will be carried out by foot or horseback.



APPENDIX I:
NATIONAL PARK SERVICE, YOSEMITE NATIONAL PARK,
ORGANIZATIONAL CHART SHOWING WILDERNESS RELATED
OFFICES AND ACTIVITIES Nov., 1987

Cooperating Organizations:
Yosemite Park and Curry Company
Yosemite Association
Yosemite Institute
California Department of Water Resources
California Department of Fish and Game