

## Wildland Fire



For most of the park's history, "preservation" of its resources was thought to mean that fires should be put out. As forest science research contributed to a better understanding of the role that fire has played in creating the landscape, people realized that natural fire is itself a part of the ecosystem they were trying to preserve. When fire was suppressed in Yellowstone, the natural landscape was altered and its diversity diminished.

Fires perform many natural functions, including:

- opening up closed-canopy forests to species that need sunlight;
- natural reseeding of up to a million lodgepole pine seeds per acre;
- promoting plant decomposition;
- halting the advance of trees into grassland areas;
- controlling the spread of plant diseases and insect infestations;
- creating a variety of habitat types for wildlife; and
- increasing the rate of nutrient cycling on land and water.



Similar to wildlife mortality, which varies from year to year but may be elevated during an unusually severe winter, fire is an episodic force that occurs under optimal fuel and weather conditions. Between 1972, when Yellowstone began using a natural fire management plan, and 1987, 234 fires burned 35,000 acres—mostly in two dry years, 1979 and 1981. Then in 1988, the extended drought resulted in conditions not seen in the history of Yellowstone National Park. Over the summer, 6 human-caused and 39 lightning-caused fires that started inside the park burned 301,080 acres. Three human-caused and three lightning-caused fires ignited outside park boundaries burned 492,800 acres. Together, a total of 793,880 acres were burned—nearly 36 percent of the park.



Most visitors, and even firefighters from other regions of the country, are unaware of Yellowstone's fire ecology. While large fires have burned at average intervals of 25 to 60 years on the low-elevation grasslands of Yellowstone's northern range, research into fire history indicates that large conflagrations burned extensive acreage at intervals of 250 to 400 years in the conifer forests that cover much of the Yellowstone plateau.



Scientists believe that fires of the same intensity (though not of the same size) as those of 1988 swept across Yellowstone in the early 1700s. While lightning causes fires every summer, only rarely are all the conditions right to support large fires. In 1998, the park had 23 fires that burned a total of 125 acres.

Firefighting itself has environmental consequences: soil and vegetation are displaced by the creation of helispots and the use of bulldozers and handtools to build firelines; chemical retardants may have short-term fertilizing

effects on vegetation and get into streams where they may kill fish; water removed for dumping on fires may draw down ponds and disturb natural aquatic processes.

**Learning from the 1988 fires.** Much research has been completed by park staff and independent researchers to determine the effects that the fires have had on many components of the ecosystem—aquatic systems, soil, vegetation, socioeconomics, and specific animal species ranging from elk to insects. It is known that the standing and fallen burned trees that are now a conspicuous part of Yellowstone’s landscape are providing important habitat for birds, insects, and small mammals, and that they will eventually decay, recycling nutrients for the next generation. It’s expected to take up to 30 years for most standing burned trees to fall, and close to a century for the tall forests to be replaced.

Nearly 60 post-fire research projects were initiated after 1988. Preliminary results from more than 30 studies were presented at and published in proceedings from Yellowstone’s 1993 second biennial science conference, which focussed on the ecological implications of fire in greater Yellowstone. However, most of the research was terminated prematurely due to budget shortfalls, and many studies should be renewed to take advantage of the valuable early post-fire work.



Although research demonstrates that on the whole, Yellowstone's natural ecosystem did not suffer any long-term damage from the 1988 fires, it must be recognized that what may be beneficial to the ecological processes does not minimize the cost of such a fire in financial and human terms. One firefighter was killed outside the park, dozens of structures were damaged or destroyed, and the fires created a hardship for some people who live and work in the area.

#### Current fire policy.

Because of the enormous public attention and controversy generated by the 1988 fires, several high-level task forces were assigned to review the National Park Service's fire policies and preparedness. While their recommendations reaffirmed the importance of natural fire in maintaining ecosystem health, they urged that additional guidelines be established to manage natural fires in national parks.

Under Yellowstone's current policy, every effort is made to suppress fires that are human-caused and most fires that threaten human life or property regardless of cause. Standard fire suppression tactics are used while endeavoring to minimize the effects of firefighting activities on the park's resources.

Naturally-ignited fires (usually caused by lightning) that do not threaten human life or property are permitted to burn only if they meet certain conditions pertaining to fire behavior, weather, and the moisture content of the vegetation. Each situation is reviewed daily to determine if the criteria are met and to make sure that adequate suppression resources are available to keep fires under control if necessary.



### 1988: YELLOWSTONE'S TRIAL BY FIRE

Some fires in national parks are allowed to burn to meet management objectives encouraging natural processes. In the summer of 1988, much of Yellowstone's lodgepole forest was more than 250 years old and reaching its most flammable stage. During the severest drought in

the park's history accompanied by strong winds, several lightning-induced fires in the park and several human-caused fires that started outside the park resulted in large-scale, stand-replacing fires.

As of July 21, after some 17,000 acres had been swept by fire, every effort was made to fight all fires regardless of cause, resulting in the largest firefighting operation in United States history. This endeavor, which cost more than \$120 million and employed up to 25,000 people, was able to save human life and property, but probably had little impact on the fires themselves or on the acreage affected—about 1.4 million acres in the greater Yellowstone area, including about one-third of the park. It was a mere quarter inch of rain and snow in mid-September that stopped the advance of the 1988 fires—a humbling reminder of our limited ability to control natural forces.

## FIRE LOOKOUTS: A PART OF OUR HISTORY

Before aerial detection began in the 1950s and remote fire weather monitors were installed in the 1980s, fire lookouts spent solitary summers watching for smoke from fire towers atop prominent peaks in the park. Five of these lookout stations still remain. Those on Mt. Sheridan and Mt. Holmes, built in 1935, have been restored; similar work is needed at the tower on Mt. Washburn, built in 1919, and Pelican Cone, which dates to the 1930s. At the three stations that are still used to support the fire management program, seasonal staff live in 15-by-15 foot glass homes from late June through September, scanning distant ridges with spotting scopes to locate fire starts. The fire guards radio in daily fire weather conditions and monitor storms that may threaten boaters on Yellowstone, Shoshone, and Lewis lakes. These bird's-eye perches also provide excellent opportunities to watch peregrine falcons soar and grizzly bears dig talus slopes for food. Fire guards provide information and interpretation to those who have the stamina to reach the top.



The Yellowstone ecosystem also includes six national forests, private property, and another national park where fire management objectives sometimes differ from those of Yellowstone. Cross-boundary fire management agreements were revised after 1988 with all of the national forests surrounding the park.

**Fuel and weather monitoring.** Since 1988, both human- and lightning-caused fires in Yellowstone have been relatively insignificant, but they fluctuate from year to year depending on environmental factors. While in 1994 Yellowstone recorded 64 fires that burned 16,345 acres (48 caused by lightning strikes and 16 human-caused, including 4 started from sparks from falling powerlines), the previous year experienced only 10 lightning-caused fires that burned less than one acre total. In cooperation with the Boise Interagency Fire Center, park staff use up-to-date monitoring systems and computer programs to predict fire danger.

The park has installed three Remote Automated Weather Stations in back-country locations to transmit data on fire-related climate conditions to park headquarters. Fire management staff also monitor fuel loads and fire weather at stations located around the park. The hazard fuels management program aims to reduce the fire danger in selected areas by pruning or thinning targeted overstory trees and understory regeneration to reduce the continuity and the volume of fuels that could feed fires.



**Fire management.** Like other national parks with major wildland fire programs, Yellowstone receives funds from a servicewide fire management program. This FIREPRO money is used to support four permanent fire management positions, two subject-to-furlough positions, a seasonal crew, and part of the costs of a summer helicopter operation. A seven-person prescribed fire crew is also stationed at Yellowstone to support monitoring of natural fires and prescribed burns in the park and across the country. Each summer hundreds of employees in other occupations are trained in basic firefighting and other fire management skills. While Yellowstone had a relatively low incidence of fires in 1998, Yellowstone rangers and maintenance workers, along with the park's fire management staff and helicopter, assisted other parks and agencies in 56 fire management efforts, rescues, and emergencies such as Hurricane Georges from Canada to Mexico and Florida.



### *Program Needs*

- **UPGRADE PROGRAM.** The servicewide fire management program has identified several additional staff needed to keep fire and aviation management plans updated and ensure a safe and effective fire management program for Yellowstone. With newly authorized FIREPRO funds, the park hired a lead fire monitor and a prescribed fire specialist in 1998. Additional fire management staff are still needed in order to maintain an effective program. While prescribed fire has been a management option for Yellowstone since the 1970s, in the future more planned ignitions may be used to create firebreaks and minimize the risk from smoke and wildfire, especially near structures and boundary areas.

- **UPGRADE EQUIPMENT.** Substandard equipment needs to be replaced, including a 10-year-old vehicle that has logged more than 130,000 miles in the line of fire, and a 2-1/2 ton stakebed truck that supports helicopter and fuels management projects. The single biggest need is for improved radio communications for fire evaluation and suppression operations. The existing overused system often contributes to the risk; new initiatives to upgrade telecommunications parkwide may address this need. The acquisition of an additional wildland fire engine would greatly enhance our ability to respond to fires throughout the park (see "Telecommunications," page 5-16.)

- **RESEARCH.** Many fire-related research projects that were abandoned due to lack of financial support should be reinstated to assess long-term fire effects.



## WILDLAND FIRE MANAGEMENT

### STEWARDSHIP GOALS



Naturally-caused fires play their ecological role in the park landscape, in keeping with approved resource management plans.



Planned ignitions are used to complement naturally-occurring fires.



A fully qualified fire management staff carries out fire and aviation management programs to protect human life, property, and where required, natural and cultural resources in the safest possible manner.



Wildfires are suppressed in the most safe, cost-effective, and environmentally sensitive manner.



Staff maintain proactive interpretation and public education programs on the ecological role of fire, wildfire risk and prevention, and safety.

### CURRENT STATE OF RESOURCES/PROGRAMS



Record fires swept greater Yellowstone in 1988, resulting in international attention, debate, education, and excitement in the research community. NPS fire management policies and plans were refined, but were reaffirmed as fundamentally sound.



Prescribed fire is used on a limited basis such as for hazard fuel reduction and weed control; more research is needed on its application for restoration of historic fire frequencies.



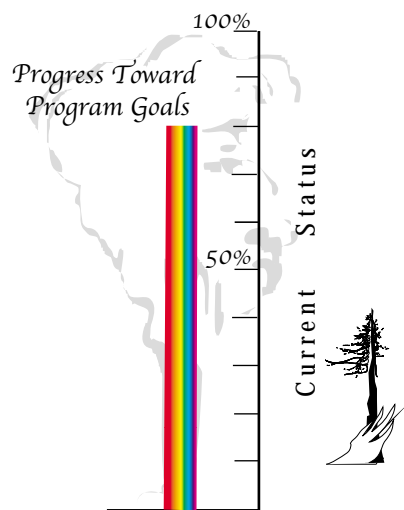
Fire and aviation management staff, equipment, and monitoring systems are modestly sufficient to run a professional and scientifically based program.



The fire safety record is good, and managers apply "light-on-the-land" fire control techniques.



Since 1988, education efforts have been more proactive, resulting in greatly enhanced public understanding of fire history and ecology. Fire danger and prevention programs are in place.



### 1998 FUNDING AND STAFF

Recurring Funds	
Yellowstone N.P. Base Budget	\$ 620,000
Staff	15.5 FTE

The human resources and funding necessary to professionally and effectively manage the park to stewardship levels will be identified in the park business plan.