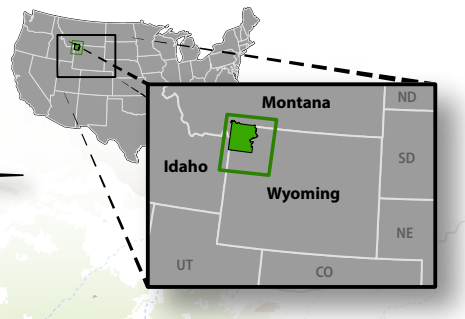
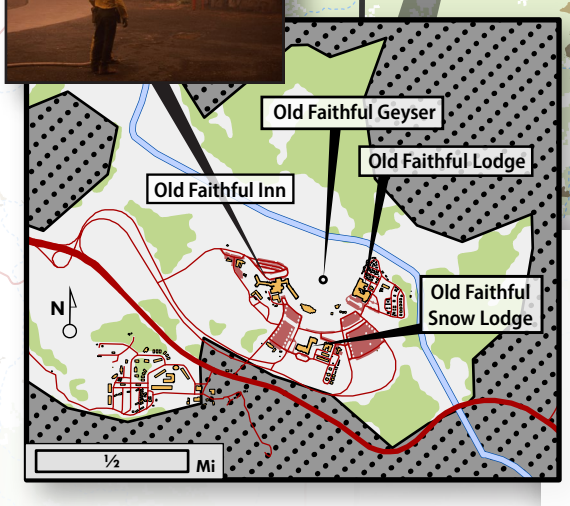
Reborn in Fire

The Vital Need for Wildfire in Yellowstone



During the summer of 1988, the largest fire in the recorded history of Yellowstone National Park swept through 793,880 acres of lodgepole pine forest, threatening lives, structures, communities, and the pristine wilderness. Over 25,000 firefighters and dozens of helicopters and fixed-wing aircraft fought the fire from July to October at a cost of over $300 million. Due to concentrated efforts on saving structures and developed areas, only eight million dollars in property was lost, along with two civilian lives and over 300 large wild animals. Antiquated fire policy prior to 1972 effectively stopped the natural cycle of fire for almost 100 years, which caused a buildup of potent fuel sources. Fire is a necessary part of the ecological cycle of the lodgepole pine forests of the Western United States, however, during the exceptionally dry summer of 1988, many small fires exploded into one of the largest fires seen in Yellowstone.

Big Sky (18 mi)
191
212
Gardiner
North Entrance
YELLOWSTONE NATIONAL PARK
Montana
Wyoming
Mammoth Hot Springs
Silvergate
Cooke City
North-East Entrance
212
212
Red Lodge (20 mi)
Roosevelt Lodge
Tower Fall
Painter
Clarks Fork R.
296
Miles
0 5 10
Scale: 1:700,000
N
W
E
S
287
Norris
Canyon Village
Yellowstone R.
West Yellowstone
West Entrance
20
Madison
Montana
Idaho
YELLOWSTONE NATIONAL PARK
Lake Village
Fishing Bridge
Pahaska Tepee
East Entrance
Cody (5 mi)
N. Fork Shoshone R.
14
16
20
Wapiti
Old Faithful
Yellowstone Lake
West Thumb
Grant Village
Idaho
Wyoming
Snake R.
South Entrance
YELLOWSTONE NATIONAL PARK
89
191
287
Jackson (31 mi)

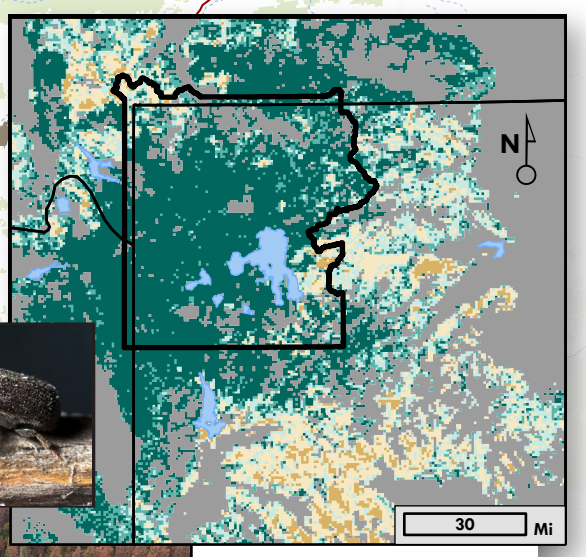


Protecting Old Faithful

Built in 1904, the Yellowstone Inn and the surrounding lodges are some of the most iconic and historic buildings in Yellowstone. On September 7th, 1988, winds of 50-75 mph pushed the fire front through the complex. Firefighters and helicopters worked tirelessly to douse and protect the buildings. At the Inn, a rooftop sprinkler system installed only one year earlier sprayed hundreds of gallons of water over the roof to protect the wooden building from huge, flying embers. As the fire moved through, a handful of small cabins were lost, but the Inn and Lodges remained standing.

The Necessity of Fire

The cone of the lodgepole pine is sealed with a resin, allowing the seeds inside to be stored in a viable state for years. This resin melts in fires, allowing the cone to open and spread its seeds. This makes wildfires a natural and necessary part of the lifecycle of the lodgepole pine forests in and around Yellowstone and the West.



Metric Tons AGC per km² due to Beetle Damage (2003 - 2012)

Significant Damage ↑ Healthy Forest

- 1,000.0 – 10,000
- 100.0 – 999.9
- 10.0 – 99.9
- 1.0 – 9.9
- 0 – 0.9
- Unforested

Epidemic Danger

The Mountain Pine Beetle is a small beetle, the size of a grain of rice, that infests and kills many types of coniferous trees in the Western Rocky Mountains. An ongoing epidemic of beetles, 10 times larger than any seen before, has resulted in a massive surplus of dry, unburned fuel in many at-risk forests. Usually an important part of the ecosystem, intensifying droughts and aggressive firefighting have allowed the beetle to spread more than ever before. The amount of beetle-killed biomass in these forests is measured as aboveground carbon (AGC), which reflects the total mass of dead timber in an area.

Time Since Last Significant Fire

Less than 22 years ago -

Forests that have burned relatively recently have little risk of fire and any fires that start are usually limited to low intensity ground fires that burn out quickly due to lack of fuel. Trees begin producing cones, but lack of fire limits new seeding.

Between 22 & 50 years ago -

Typical fire interval for small, less intense fires. Forests of this age will typically burn as a smaller ground fire that allows cones to open and spread seeds. Large fires are possible, but not common and are usually not intense enough to cause significant damage.

Between 50 & 140 years ago -

Typical fire interval for large, stand replacing fires. Enough fuel has accumulated in dead trees and vegetation to allow for large fires, but not so large as to be out-of-control and destructive. Fires are large enough to completely burn stands of trees, but reseeding from the fire will replace stands.

The Fire of 1988

The combined extent of the fires of the summer of 1988. Almost 800,000 acres burned between July and October, stopping only when the heavy snows of winter arrived.

No Fire Activity/Unburned

Forests that have not burned in 140+ years have an abundance of unburned fuel. Lightning or human interaction can easily ignite this fuel, leading to large fires that can spread uncontrollobaly in dry and windy conditions. Fires get hot enough to cause severe damage to underground vegetation and roots.

Main Map, Old Faithful Detail, Beetle-Kill Map: USA Contiguous Albers Equal Area Conic Projection, Central Meridian 110°W, Standard Parallels 44.3°N & 44.9°N
Locator Map: US National Atlas Equal Area Projection, Central Meridian 100°W
Map Data: State Boundaries: Natural Earth; Roads: WYDOT; Lakes, Rivers: USGS; Yellowstone Park Outline, Buildings, Parking Areas: National Park Service; Landcover/Forests: CEC North American Environmental Atlas; Fire Boundaries: Wildland Fire Decision Support System; Symbols: ESRI
Highway Shield Icon: US Highway Shield by Dolly Holmes from Noun Project

Created by: Michael Imhoff, December 2022 – for UW-Madison Geography 370

Legend data: Lotan, J., Brown, J., Neuenschwander, L. (1985). Role of Fire in Lodgepole Pine Forests. The Bark Beetles, Fuels, and Fire Bibliography (pp. 134-144)
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Photos from: National Park Service, USGS, NPR, Michael Imhoff