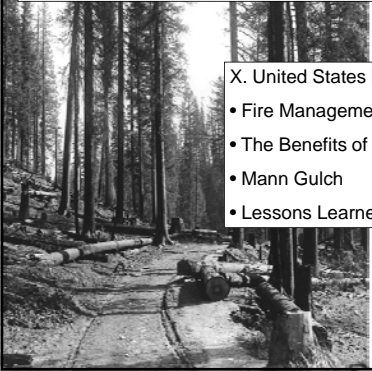


Introduction to Wildland Fire Management



REM 244: Introduction to Wildland Fire Management



X. United States Fires: 1935-1949

- Fire Management Gets Organized
- The Benefits of Rx Fires
- Mann Gulch
- Lessons Learned

REM 244: Fire Management Gets Organized

From 1910-present we can describe the evolution of U.S. fire management by both objectives and resources that were unexpectedly made available (Pyne, 1982, 2010).

Period	Problem Fire	Policy	Strategy	Resources
1910-1929	Frontier fire	Economic Theory	Systematic fire protection	Land via the Weeks Act
1930-1949	Backcountry fire	10 AM Policy	Hour control	New Deal and CCC's
1950-1970	Mass fire	10 AM policy	Conflagration control	Post- WWII Army Surplus
1970-2000	Wilderness fire	Prescribed Fires	Fuel modification	Information from fire ecology
2000-Present	Wilderness fire and WUI fire	Decision Support Systems	Real time forecasts and models	Advances in computing and internet

Source: Modified from Pyne (1982)

REM 244: Fire Management Gets Organized

In 1931 the Northern Rocky Mountain Forest and Range Experiment Station was established in Missoula.

Early research led by Harry Gisborne led to the development of an operational fire-danger rating.

A fire weather station (min/max thermometers, moisture stick scales, and a sling psychrometer) provided information for predicting the fire-danger rating on a daily basis.

In 1934, this system successfully predicted the blowup from the Pete King-Mc Lendon Butte fire, which burned 250,000 acres.



Forest ranger recording morning readings of fire-danger weather data on the San Isabel National Forest (formerly Cochetopa National Forest), Colorado, 1939 Source: foresthistory.org

REM 244: Fire Management Gets Organized

In the midst of the Great Depression, President Franklin D Roosevelt initiated the New Deal Program. As part of this the Civilian Conservation Corps (CCC) was established. The CCCs were a public work effort that ran from 1933 – 1942.

Of the 10 classifications of work projects that the CCCs could perform, several related to fire management:

Structural Improvements: bridges, fire lookout towers, service buildings

Forest Culture: planting trees and shrubs, timber stand improvement, seed collection, nursery work

Forest Protection: fire prevention, fire pre-suppression, fire fighting, insect and disease control



CCC Lookout tower (1940)
Sources: Wikipedia, Pyne (1982)

REM 244: Fire Management Gets Organized

In 1933 the Tillamook Fire was the first incident where CCC personnel in large numbers were used for firefighting.

The use of the CCCs were a great success and the influx of resources and personnel from the New Deal and CCCs enabled the Forest Service (who controlled most CCC fire camps) to modernize its fire program.

The mistake of the Forest Service was that it relied too much on the CCCs for personnel and resources. When the CCC program ended in 1942 it decimated the status of the fire organization.



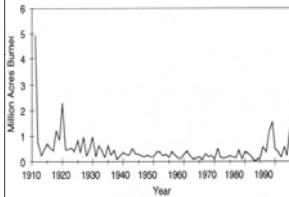
In a single day the 1933 Tillamook Fire increased more than 200,000-acres in size, creating a mushroom cloud 40 miles wide and 8 miles high and producing hurricane-scale winds that furthered the spread of the fire.
Sources: Oregon Department of Forestry, Pyne (1982)

REM 244: Fire Management Gets Organized

In 1935 the U.S. Forest Service enacted its 10 AM policy, which stated that every fire was to be controlled by 10 AM the day after it was reported. If this "hour control objective" was not met then the fire was to be controlled by 10 AM of the next day, and so on until controlled (Pyne, 2002).

In terms of area burned the 10 AM policy succeeded until 1990.

However, the policy was intended to rally fire protection efforts like the New Deal had rallied the economy. In this it failed as large fires continued to occur. It would take the end of WWII and the surplus of military resources to meet the acres burned targets of the 10 AM policy.



Acres burned by wildfires on national forests, 1910-2000. Sources: USDA Forest Service, foresthistory.org, Pyne (1982)

REM 244: Fire Management Gets Organized

Between 1935 and 1937 The U.S. Forest Service sought to completely establish its fire program. The fire exclusion policy did continue to face some dissent.

In 1934 Elers Koch remarked that

"fire exclusion in the rugged and heavily forested backcountry of the Selway and Lochsa River wilderness areas in Idaho was ill-advised and futile".

This opinion was rebutted by the U.S. Forest Service's DC office – highlighting that "more efficient" suppression methods were needed" rather than a "reckless let burn" policy.



Fire Fighting 1934, Nez Perce National Forest Sources: Arno and Allison-Bunnell (2002); Pyne (1997), foresthistory.org

REM 244: Fire Management Gets Organized

In 1935, Gisborne at the Priest River Experimental Forest developed a simple visibility meter to help gauge fire danger.

The fire-danger meter used several factors to estimate fire hazard. Namely, visibility combined with relative humidity, hours of sunshine, wind speed, and fuel moisture.

The clearer the visibility in the meter, the higher the fire-danger.

1937: Gisborne became Division Chief of what became the Division of Forest Fire Research.

At the National Fire Planning Conference it was decided that the fire-danger techniques would be implemented nationwide.



Harry Gisborne using visibility meter he helped design.

Source: RMRS

REM 244: Fire Management Gets Organized

In 1934, T.V. Pearson introduced a radical idea in U.S. Fire Management: parachuting in self-sufficient firefighters who could quickly attack remote fires. Smokejumping was born.

1935: tests began on using airplanes to drop fire retardants.

1939: The smokejumper program was initiated as an experiment in the USFS PNW Region.

1940: The first fire jump was made on Idaho's Nez Perce National Forest in the Northern Region.

1943: First "fire jump" out of the McCall Smokejumper base was made by John Ferguson and Lester Gohler.



Source: NPS.gov View of firefighters parachuting into smoky fire.

REM 244: The Benefits of Rx Fires

The southern states continually battled with the U.S. Forest Service's attitude on fire. Research has consistently shown the value of fire in long-leaf pine systems. HH Chapman (Dean of Yale School of Forestry) and others (Stoddard, 1931) had demonstrated that fire was critical for maintaining quail habitat and other game birds.

Result >> Pressure on U.S. Forest Service to allow Rx fires in southern forests

Pushback >> Via financial pressure. Namely, ability to withhold Clark-McNary funding from states that knowingly engaged in fire practices like Rx fires.

Changes >> In the late 1940s, southern states given an exemption and opened the way to southern Rx fire management.



Source: NPS.gov Smoke rising from fires in pines and palmetto.

REM 244: The Benefits of Rx Fires

The Forest Service made it clear that the exemption of Rx fires in the Southern States should not be extended to the West. However, in echoing earlier observations of Pinchot and others, doubts continued to be raised about the benefits of fire exclusion in western forest ecosystems.

In 1943 Harold Weaver spoke out for the case for fire,

"successful management of ponderosa pine forests depends on either finding a substitute for fire ... or using fire as a silvicultural tool"



Source: NPS.gov Fire burning on ground by pines

REM 244: The Benefits of Rx Fires

The Forest Service made it clear that the exemption of Rx fires in the Southern States should not be extended to the West. However, in echoing earlier observations of Pinchot and others, doubts continued to be raised about the benefits of fire exclusion in western forest ecosystems.

In the late 1940s, Harold Biswell at University of California - Berkeley, started to "experiment with controlled burning"

Weaver and Biswell were arguably the forefathers of Rx burning in the western United States.



REM 244: The Benefits of Rx Fires

Prescribed fires for many years had been shown to be useful tools for many management actions, such as maintaining habitats. Using Rx fires to prevent wildland fires (by reducing fuel loads) is a more recent concept.

In 1943, the then Chief of the U.S. Forest Service Lyle Watts in a break from tradition gave National Forests permission to use Rx fires

"for the reduction of unnaturally high fuel accumulations".

This change in policy was the first time the U.S. Forest Service acknowledged at an upper level the benefit of managing the landscape with Rx fires.



Source: NPS.gov Man lighting fire in palmetto and pines using drip torch. Courtesy of USDA Forest Service.

REM 244: The Benefits of Rx Fires

By the end of World War II, Rx burning was being used nationwide. In 1945, California conducted over 250 Rx fires totaling over 80,000 acres with only an additional 16,000 acres resulting from escapes.

[in 1945] "The method most used is burning and is often used alone. It has given rise to great controversy as to where, when and how it should be used.

Some advocate extensive use of fire; others believe there should be no use of fire. Generally, informed opinion lays somewhere between these extremes.

The U.S. Forest Service is the prime objector to the present use of controlled burning, because of a belief that there is not enough known about burning and its results, and the public interests involved are too great to be risked to mistreatment.

Its use without further land treatment is also questioned because many of the shrubs have the capacity to sprout from their roots and to germinate from seed in the burn. This persistence often results in more dense stands of brush a few years after the fire than there were prior to it."

Source: National Park Service

REM 244: Fire Research Progress

1937: G.L. Hayes published study showing the influence of altitude, aspect, and time of day on fire danger.

1941: Priest River conducted study showing influence of altitude on daily variation of fire behavior.

1945: Pechanec conducted studies of fire in sagebrush steppe ecosystems



Source: NPS.gov

REM 244: Mobilization

The late 1940s brought attempts to formally mobilize to attack fires.

1947: In a collaboration between the U.S. Military, the U.S. Forest Service explored using aerial bombing to deploy fire retardant over forests.

1948: The first hot shot crew was called the Los Padres Hotshots and as the name suggests were established on the Los Padres National Forest.

1949: California was the first state to organize fire crews using inmates.



Source: NPS.gov

REM 244: Mann Gulch

In the United States, a series of critical events shaped fire management into what it is today. One of these events was the 1910 Firestorm; another was the Mann Gulch Fire.

Worth Reading:

Young Men and Fire, Norman MacLean

The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster by Karl E. Weick

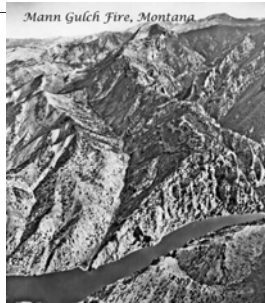
REM 244: Mann Gulch

Mann Gulch is a chimney-shaped canyon, whose mouth opened onto the banks of the Missouri River outside Great Falls

Fire Ignition (4th): Lightning at south side of Mann Gulch, Helena National Forest Montana

Fire Spotted (5th): Forest ranger spots fire at noon and smokejumpers dispatched.

Initial Efforts to control the fire were undertaken by Fire Prevention Guard James O. Harrison who was a former smokejumper.



Investigation party standing in Dodge's escape fire on the North slope following the Mann Gulch Fire. Source: Wildfirelessons.net

REM 244: Mann Gulch

Conditions on the 5th: Extended period without rainfall, thus making forest fuels very dry. Temperatures of 97°F and fire danger of 74/100 (explosive potential).

4:10pm: Smokejumpers dropped at 2000 feet (rather than usual 1200 feet due turbulence). Radio damaged during drop.

Fire was classified as a class C at time of jump (expected burn of 10-99 acres).

5:10pm: Crew crossed to north side of gulch to avoid high risk heavy forest.



Sources: Wildfirelessons.net, nifc.gov *The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster* by Karl E. Weick, Wildland Fire Lessons Learned Center.

REM 244: Mann Gulch

Weather: During this time, a thunderstorm cell passed through the area, and strong, gusty winds from the cell spread fire up the ridge and over the other side.

The race that could not be won:

The fire had crossed the gulch 200 yards ahead of the crew and was moving up towards them.

The crew angled up-slope to try and outrun the fire but where moving in 2.5 feet tall grasses and quickly lost ground to the 20 foot flames of the fire.



Sources: Wildfirelessons.net, nifc.gov *The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster* by Karl E. Weick, Wildland Fire Lessons Learned Center.

REM 244: Mann Gulch

Last Ditch Effort:

The crew boss, Dodge, lit a fire and ordered his crew to lie down in the burned area. Only he did, and the rest ran for it.

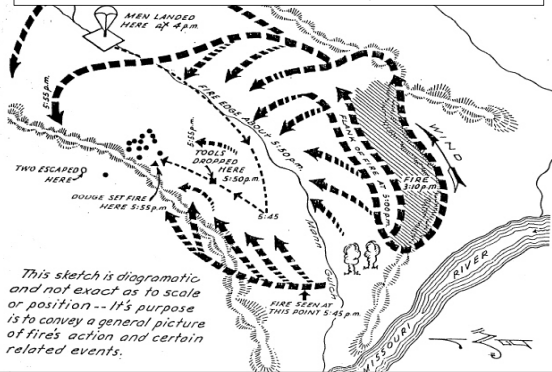
13 men died within 300 yards.

Took 450 men 4 more days to control the fire that had spread to 5000 acres.



Investigation party standing in Dodge's escape fire on the North slope following the Mann Gulch Fire.
Source: Wildfirelessons.net

REM 244: Mann Gulch – In Summary



REM 244: Lessons Learned

Following various suites and a board of enquiry, the Forest Service upheld the decisions the crew had made that day as "logical".

MacLean noted in his "Young Men and Fire" that, "The board [Forest Service board of inquiry] also felt that the men would have been saved had they "heeded Dodge's efforts to get them to go into the escape fire area with him" (quoted in Maclean, p. 151)."

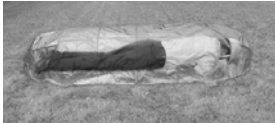


It must be noted that the survivors of the Mann Gulch fire adamantly disagreed with MacLean's interpretations of what happened that day. MacLean's book was set aside and then finally published 2 years after his death.

REM 244: Lessons Learned

Following the Mann Gulch fire, the U.S. Forest Service set up research centers in Montana and California. Their goal was to develop equipment to increase safety of firefighters on the line.

The principal invention that came out of these centers was the fire shelter: a metal coated tent-like shelter that protects the firefighter from radiant heat.



Most people can deploy their shelters within 15-20 seconds.

Sources: Wildland Fire Lessons Learned Center.

REM 244: Lessons Learned

The U.S. Forest Service also set up the Missoula Fire Sciences Lab.

The most important change following Mann Gulch was the shift in U.S. agency emphases on safety training by all personnel involved in wildland fires.

1957: The Ten Standard Fire Orders were developed

1960s: The 18 Watch Out Situations were initially proposed.

1990s: Communication, Escape Routes, and Safety Zones (LCES)



A smokejumper from Missoula, Montana, is dressed for action, 1954. Five years earlier, the lives lost by the experienced men who jumped into the Mann Gulch situation led to improved fire-fighting equipment development at the Missoula center.

Sources: Wildland Fire Lessons Learned Center.

REM 244: High Impact Fires in Summary - 1970

Date	Name	Impact
1825	Miramichi Fire	3 Million acres, 160 people killed
1845	Great Fire	1.5 Million acres burned
1853	Yaquina Fire	450,000 acres burned
1865	Silverton Fire	1 Million acres burned
1868	Coos Fire	300,000 acres burned
1871	Peshigo Fire	1.2 Million acres, 1,182 people killed
	Lower Michigan Fires	2.5 Million acres, 200 people killed
1881	Thumb Fire	
1894	Hinckley Fire	160,000 acres, 418 people killed
1898	Series of fires in Carolina	3 Million acres, 14 people killed
1910	The Firestorm – the big burn	3 Million acres, 85 people killed
1912	Cloquet	1.2 Million acres, 450 people killed
1933	Griffith Park Fire	29 firefighters killed.

REM 244: High Impact Fires in Summary - 1970

Date	Name	Impact
1937	Blackwater Fire	15 firefighters killed when Cold front caused 90° shift in head fire, trapping groups of firefighters
1943	Hauser Creek Fire	10,000 acres and kills 11 U.S. Marines – fire started due to gunnery practice
1949	Mann Gulch Fire	Kills 13 fire fighters.
1953	Rattlesnake Fire	Kills USFS ranger and 14 firefighters
1956	Inaja Fire	43,000 acres and kills 11 firefighters
1966	Loop Fire	13 El Cariso hotshots killed
