Northeastern Regional Fire Outbreak of 1947

Charts and Tables

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Highlights

1. This document presents a set of charts and tables embodying initial research on this important event.
2. The October 1947 fires were a truly regional event, occurring largely in coastal areas from New York State to Nova Scotia, though the largest and most widely recognized was the 208,000 acres of fires occurring in Maine. In Maine, the number of fires was not impressive – it was their size,
3. Decadal peaks were set in 1947 for annual burned in Maine, Nova Scotia, and Newfoundland but not in the more southerly areas or New Brunswick.,
4. Apart from these 3, fire experience in 1947 was not the worst of the 30's and 40's. But even in Vermont, which had a mild fire year, its fires were concentrated in October.
5. The drought conditions in several of these areas were of unprecedented duration and severity, and in some respects have not recurred since. Yet, weather analysts believe that serious regional droughts will afflict the northeast once every 50 years.

6. In both Maine and New Hampshire, fires that would be considered large and dangerous by recent standards occurred occasionally in and near the ’47 fire footprint – in decades preceding 1947 and since.

Introduction and Overview

This note assembles primary data on the famous ’47 fires. Because of regional weather patterns, it was truly a regional event and not confined to Maine and New Hampshire. We will build on this later to do a short analysis of what has changed since then.
Quebec experienced a mild 1947 for fires, with area burned well below its average for the 1940s, so we will not consider Quebec further here. The regional character of this outbreak has been somewhat obscured in recent years by the practice of publishing fire data on a fiscal year basis in several states. At the time, however, its regional character was recognized.

Maine’s fires were the most famous because of their unprecedented size, destruction of structures, and occurrence in regionally recognized locations such as the southern coast and the Bar Harbor area.

Southern **New Hampshire** experienced a severe fire outbreak concurrently with Maine’s October outbreak. New Hampshire’s ’47 fires did not come close in area burned to the state’s previous records – it was only a modest event relative to the previous 40 yr record, and far less than the bad year of 1940.

Massachusetts also experienced an October 1947 fire outbreak, following a similarly dry autumn. Its October 1947 fires burned 16,000 acres, and its annual total (calendar year), was less than the previous year.

In 1947 **New York** experienced a heavy fire year, tho not as severe as several previous ones. In 1947 32,000 acres burned, not all forest. This contrasts with 1944’s 48,000 acres, and a later statewide average 1970 to date of about 3100 acres/yr. The state has only approached that amount of burned area once more since then, at 30,000 acres in 1957. The State forester’s report credited effective response with preventing a severe drought from triggering much worse damage. The fall drought was extreme. Fire incidence was high south of the Adirondacks, with 2/3 of the year’s area burned coming from just 3 Districts. There were 45 fires above 100 acres, totaling 2/3 of the total area burned. And 9 fires exceeded 600 acres. In 1948 with the return of more normal weather, area burned fell to the lowest level in previous 6 yrs. Consistent with the other states, the month of October saw the most fire activity and area burned.

Vermont experienced an unusual level of fire activity in October 1947, though the year as a whole was not unusually active. Total area burned was less than it had been in 1941, and about the same as 1944 and 1949. The number of fires was similar to adjacent years. Interestingly, though, the state experienced more than half its total number of fires in October, the same month as the regionwide outbreak. This was a surprising break from the normal pattern in which many of the fires were concentrated in April May and June. The

fires were also larger than average: 70 % of the statewide area burned for 1947 occurred in October. That area alone was about 1500 acres, equivalent to the total area burned in some entire years during the 1940s. (data from Richburg and Patterson report)

For **Connecticut**, the 1947 season was far milder than any of the years 1941 to 1944, tho more severe than subsequent years. In 1947, only 4,442 acres burned. We lack monthly data to see if CT experienced an October season like the other states. Unlike most other states, though, the area burned of 1946 and 1947 were equaled several times in subsequent decades.

Our information on fire history for **Rhode Island** is fragmentary, but fortunately the latter part of the 1940s is included. According to this data, the state experienced its fire peak in the 40's in 1946, at 5,481 acres. The area burned fell to 2,846 in 1947, with the number of reported fires falling to 346. Rhode Island's later fires of 19450 -1952 far exceeded 1947, but the 1947 level of area burned was nearly reached once again during the 60s drought.

For **Nova Scotia**, the 1947 fires, at 45,000 acres, set a decade peak, but not that much higher than previous annual burns of 28,000 acres in 1942, and 37,000 in 1944.

Dan Mckinnon of the DNR reports:

"I started looking through previous fire history fire notes that I have collected over the years and found some information that may be useful to you. Wildland fire in N.S. was a serious problem during 1947. Notes state that 45,000 acres burned, including a fire that burned around 10,000 acres in August on Cape Breton Island. A number of large fires also occurred in the province at: Lake Charlotte (Halifax Co.), Antigonish Co. Richmond Co. and Shelburne Co.

The previous year seems to have had a lot of extreme activity as well. On July 25,1946, a fire started in Halifax Co. and burned 6,000 acres, other large fires occurred at: Folly Mtn. (Colchester Co.), Antigonish Co. and Lake Rossignol (Queens Co.).

In 1942, the acreage burned was 28,119 including one fire in the central region that burned what was described as 25 square miles.

There seems to be a cluster of serious fire years during the 40`s (42, 44, 46, 47) that had extreme fire events." (McKinnon E=-mail to author. 8/4/2011)

Newfoundland had an extreme fire year for the period, at more than 300,000 acres. Unfortunately our record for Newfoundland begins in 1944 so we cannot say if this was a decade peak or not, but it is the peak for the data we have.

Regional Summary

Area Burned, 1947 Regional Fire Outbreak

	Acres	Decade Peak?
New York	31,683	N
Connecticut	4,422	N
Rhode Island	2,846	N
Massachusetts	22,000	N
Vermont	2,214	N
New Hampshire	17,535	N
Maine	208,000	Y
New Brunswick	51,949	N
Nova Scotia	45,000	Y
Newfoundland	305,000	Y

In summary, this region did experience a fire outbreak in 1947, but only in Maine, Nova Scotia, and Newfoundland did the area burned reach decade peaks. In several other states, area burned was higher than the decade average. In Vermont, a fairly average fire year did see a concentration of the year's total in October, synchronous with the rest of the region. In some of the states, later peak fire years exceeded 1947.

Maine's 1947 Fire Outbreak

Our principal data source is the listing of individual fires from MFS records as published in Commissioner's report 1947-48. Plus NH Forestry Commissioner '48 Report, and website of National Climate Data Center. *Note that all the area burned was not forest. Wilkin's 1948 summary says 206,000 acres total, of which 179,000 was forest; our tab from the report's table shows 208,000 acres. He reports 213,000 in his 1978 book (p. 258). See maps at end of memo.*

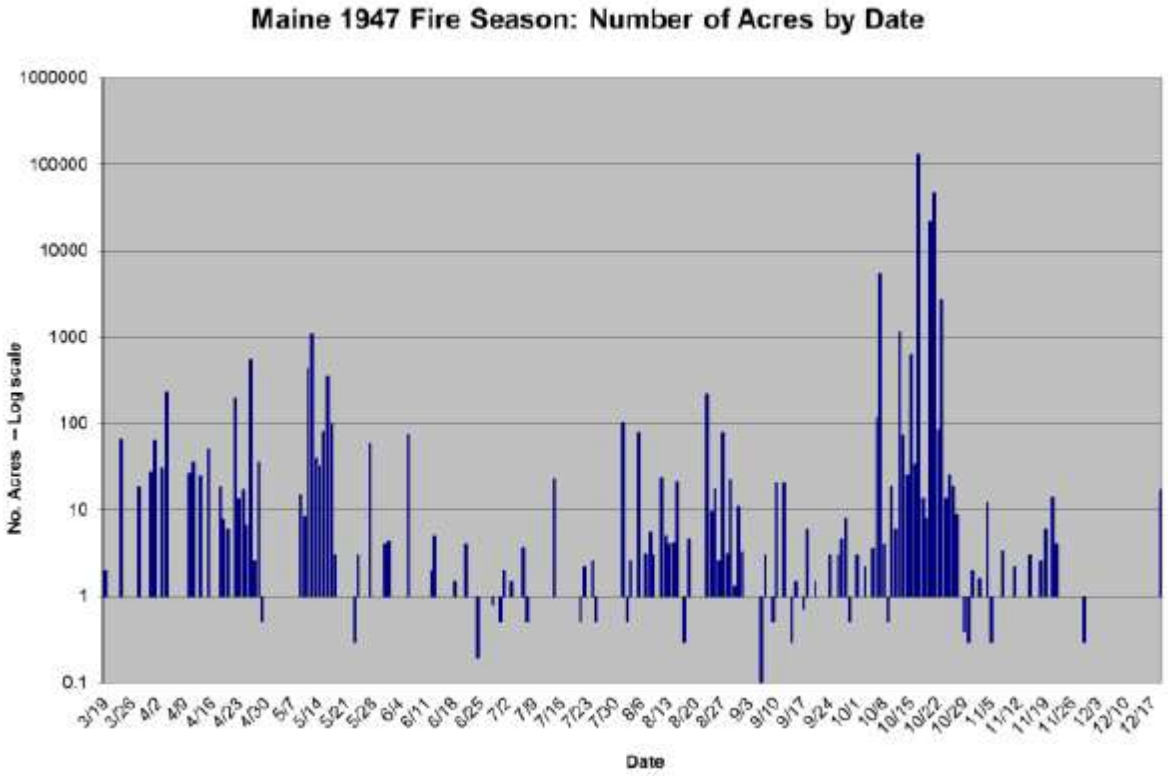
In 1947, Maine's total area burned was 12 times the 1903-2010 average annual area burned. The highest experienced since was about 30,000 in '57.

This is is Plotted on log scale due to huge differences in fire sizes; many recorded were smaller than one acre.

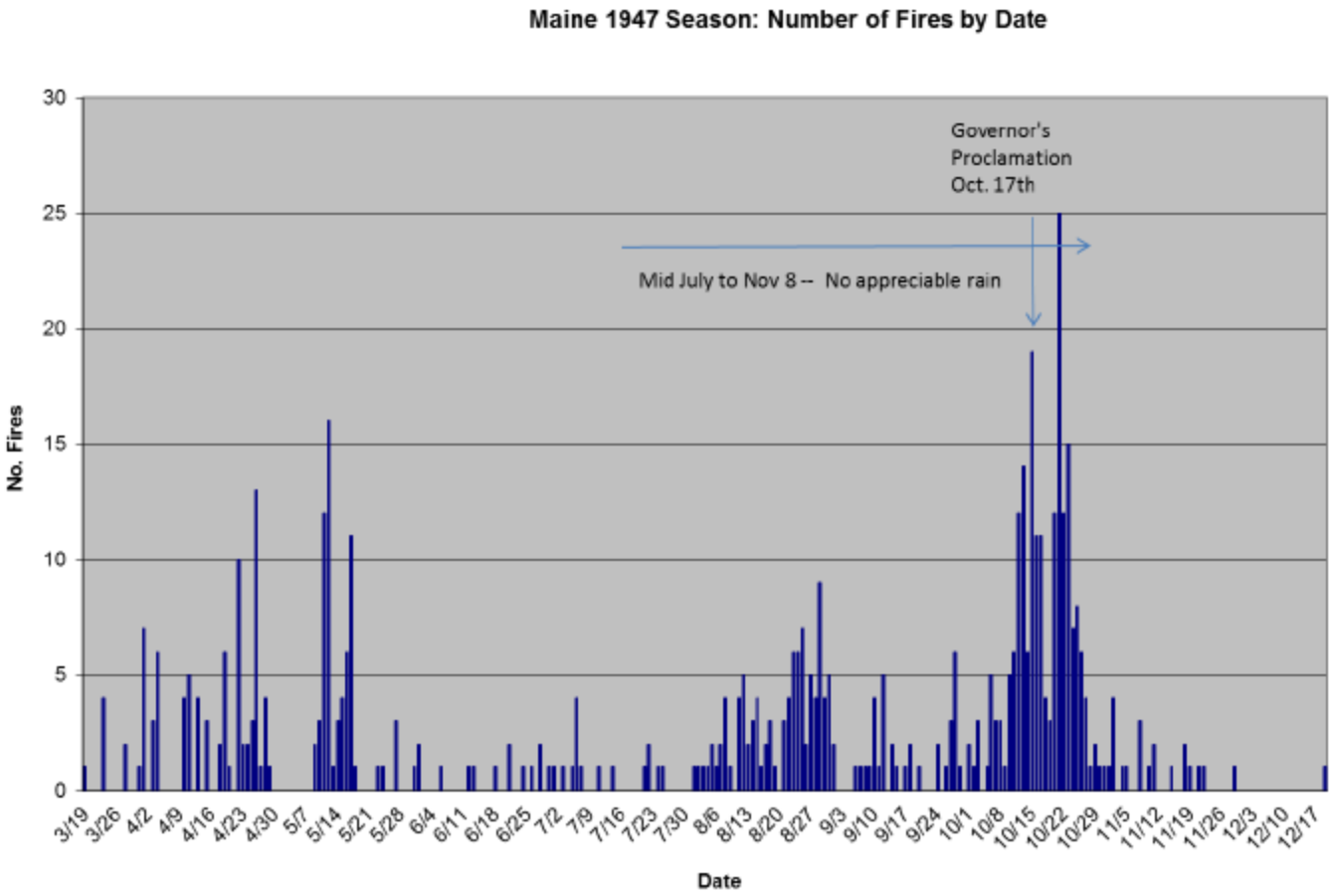
The 1947 fire year in Maine began quietly with a rainy spring and summer. Then after mid July the weather along the Maine/New Hampshire Coast transitioned to prolonged drought – but people living it day by day did not know that till it had passed. By early October, though, signs of its severity were clear. The '47 Fires were not a bad fire season – they represented a terrible 2 to 3 weeks of fire. Not only that, but those 3 weeks occurred after a "normal" fire season would have been over. Longterm records from the National Climate Data Center indicate just how extreme this October was – it was basically a once in a century event (see charts at end of this paper). Maine's fires were broadly distributed in the coastal areas and nearby. More importantly, 1947 was the state's second worst fire year since 1903, and a 3.7 standard deviation event based on the 1903-1946 record.

Reviewing other years, the footprint of the Maine '47 fires saw occasional fires that would be considered large by recent standards, in the decades before 1947 and also since. This hints at a certain fire-proneness to these areas. Which is consistent with soil and vegetation types. We are pursuing a tighter documentation of this point. Coolidge supplies an accessible reference for largest fires in these years up to the late 60s.

The October fire outbreak illustrates another point – individual states are not usually good analysis units for fire experience. In both northern Maine and northern New Hampshire, fire experience was normal or below normal in Oct of '47 – partly because it was so much cooler up there normally. Also, the coastal climate belt extends from the eastern Maine coast southward to Rhode Island, where weather and soil and vegetation conditions have broad similarities.



We assume entire burned area plotted on date fire started… source not clear on this. This would exaggerate the spikiness of the daily area burned record.


Maine 1947 Season: Number of Fires by Date
No. Fires
Date
Governor's Proclamation Oct. 17th
Mid July to Nov 8 -- No appreciable rain
0
5
10
15
20
25
30
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9
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7/30
8/6
8/13
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8/27
9/3
9/10
9/17
9/24
10/1
10/8
10/15
10/22
10/29
11/5
11/12
11/19
11/26
12/3
12/10
12/17

Maine's 47 fires were concentrated along the Coast and nearby (S. Oxford County). It is noteworthy that in any other year, the fires in Washington and Sagadahoc, would have been memorable and record-breaking.

No. Fires and Area Burned by County

County	No. Acres	No. Fires	Avg size
Androscoggin	1,814.2	42	43.20
Aroostook	14.0	4	3.50
Cumberland	1,727.7	99	17.45
Franklin	74.0	13	5.69
Hancock	17,845.7	42	424.90
Kennebec	209.0	39	5.36
Knox	130.0	21	6.19
Lincoln	127.7	35	3.65
Oxford	20,636.4	40	515.91
Penobscot	949.3	14	67.81
Piscataquis	13.0	4	3.25
Sagadahoc	8,355.0	28	298.39
Somerset	2,983.7	22	135.62
Waldo	263.3	27	9.75
Washington	20,880.2	43	485.59
York	132,834.9	60	2213.92
Grand Total	208,858.1	533	391.85

Ken Laustsen, MFS, supplies data suggesting that in the late 40's there were some 450,000 acres forest in York County. Its land area is about 646,000 acres, so about 20% of the entire county burned over! In just a few weeks.

The year opened with a fairly normal spring fire season, and a wet early summer. Fires remained small through September. The fires of October were not only bigger, they were two orders of magnitude than the averages for the other months. October was so busy a month that it accounted for 98% of the entire year's burned area.

No. Fires and Area Burned by Month			
Month	**No. Acres**	**No. Fires**	**Avg Size**
Mar	112	8	14
Apr	1,318	77	17
May	2,204	65	34
Jun	94	13	7
Jul	37	15	2
Aug	627	94	7
Sep	78	36	2
Oct	204,320	204	1,002
Nov	51	20	3
Dec	17	1	17
Grand Total	**208,858**	**533**	**392**

No. Fires and Area Burned by Cause			
Cause	No. Acres	No. Fires	Avg Size
Campfire	1,039	16	65
Debris	939	76	12
Incendiary	548	20	27
Lightning	14	12	1
Lumbering	85	19	4
Misc.	24,070	72	334
Railroad	1,056	15	70
Smoking	47,888	194	247
Unknown	133,219	109	1,222
Grand Total	208,858	533	392

Looks like with all the unknowns and miscellaneous they did not have a very good handle on causes then… too busy fighting the next fire to investigate the last one, most likely…

Maine 1947: Days by No. Fires		
No. fires	No days	
1 to 5	120	
6 to 10	15	
11 to 15	10	
16 to 20	2	
21 to 25	1	

From Apr to Nov inclusive, there were 101 days with no reported fires.

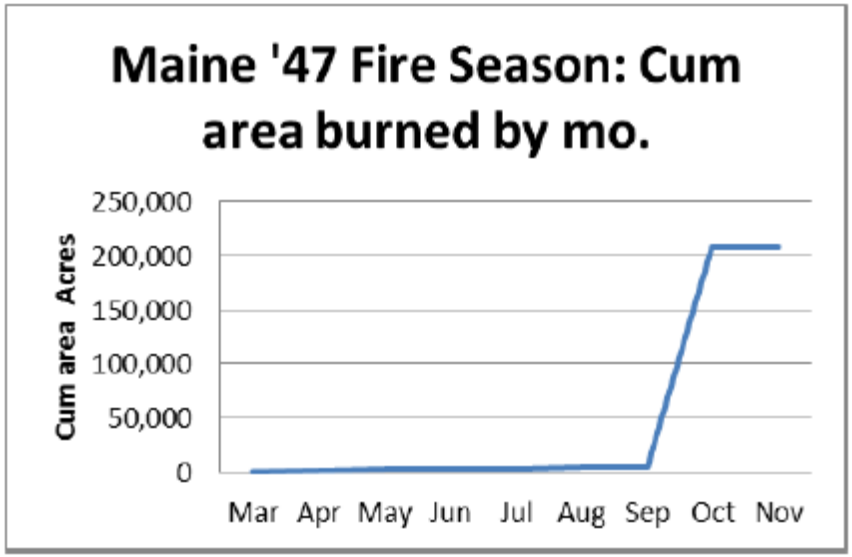
This table needs to be looked at together with the others – the days with lots of fires also had the big ones…

Looking at the detailed calendar, the busiest months were August -- 29 days w. fires and October -- 30 days with fires.

	Days w/Fire	Days w/o a Fire	Actual No. Days
Full year	148	217	365
Jan	0	31	31
Feb	0	28	28
Mar	4	27	31
Apr	18	12	30
May	14	17	31
Jun	10	20	30
Jul	11	20	31
Aug	29	2	31
Sep	18	12	30
Oct	30	1	31
Nov	13	17	30
Dec	1	30	31
	148	217	365

From the record we can calculate number of fires per day, but this hinges on attributing one fire to its date of ignition. This means that these numbers underestimate the total number of fires actually burning at one time. At the height of the May burn, 14 days had fires, and the average was 5 per day. In October, 30 days had new fires, averaging 7 fires each and every day. This followed fairly busy August and September activity. The problem in October was the immense size of the few big fires, their threats to property, and the cumulative exhaustion factor after so many continuous days of action.

In terms of area burned in Maine, 1947, as of September, was set to be a real yawner – possibly the lowest area burned of the decade, with only 4,470 acres burned by the end of the month. (The weather, though, was telling a different story….see references)



Assessments of 47 Fire Impact in Maine

Following the fires, USFS staff made several reconnaissance surveys to document effects of the fire and to help plan remediating measures (Nutting et al 1948; Forest Survey, Div For Econ. 1948). A timber cruise for the SW Maine area gives an indication of the stand types affected. Out of a survey area of 151,00 acres, 86% was forest. About 1/6 of the area was in sawtimber stands and a similar proportion in poletimber. Of that area, 48,000 acres, more than half was in softwoods. In vivid contrast to the dramatic depictions of the fire's intensity, only 8% of this area was burned by crown fires, the balance by surface fires. Details were provided for 3 distinct burned areas and by species group. For white pine, it was estimated that in poletimber stands, 17% of trees in the fire area were living, 8% likely to die, and 75% dead. In the sawtimber stands, 41% were living, 15% likely to die, and the remaining 44% living. Despite the fact that the area burned contained more than 200 MMbf of sawlog material in total, and that the fire was so intense, complete killing of pine in the burned areas did not occur. The report does not characterize to what extent this was due to patchy burning, but that is likely. Detailed tables are included. This report refers to detailed maps provided to the state (we ought to try & find – but Archives reports that no files prior to 1950 have been retained for MFS) .

Nutting and co authors (1948) examined fire effects and likely rehabilitation options. They developed a listing of some 1000 owners who owned the vast majority of the burned area. They surveyed a sample of these owners, leading to interesting observations on the land ownership situation. They ventured estimates as to the fire's local economic impact. They estimated that 125 million bd ft of sawtimber had been or were under contract to salvage. This was a very large amount relative to annual pine lumber production in the area at the time. They offered an assessment of the situation and recommendations for a planting program on the 25,000 acres that they identified as high priority.

A later report by the Dept of Inland Fish and Wildlife (1956) examined effects on wildlife habitat in SW Maine. The agency had visited the fire area immediately post fire to assess habitat and determine hunting regulations. It was decided that in view of reduced cover and forage, hunting should continue. Hunting seasons met with lower deer harvest for several years, as had been expected. Ten years later, food plots were tallied, though only half of them could be relocated. Conifer cover was sparse; this was identified as a concern for future habitat. But deer browse

seemed by then to be at a peak. Hardwood regen was less than 6 feet high (probably a reflection of the sandy soils and intensity of the burn) Data sheets attached to the report give details. The authors noted that the ecological effects had not been carefully studied.

A brief, anonymous USFS note dated Jan 30 1948 records a visit to the area of the Centerville-Whitneyville fire in Washington County (see map in Appendix). Of the 19,970 acres in the burn, 2,560 was nonforest; of the forest area, 330 acres was not burned and the balance was evenly split between merchantable timber and "unmerchantable forest". Salvaging by St. Regis was already under way, with a 60-man camp in full swing. Eastern Pulpwood Co expected to complete salvage of all salvageable wood on their lands during 1948.

Their observations on this fire:

"The crown fire covered approximately 10,000 acres. This of course is a complete kill. It is reported that the fire travelled over six miles in less than an hour on the afternoon of October 23. The area not covered by crown fire was less severely burned but almost all the softwoods were killed. There were a few small unburned islands within the area but with this small exception, nearly all trees within the fire are doomed. The scattered trees which were not burned severely will probably blow over before next year. "

In late 1951, two NEFES scientists re-visited the burn area in SW Maine (Banks and Ostrander, 1952). They estimated that lost growth on the 130,000 acres considered would equal 9 MMbf annually. They examined reproduction on areas where adequate stocking did not survive the fire, measuring 148 plots. Of these, they found 25% to be adequately restocked with softwood seedlings, and 66% with hardwood seedlings. Fully 67% of plots had 40% or better stocking with merchantable species in "position of dominance". They found not effect on restocking from degree of burn, exposure, slope, soil type, or grazing. They found only 5% of the area to be nonstocked.
As to species, they found the following percentages of plots stocked as shown by species:

Species	**Present**	**Dominant**
Whte birch	46% of plots	40%
Red maple	27	20
Hemlock	17	3
Aspen	14	8
White pine	14	3 (incl 1% red pine)
Red oak	10	7
Fir	11	1
Yellow birch	10	5
Pitch pine	7	2
Gray birch	30	7

(Banks and Ostrander p. 3)

The authors observed white pine on half of the 1/5 A plots examined. They thought that further seeding of white pine was likely, but that planting would be too difficult to undertake at the time in view of slash and blowdown remaining everywhere.

The southern Maine burn area was affected by later hurricanes that blew down some of the surviving timber (Dibble et al. 2004).

Copies of these documents are in the author's possession as Pdf files. Two were retrieved by the aid of Joyce Butler and the Maine Historical Society in Portland.

Informal Statistical Analysis: Maine

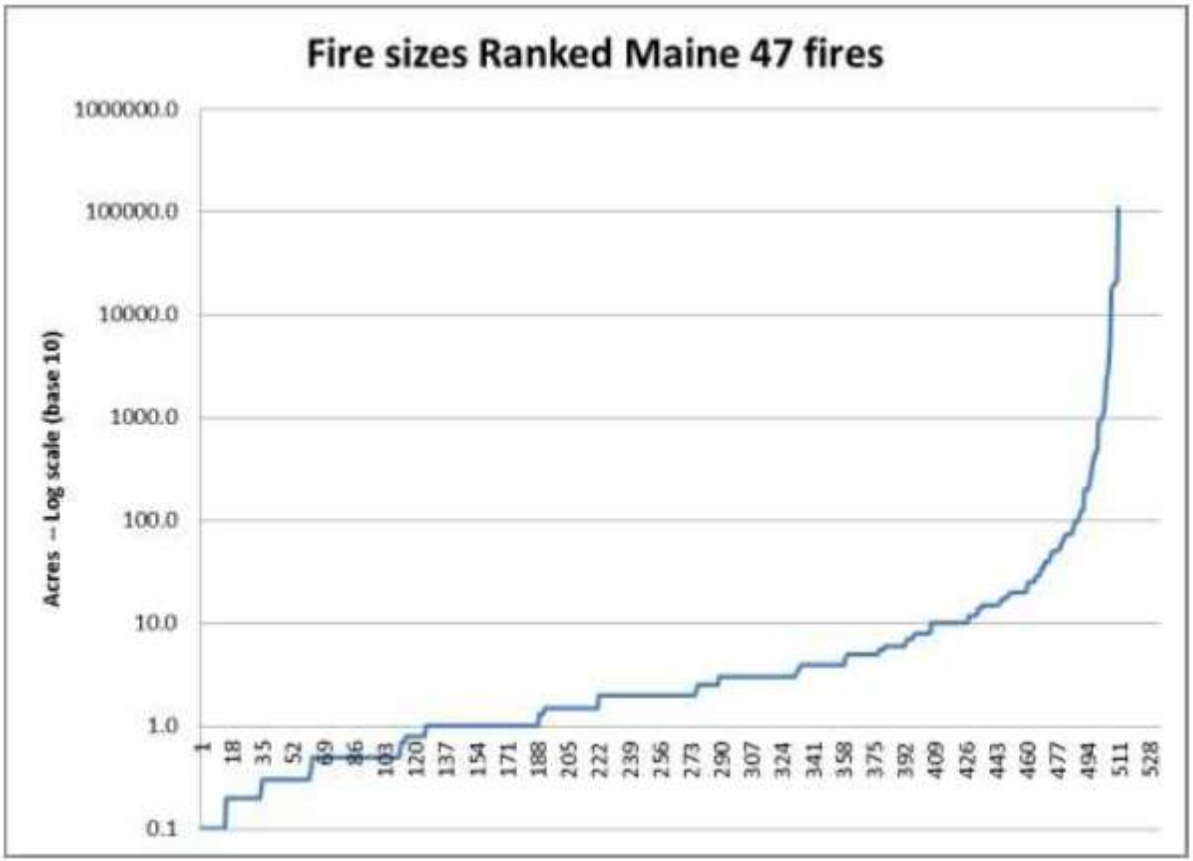
The ’47 fire season in Maine was an extreme example of extreme value situations. In the waning weeks of the fire season, a single fire, the fire complex burning from Fryeburg-Brownfield to Kennebunk, burned more than half of the total for the entire year. In fact, that single fire complex exceeded the annual totals of all but four other entire years. In ’47, the top 5 fires burned 90% of the acreage for the year.

The largest fire complex was, in the jargon of extreme value analysis, a “2.2 standard deviation event” within the year, and a 3.7 standard deviation event compared to 1903-46 experience.

With a fire size distribution like that depicted below, it shows the danger of using summary statistics such as averages or even standard deviations to depict fire history. Even the tenth largest fire of ’47 (which coincidentally was listed at 1,000 acres) would be a very large fire by recent Maine standards. **The steepness of the leg of the curve where the top ten fires are reached is stunning.** There is no equation that closely fits the entirety of the data for the year. This fits an idea that extreme fir conditions are in a class of their own where the relationships of ordinary months do not apply due to extreme fuel dryness and windiness.

Compared to these numbers, more recent decades have been placid:

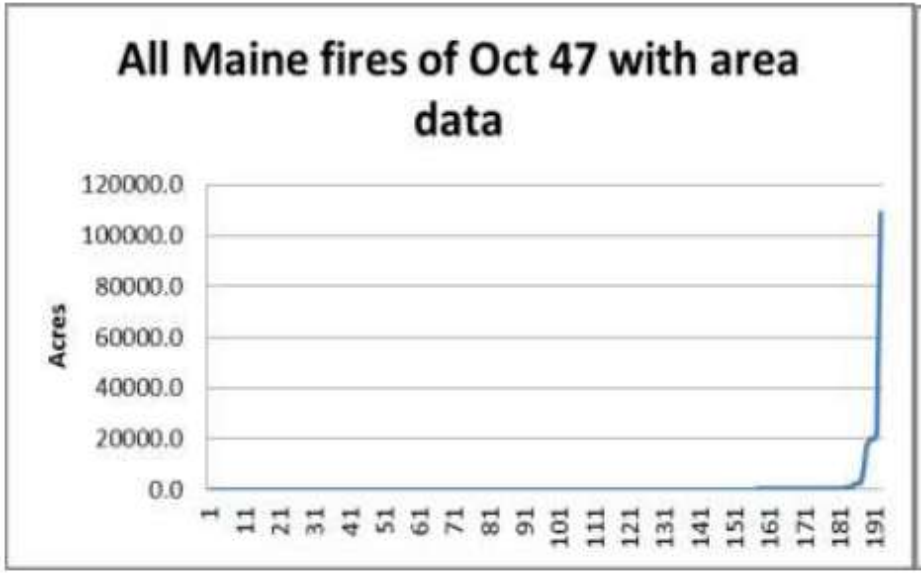
1950-69 average fire year	7,493 acres burned
1970-2010	3,693 “

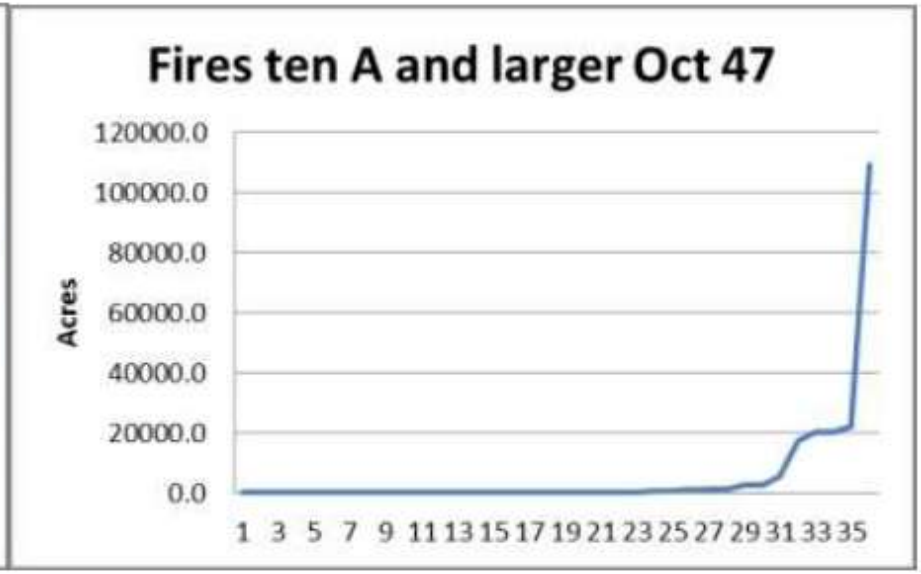


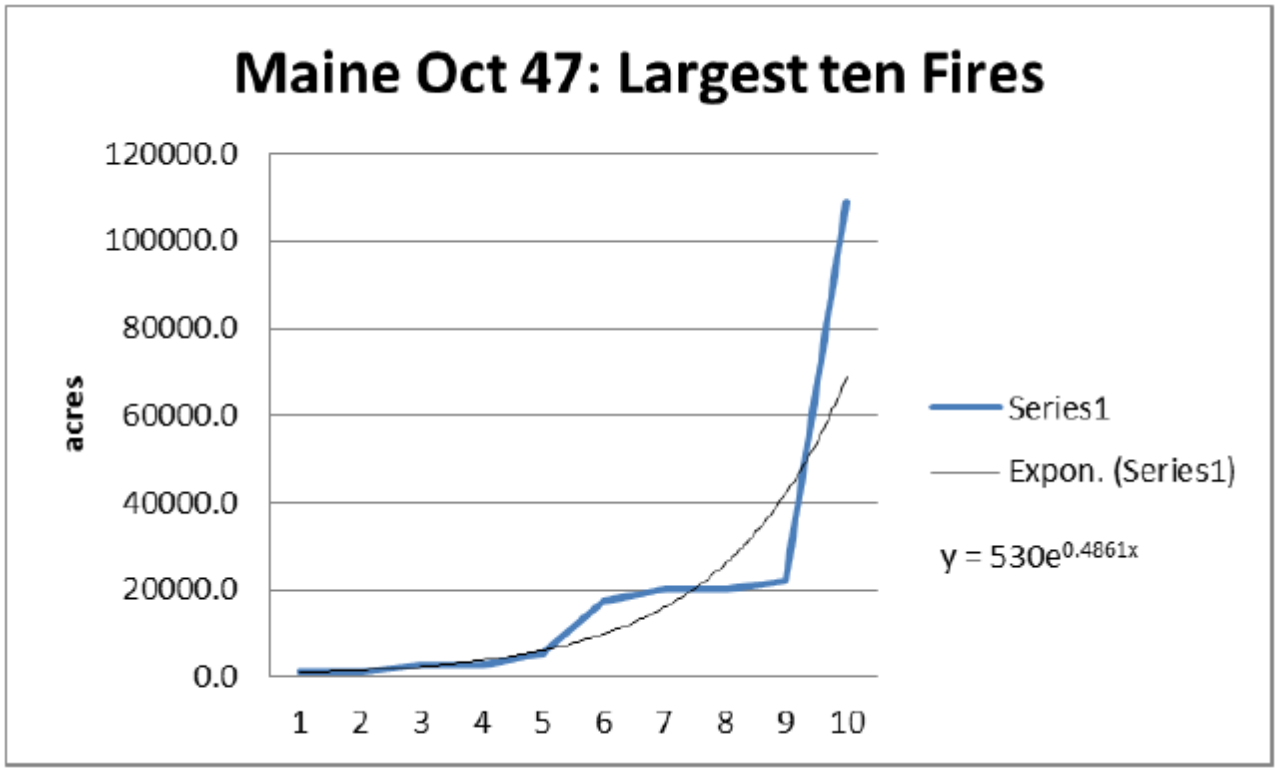
Note: this chart shows 511 fires for which area data were recorded, an additional 22 were listed with no area. Fair to assume they were very small (?)

Focusing in on the October Outbreak –

In October, the fire size distribution was dominated by the very largest ones. Even in this terrible month, with more than 200 fires, most of the fires were smaller than 10 acres. Among the largest ten, the range in sizes was fully 2 orders of magnitude. In fact, the largest one was five times the size of the second largest. This was probably a fire resulting from many smaller ones burning together.






Maine Oct 47: Largest ten Fires
120000.0
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acres
1 2 3 4 5 6 7 8 9 10
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The 16 largest Fires, Maine Oct 1947			
County	**Town**	**Date**	**Area**
Androscoggin	Poland	10/6/1947	100
Androscoggin	Durham	10/17/1947	130
Cumberland	Brunswick	10/21/1947	307
Somerset	Anson	10/21/1947	410
Washington	Cherryfield-Steuben--Org Towns--No. 10 MFD (Org. town figures listed here)	10/15/1947	480
Penobscot	Carmel	10/21/1947	900
Cumberland	Standish	10/12/1947	1,000
Androscoggin	Livermore Falls (Fayette in Kenn Cty)	10/21/1947	1,200
Somerset	Madison-Norridgewock	10/21/1947	2,496
Sagadahoc	Richmond	10/23/1947	2,650
Sagadahoc	Topsham-Bowdoin	10/7/1947	5,450
Hancock	Bar Harbor	10/17/1947	17,188
Washington	Centerville-Jonesboro-Machias-Roque Bluffs-Whitneyville	10/21/1947	19,970
Oxford	Fryeburg-Brownfield-Hiram-Porter-Denmark, Oxford County; Cornish, York County	10/21/1947	20,120
York	Biddeford-No. Kennebunkport-Kennebunkport	10/20/1947	21,910
York	Shapleigh-Waterboro-Wells-Lyman-Saco-Kennebunk-Hollis-Dayton-Alfred-Newfield-Limerick-Parsonsfield	10/17/1947	109,110

The Fire Largely Forgotten: Centerville-Whitneyville

The Downeast region is not a stranger to great fires. Fox (1985) notes an undocumented observation by Austin Cary (at p. 58) of a fire in 1827 sweeping from Wesley to Jonesboro, a fire intense enough to destroy soil. She also summarizes newspaper accounts of the fire of September 1851 that burned for two weeks, with smoke visible at Lubec 58). Then in August 1854 another regional outbreak of fires occurred from Ellsworth and eastward along the coast to the St Croix (Fox, pp. 60-62). Logging slashings were probably a significant contributing cause. Steady, strong winds were a major factor. Some observers attribute the origin of blueberry barrens, and the stony bare slopes of many of the hills of this area to these fires.

Austin Wilkins, in his remarks on the 50th anniversary of the fires, makes available one of the few summaries that is easily found:

Approximately 20,000 acres burned including Machias - Roque Bluffs, Whitneyville.

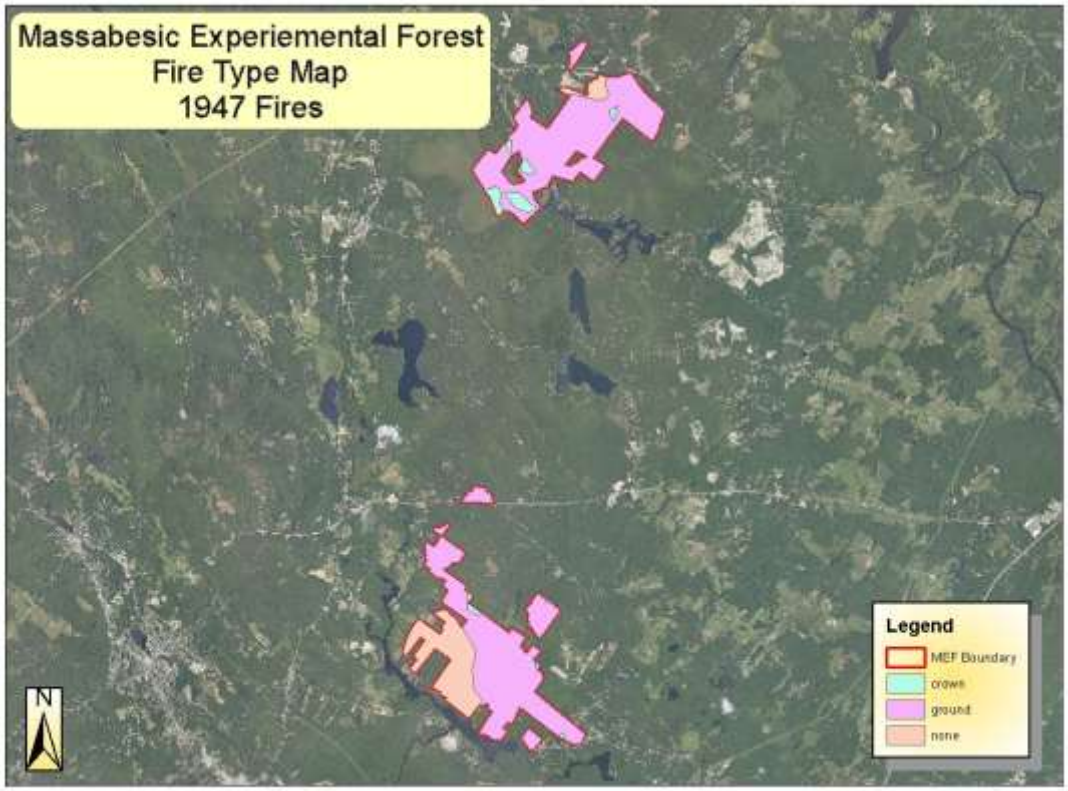
> *This fire started on October 21 and fanned by strong winds on that day and the 23rd burned over 19,970 acres, of which 17,410 were forested. Much of the area burned was on land owned by the St. Regis Paper Company and the Eastern Pulp Wood Company. A survey of the fire damage shows a net volume for salvage of 37,900 cords of pulpwood and 6,900,000 board feet of sawlog material. Approximately 2,200 cords of pulpwood cut and piled were burned by the fire.*
>
> *The wind was so strong on the afternoon of October 23 that the fire traveled over six miles in less than an hour. Although no villages were burned several were seriously threatened. Lack of water necessitated long hauls by trucks and tractors and laying long lines of hose. Bulldozers opened up miles of fire lines through heavy forest growth. Winter set in on this fire before all the equipment had been picked up. Smoke was reported coming from burning logs, roots, and stumps late in December. (A. Wilkins, SWOAM website)*

By the time this fire escaped control, the other major Maine fires were out of control. When the fire authorities in Machias called for help, they were told, "We can't help – you're on your own" (interview, Chief Clint Gardiner, Jan 2012 – see CD listed in references, which contains many interesting observations)

Adapted from Anonymous, 1948, (the USFS postfire survey) --

In contrast to the other fires, most of this land was owned by paper companies and large owners. About 2600 acres was nonforest. Of the forest area, about half was classed as "merchantable forest", and half as nonmerchantable.
Only 333 acres were classed as unburned within the fire area. The fire crowned out over 10,000 acres. Elsewhere, heavy kill of timber was observed.

The **Massabesic Experimental Forest** in York County was heavily burned over, though mostly by surface fires. The brought a budding research program there to a halt for several decades. The Massabesic is still administered by the Northern Research station, Portsmouth, NH office. Most of its area was burned in 1947. A full inventory was done in 1997-2000, and publsijhed in 2004 (Dibble 2004). This document contains many observations about the fire and the later condition of the vegetation there.


Massabesic Experiemental Forest
Fire Type Map
1947 Fires
Legend
MEF Boundary
crown
ground
none
N

Footprint of the 1947 Maine Fires: Before and Since

Prior to the 1947 fires, the areas affected were not strangers to fire at all. We defined the footprint of the fire to include towns and towns adjacent to the 47 fires. State foresters reports for 1903-1946 record:

3 major fires on Mt Desert, all 700 A or larger.

17 months in which fires totaled 54,000 acres in Western and southern Maine

3 individual fires all above 500 acres in the Downeast area. (in light of subsequent events we wonder if that area had compete records)

With the aid of the DOC GIS project, by Greg Miller, we have made maps showing fires 1990-2010 in these areas (See appendix). The maps certainly suggest that wildfire by itself does not always serve as a longterm fireproofing agent in fire prone landscapes in Maine.

We reviewed in detail the fire records in the "footprint" for 1990-2010. For those years, fires in the southern Maine area were few and they were small. IN the 12 towns we defined as "footprint" in southern Washington County, however, these two decades saw 136 fires, totaling more than 4000 acres. More than half of the area burned was in the single town of Addison. Centerville and Jonesport accounted for most of the rest. This is why local fire rangers label this an area with a "fire culture".

In this period the area we defined as footprint for the Mt Desert area saw 49 fires. Totaling 272 acres, more than half of which was in Blue Hill.

New Hampshire's October 1947 Fire Outbreak

Concurrent with Maine's terrible 3 weeks, New Hampshire was struggling with its own fires. In fact, there was concern that one of them, near Rochester, might spot across the Piscataqua into Maine. The chart, from the 1948 Forestry Commission report, shows that right up to Oct 21, an escalating rate of daily fires was not producing fires of any consequence, whether due to effective control or otherwise. Then most of the burn occurred in just a week.

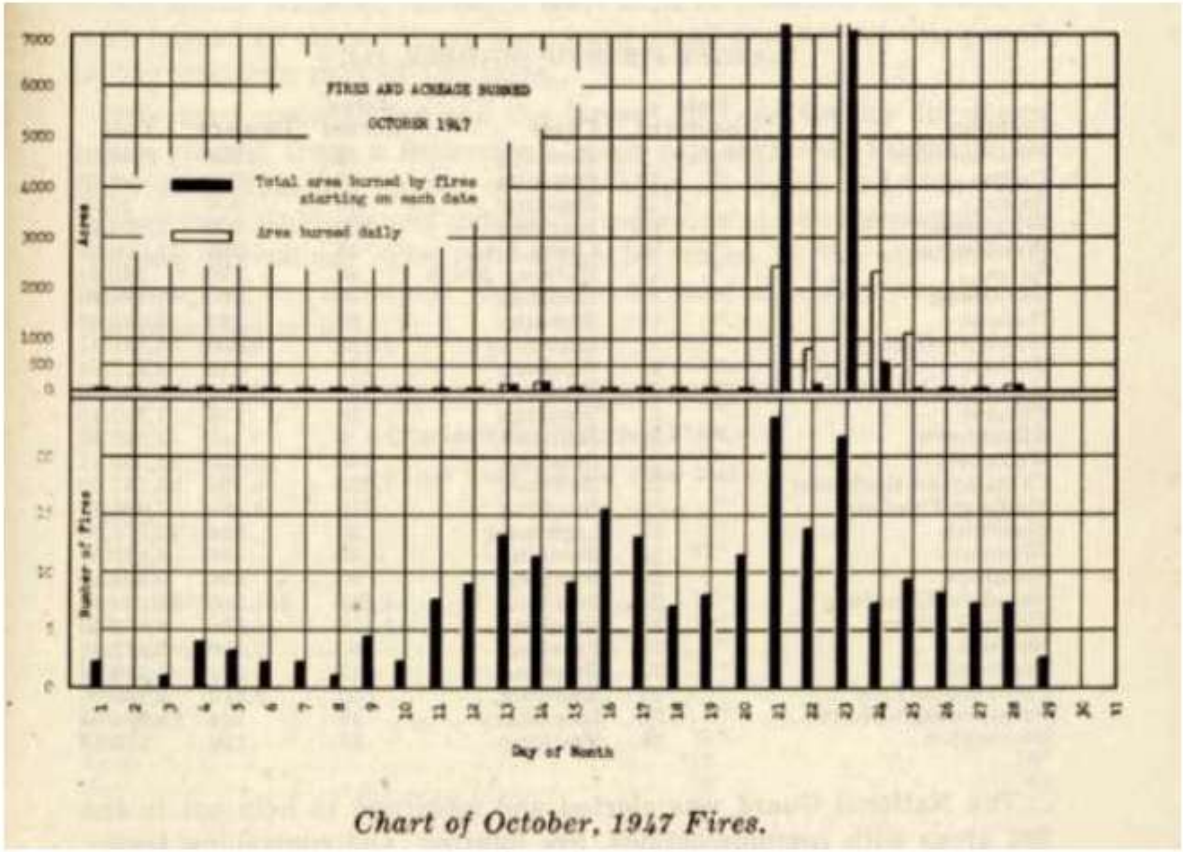


Chart of October, 1947 Fires.

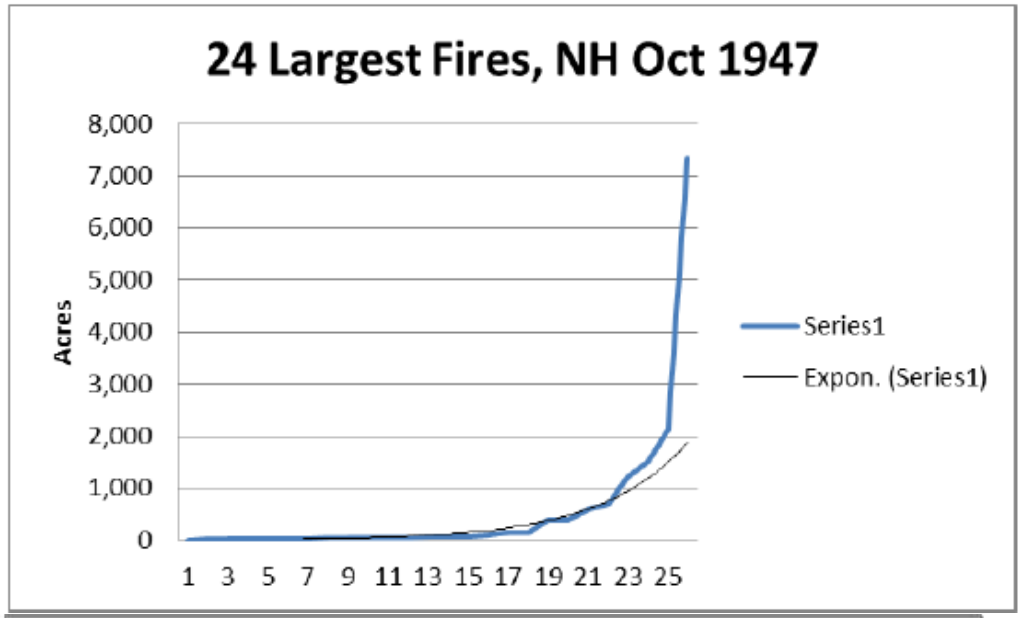
Source: NH Forestry Comm, 1948.

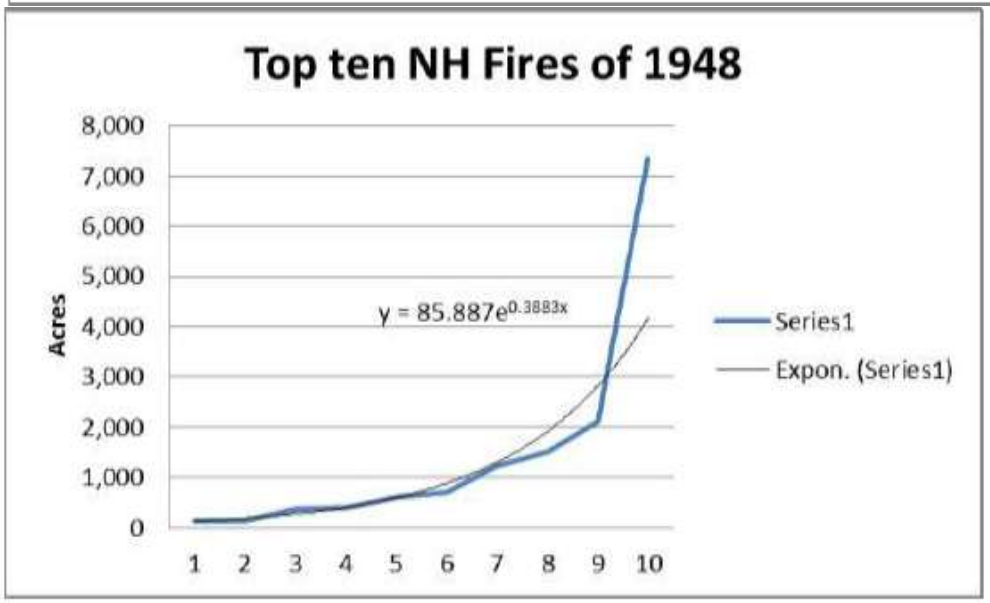
Size Distribution: largest Fires

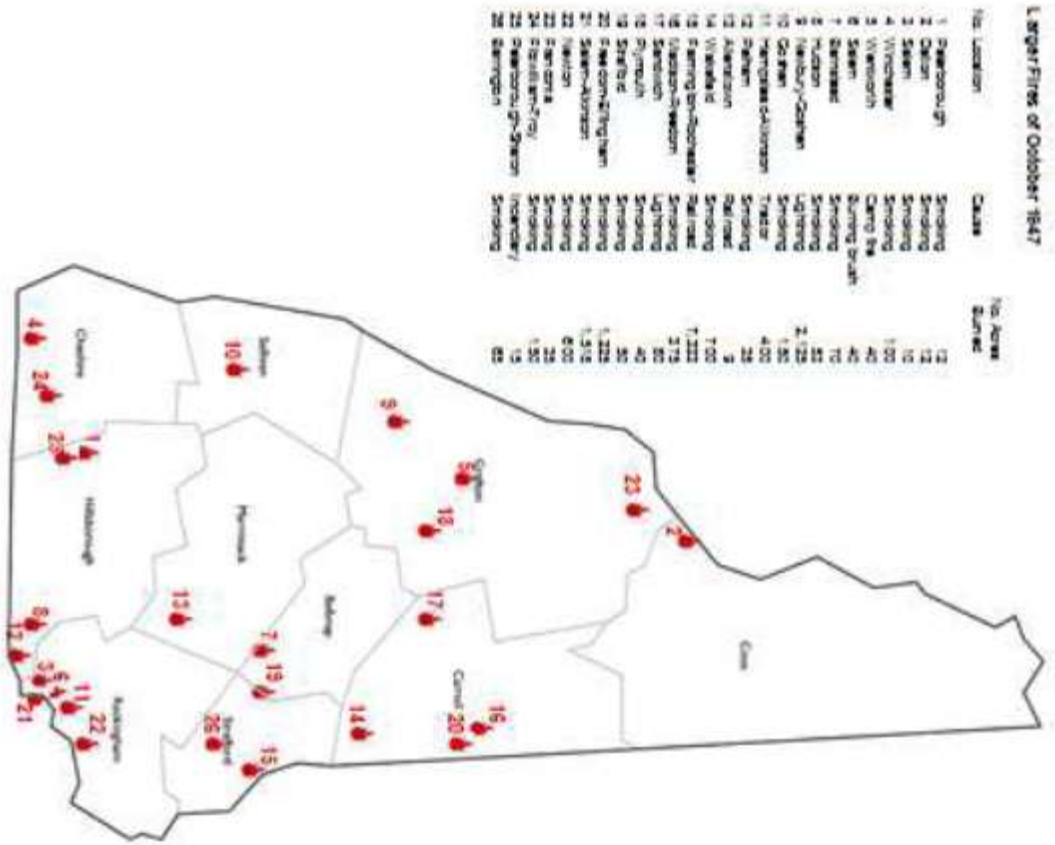
The largest fires occurred south of the Notches, many in apparent clumps in the southerly areas. The 24 largest fires of October totaled 15,242 acres, a large fraction of the total area burned for the year. The size distribution of the largest fires follows the pattern we see elsewhere: the very largest ones have a size distribution of their own, far divergent from the “averages”. Looking at the top 24 fires, it would take a fourth power expression to depict the

largest fires. Even when only the top ten are examined, the distribution is not smooth -- the very largest fire is 3 times the size of the second largest. This single fire accounted for half of the area burned by the top 24 fires.

According to an informal, incomplete compilation of 20th century large fires, there has occurred no fire in NH nearly as large since 1947.

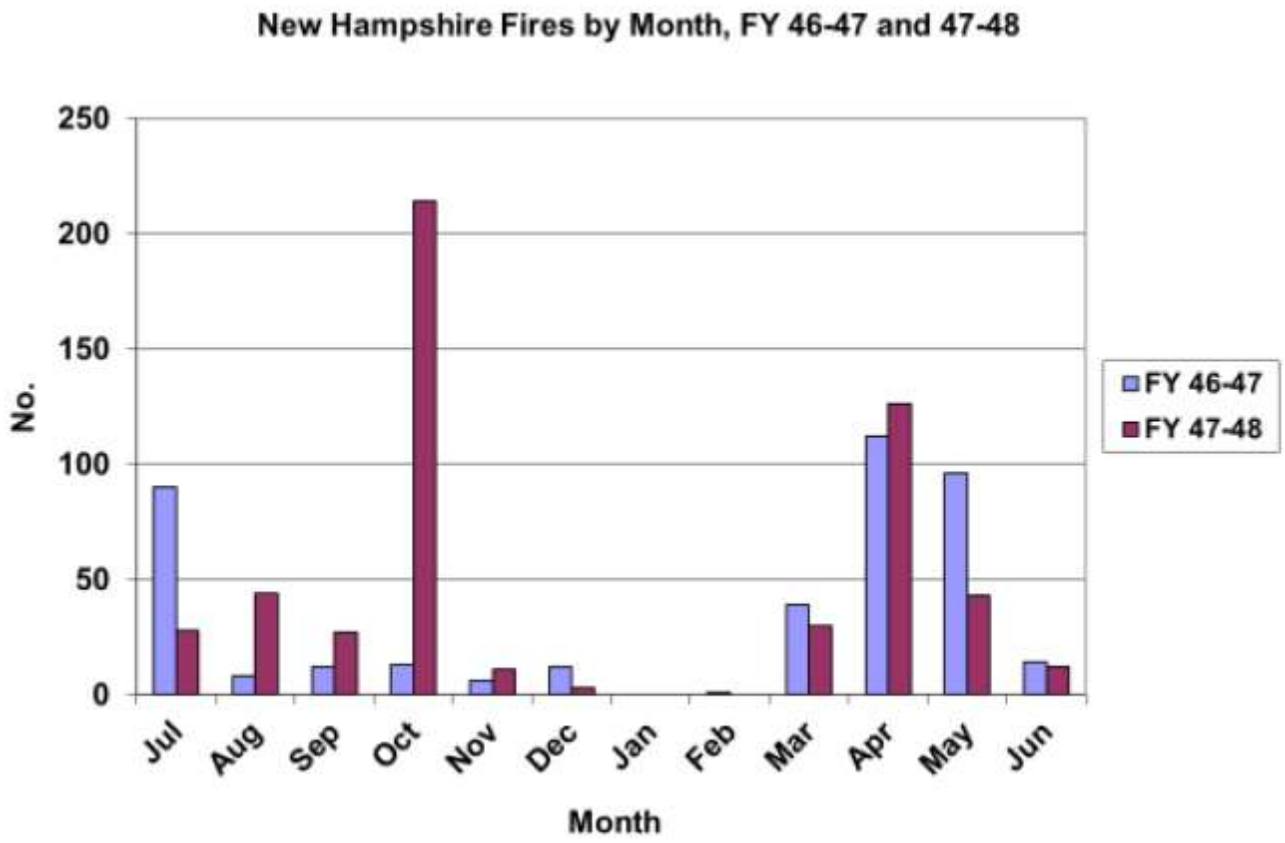

24 Largest Fires, NH Oct 1947
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Acres
1 3 5 7 9 11 13 15 17 19 21 23 25
Series1
Expon. (Series1)


Top ten NH Fires of 1948
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Acres
y = 85.887e0.3883x
1 2 3 4 5 6 7 8 9 10
Series1
Expon. (Series1)



Forestry Commission's 1948 report shows that up to midsummer, the 1947 season was somewhat lighter than 1946 had been.

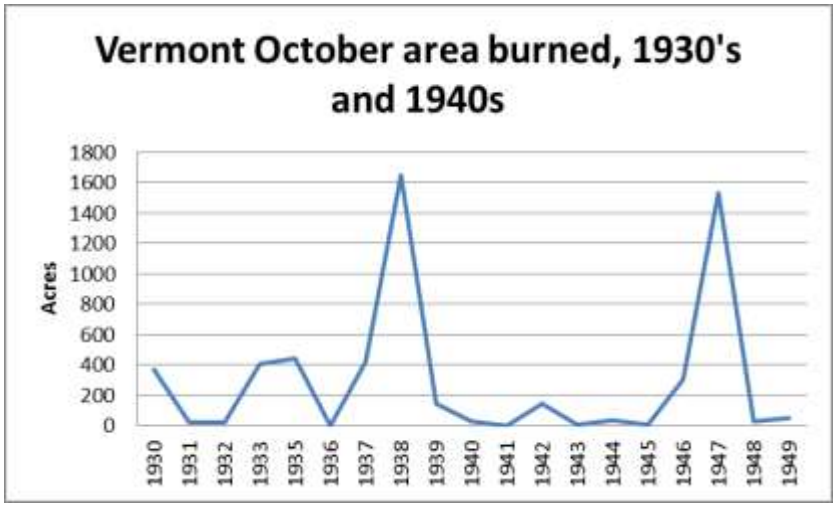
(Note: Due to the fiscal year, the ’47 fires are tallied in the ’47-48 fiscal year)

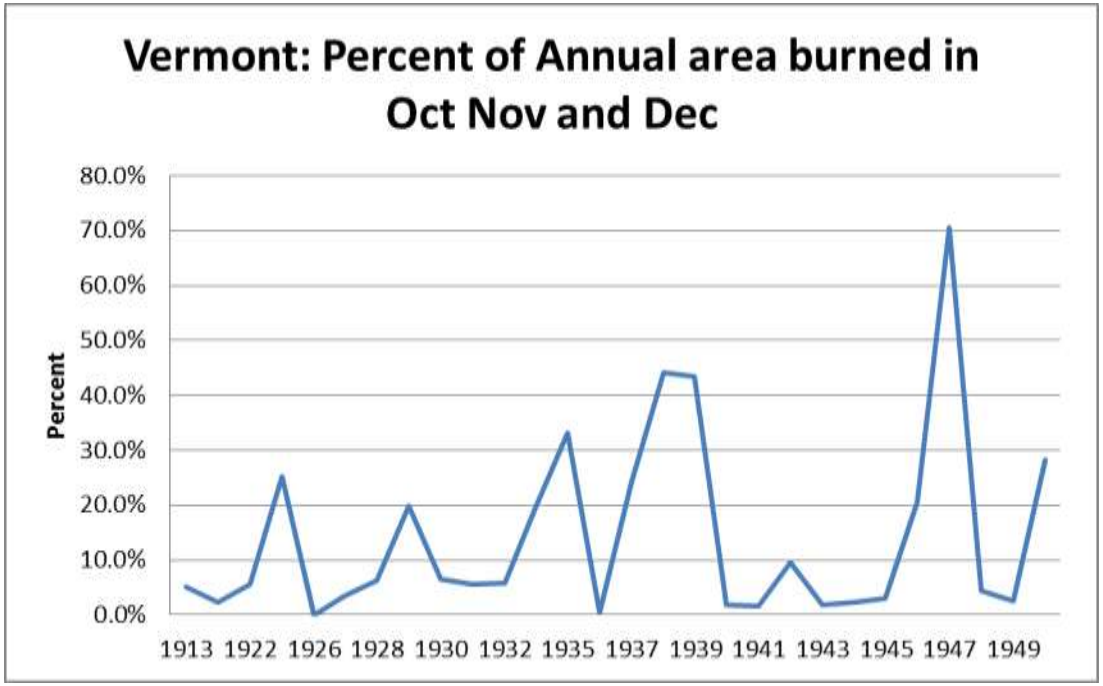


NH Fires FY 1947-48 By County				
		No. Acres	No. Fires	Avg Size
Belknap	1947	217	23	9.43
	48	155	35	4.43
Carroll	47	76	26	2.92
	48	2,523	64	39.42
Cheshire	47	1,055	45	23.44
	48	419	65	6.45
Coos	47	34	17	2.00
	48	1,052	46	22.87
Grafton	47	48	21	2.29
	48	275	53	5.19
Hillsborough	47	556	100	5.56
	48	255	86	2.97
Merrimack	47	106	55	1.93
	48	2225	67	33.21
Rockingham	47	184	81	2.27
	48	2,698	78	34.59
Strafford	47	94	21	4.48
	48	179	25	7.16
Sullivan	47	12	14	0.86
	48	297	19	15.63

Vermont

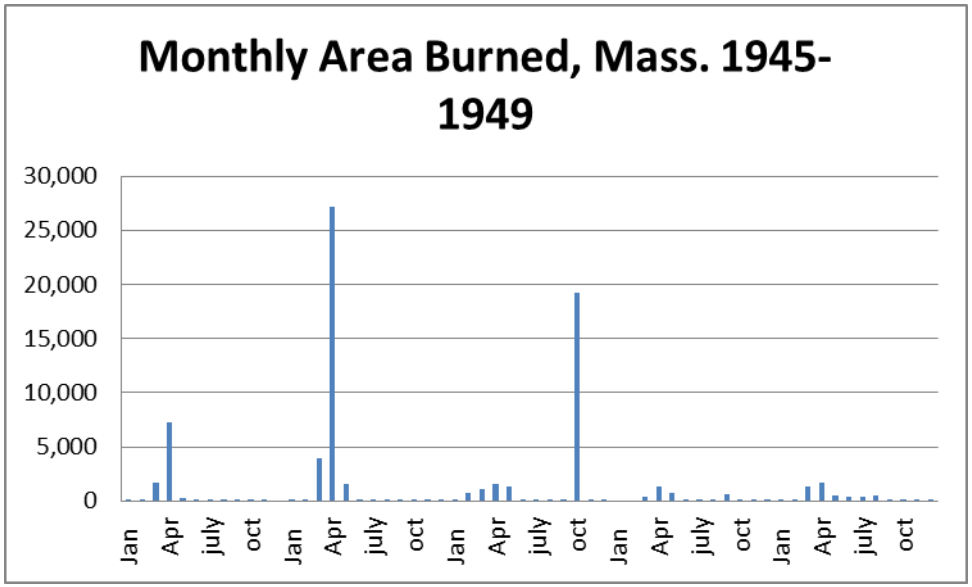
Monthly data compiled by Richburg and Patterson enable us to give a helpful picture of the 1947 fire year in Vermont. In 1947, the state's area burned was lower than it had been in the peak years of the early 30's, and of 1938 and 1940. Looking only at annual data, we would infer that the October fire outbreak missed Vermont entirely. But this would not be a correct conclusion. For most of 1947, as in Maine, Vermont had been experiencing a very mild fire season, which then exploded in Octobe. In October 1947 alone, more area was burned than in the entire year in several previous years. Seventy percent of the year's burn occurred in that one month. This mirrored a severe 1938 fire season.



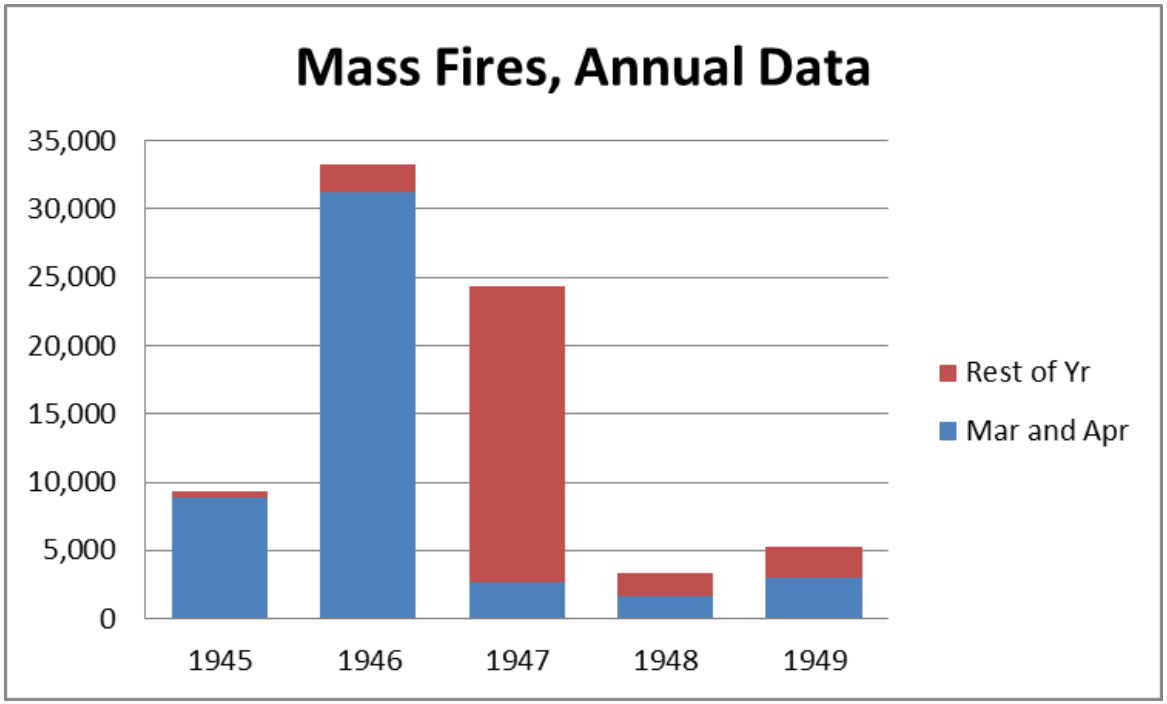

Vermont: Percent of Annual area burned in Oct Nov and Dec
Percent
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
1913 1922 1926 1928 1930 1932 1935 1937 1939 1941 1943 1945 1947 1949

Massachusetts Fires of Late 1940's

Massachusetts was also affected by the fire outbreak, with large fires occurring in traditionally fire-prone areas of Cape Cod and southeastern areas. The state also experienced severe fire years earlier in the 1941 and 1944s (about 29,000 acres each), as did other southern New England states. This depiction is based on corrected data from primary files of the Mass DCR, with the assistance of Sean Fisher, archivist. Past tabulations of Mass data often omitted the largest fires, because the final data was not yet available at reporting time. For this reason, relying on previous tabs may lead one to the incorrect conclusion that Mass did not share in the elevated fire experience of 1947. Further, the fact that the state reports were summarized on a fiscal year basis obscures the fact that the state suffered a two-year one-two punch of major fire, although the 1947 incident was actually less widespread in total than was 1947.



The fires of 1946 occurred in the expected spring time window, while those of 1947 did not – they were concentrated in October (chart below), following a fire year that would until then have been described as uneventful. The 1947 fires occurred concurrently with those in nearby states and Maine.



From the 1948 Report of the state Forester—

"The outstanding feature of the year's work was the serious forest fire hazard which existed throughout the state in the fall of 1947. Like the situation elsewhere throughout all of New England, the drouth (sic) period beginning the month of August continued through September and October and created an ever-increasing hazard which reached its climax in the middle of October. During the month of October there were more than 500 forest fires in the state and in the month

approximately 15,000 acres of forest land were burned over[1]. The real crisis occurred on October 23d when some 60 forest fires, many of them running into several hundred acres, burned out of control at one time. It was the worst forest fire situation which ever confronted Massachusetts.

…..

… the major difficulty was not the drouth conditions which resulted in the starting of many fires as it was the failure or the inability of local authorities to keep fires in check once they were under control. Had this been done it would not have been necessary to cope with fires which broke out anew four or five days in succession with an ever-increasing acreage to extinguish.

… 285 fires occurred during the ten-day period of October. There was only one casualty among the firefighters. There were 65 homes and buildings burned at an estimated loss of $125,000.00. We had sufficient equipment available throughout the state at all times to fight the fires during this period."

On Oct 16, the Governor issued a proclamation banning open burning.

Coda: history notes that on October 28, 1947, Governor Bradford called a statewide conference on fire prevention. This was not the only one in the wake of these fires.

[1] Note: the statistical table later in the report says 16,000 acres. Not the only state in which such minor inconsistencies crept into the official record.

Massachusetts Fire Outbreaks of 1946 and 1947 --Corrected Data							
	Months						
	1945	**1946**	**1947**	**1948**	**1949**	Month Totals	Percent
Jan	3	11	26	0	82	122	0.2%
Feb	16	16	694	0	35	761	1.0%
Mar	1,671	3,977	1,131	326	1,282	8,387	11.1%
Apr	7,224	27,400	1,570	1,325	1,714	39,233	51.8%
May	217	1,552	1,346	762	516	4,393	5.8%
June	38	39	28	14	382	501	0.7%
july	50	174	23	13	387	647	0.9%
aug	26	17	24	42	506	615	0.8%
sep	9	6	22	656	54	747	1.0%
oct	81	52	19,280	100	186	19,699	26.0%
nov	50	77	54	144	130	455	0.6%
Dec	0	141	100	8	1	250	0.3%
							0.0%
totals	9,385	33,462	24,298	3,390	5,275	75,810	100.0%
Mar & Apr	8,895	31,377	2,701	1,651	2,996	47,620	
% Mar & Apr	95%	94%	11%	49%	57%	63%	
	Note: this table presents data formatted to calendar years and						
	corrected from previous tabs which inadvertently omitted the						
	largest fires of 1946 and 1947.						

Agostino, T. 1997. Unpub. hist. of DCR fire Control. Unpub doc.
Annual reports of State Forester, courtesy of Sean Fisher, DCR archivist.

Extreme Weather of Late summer and fall 1947.

The weather leading up to October was extreme in several ways and is vividly described by Butler (1987) and Wilkins, (1948). Also the NY State Forester's report for 11974.

Weather conditions can be analyzed in a number of ways, there are several variables and seasonal patterns that can be relevant to fuel conditions and fire weather. But for context for the October Fires, we will focus on two;

3 month accumulated precipitation, Aug to Oct, and

October temperature.

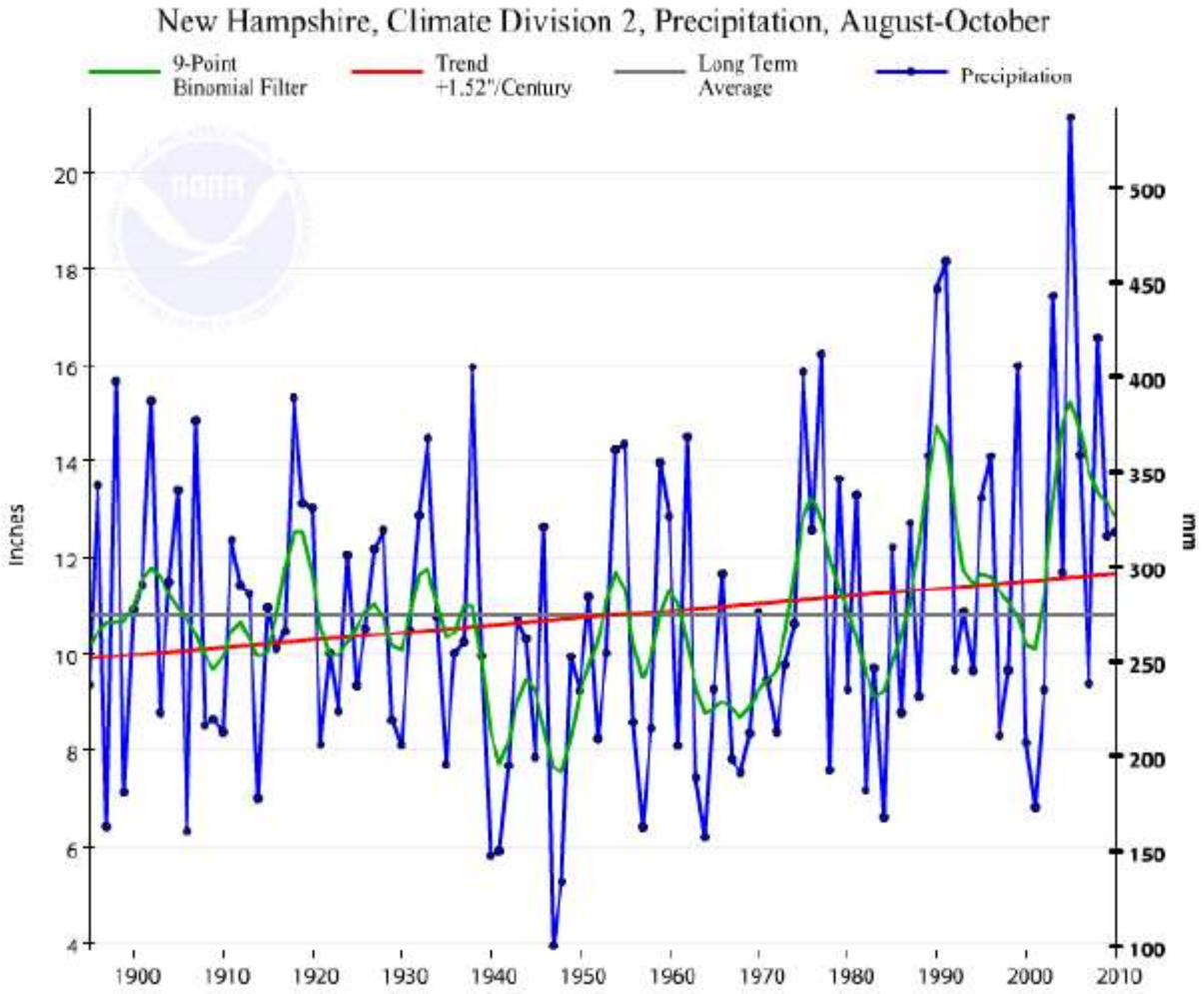
These measures supply a sense of how extreme the conditions were at that time. Widely used drought indicators, a family of Palmer indexes, are readily available but each generates a different spatial and time pattern and using rainfall and temperature seems more concrete and readily understood.[2] For wind, a critical factor, we have not found as convenient a source as the NBCDC website that generates the charts below.

New Hampshire.

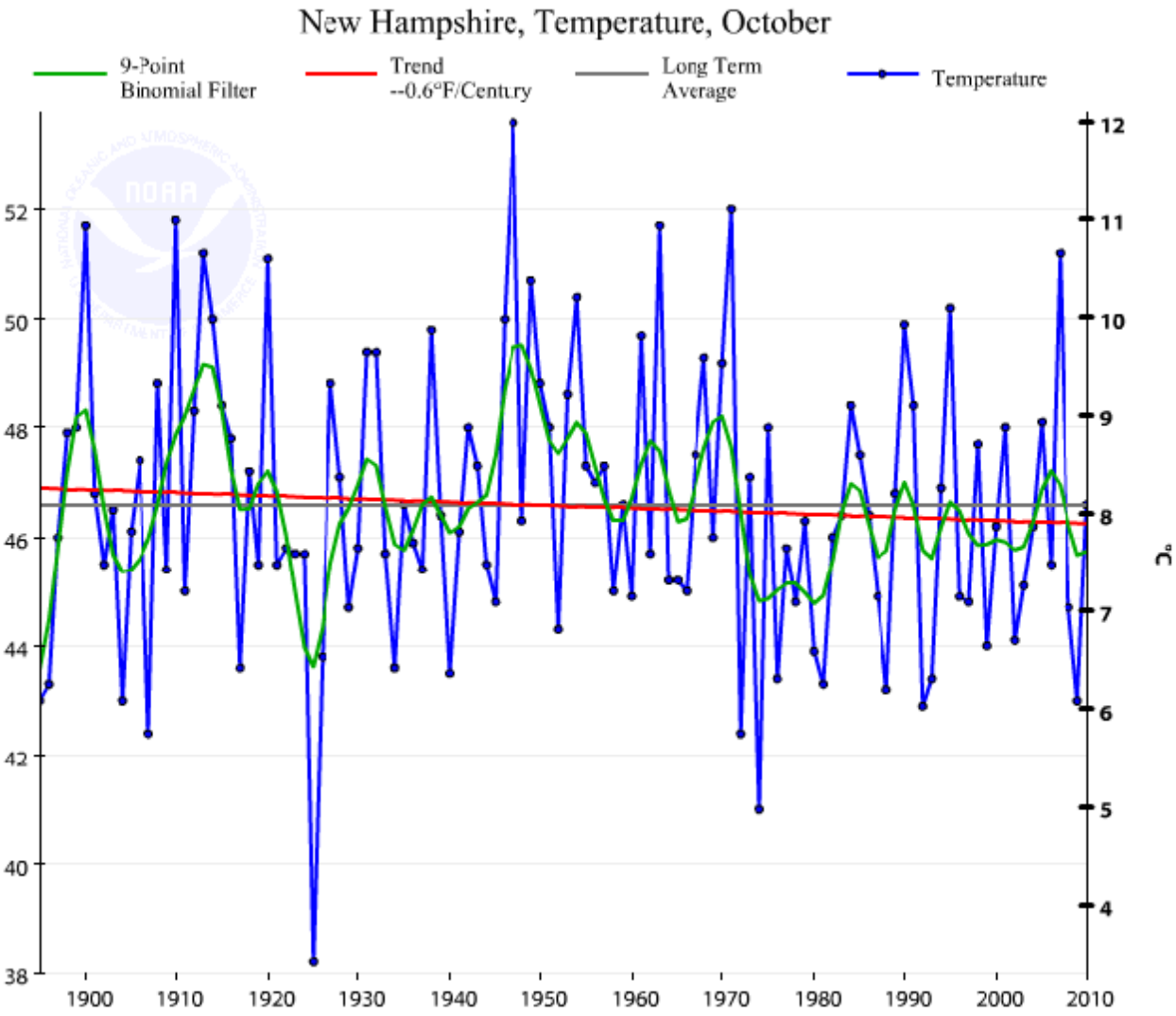
Climate Division 2 is basically New Hampshire south of the Notches.

Three month precipitation up to October 1947 in the was by far the lowest on record since 1895. It may not far wrong to speak of this drought. Late season precip shortfalls occur roughly once a decade in this zone. As the chart also shows, averages for this period have risen notably over the period of record.

[2] NCDC has a great graphic website which enables you to see the USA as a whole, with values of different Palmer Indexes, as they change over time. You can select the index and month, and the site displays a series of maps illustrating the Index levels for any user- selected period of years. http://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers.php?index. This could be a powerful educational and I&E tool.

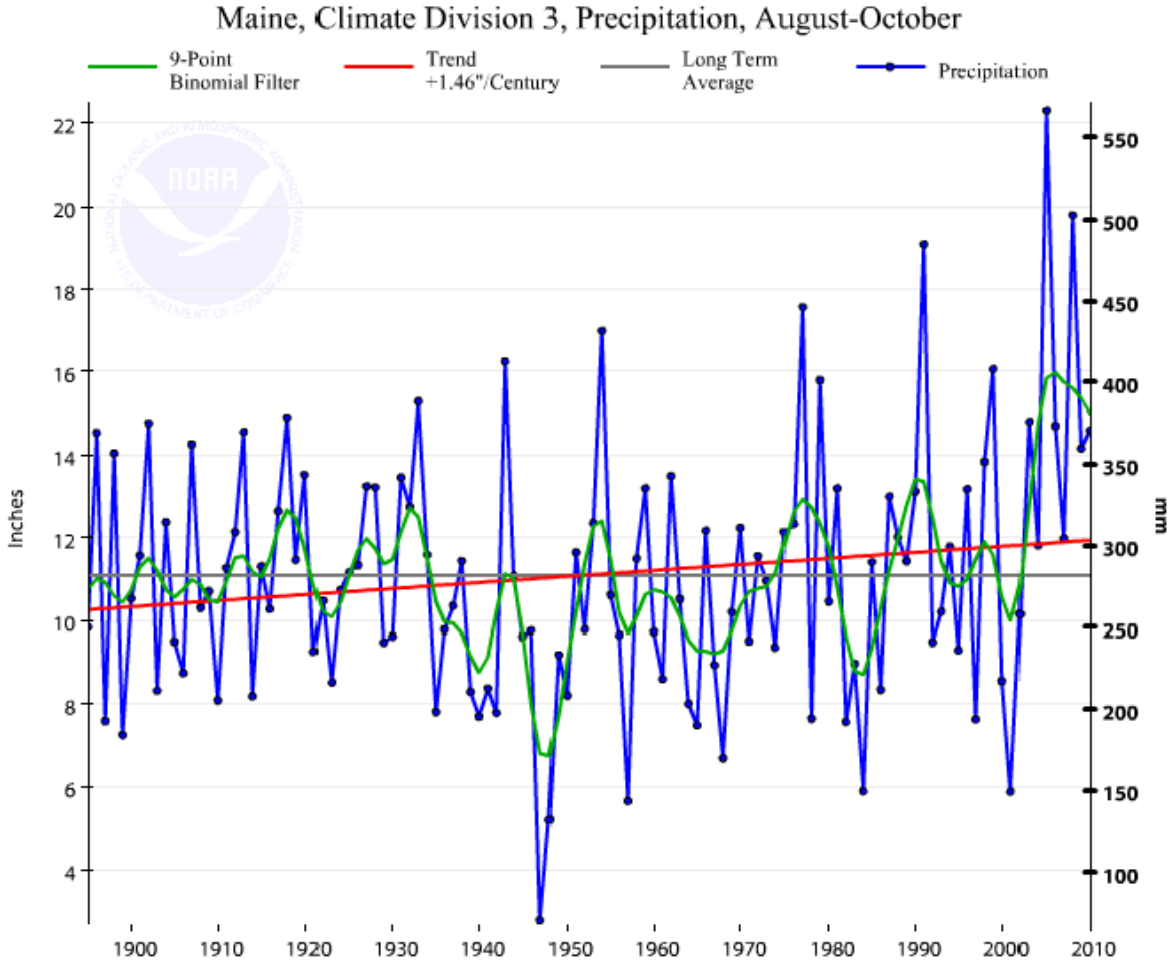


Adding not only to hazard conditions but the burdens on firefighters, October 1947 was by far the hottest October on record since 1895, and since. Temperatures hit about 5 degrees above the previous average of about 47 degrees.

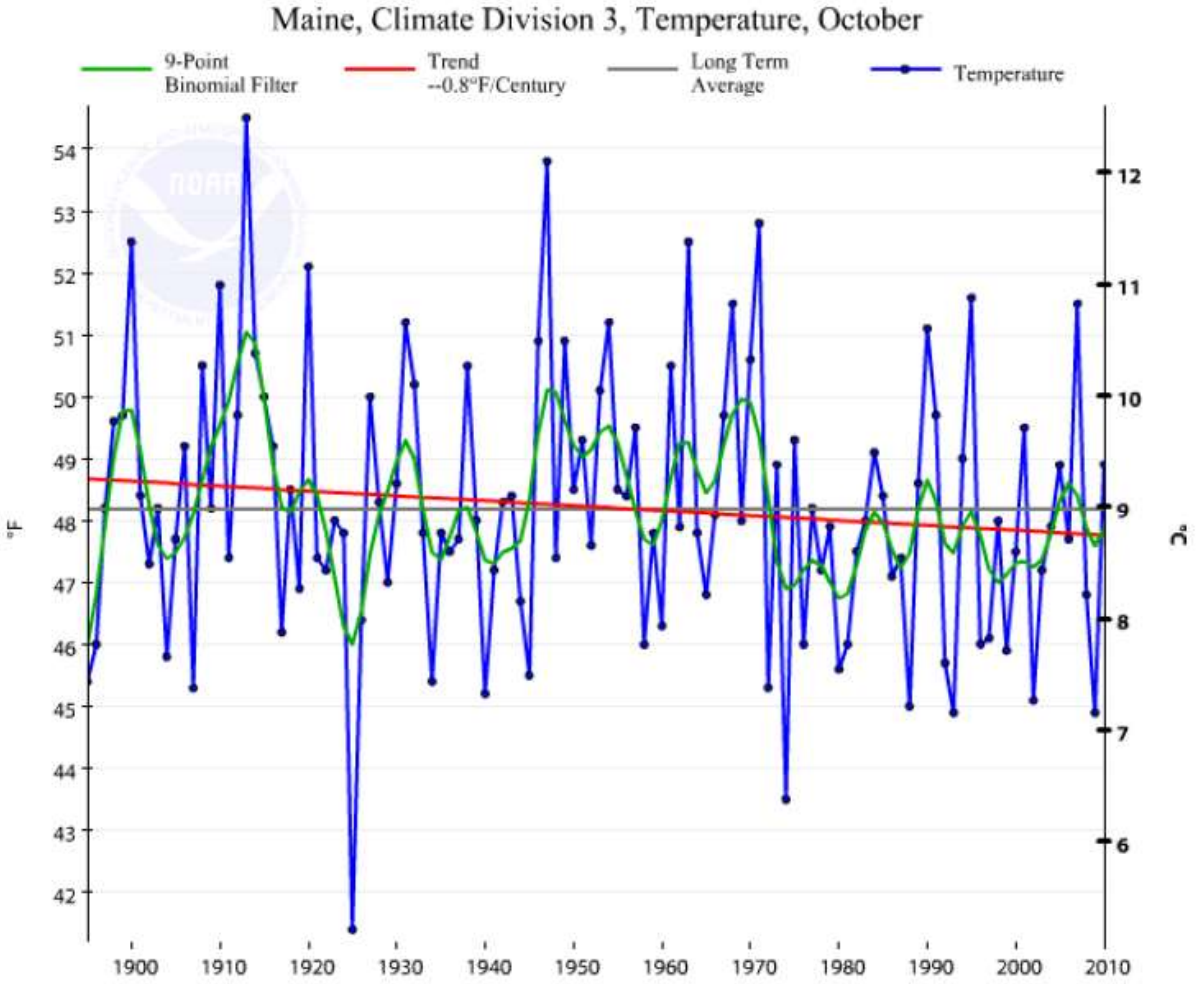

New Hampshire, Temperature, October
9-Point Binomial Filter
Trend --0.6°F/Century
Long Term Average
Temperature
52
50
48
46
44
42
40
38
12
11
10
9
8
7
6
5
4
°C
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

Maine

Accumulated 3 month precipitation in Maine up to October set an all time low in 1947, far lower than ever reached previously. The widely held expectation in early October -- that the fall rains would come -- was well founded. Even the lows of the previous decade brought 8” of rain in August, Sept and October, whereas in 1947 the same three months yielded less than a meager 3”.

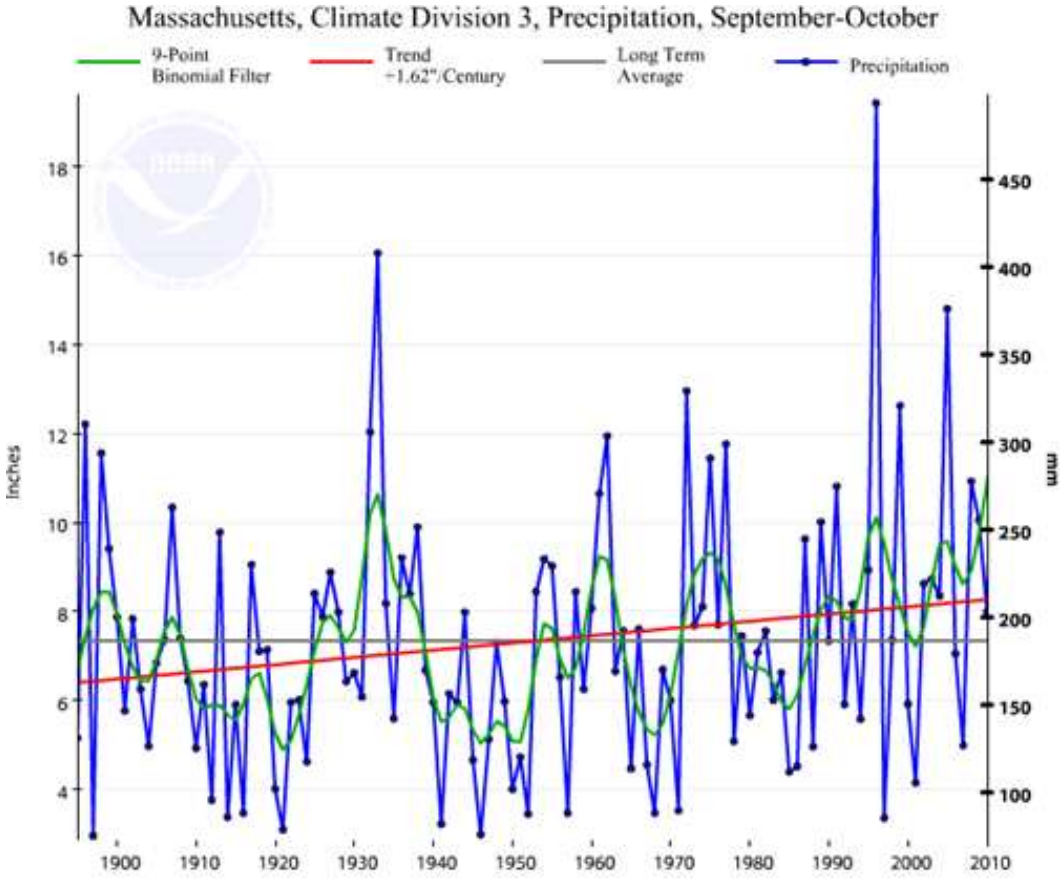


October 1947 was also historically very hot along the Maine coast. It was the hottest since a warm period 1910-1914. The level of 53.8 was only exceeded by the 1913 record of 54.5. Warm Octobers have not been uncommon, however, even as the general October average has declined.

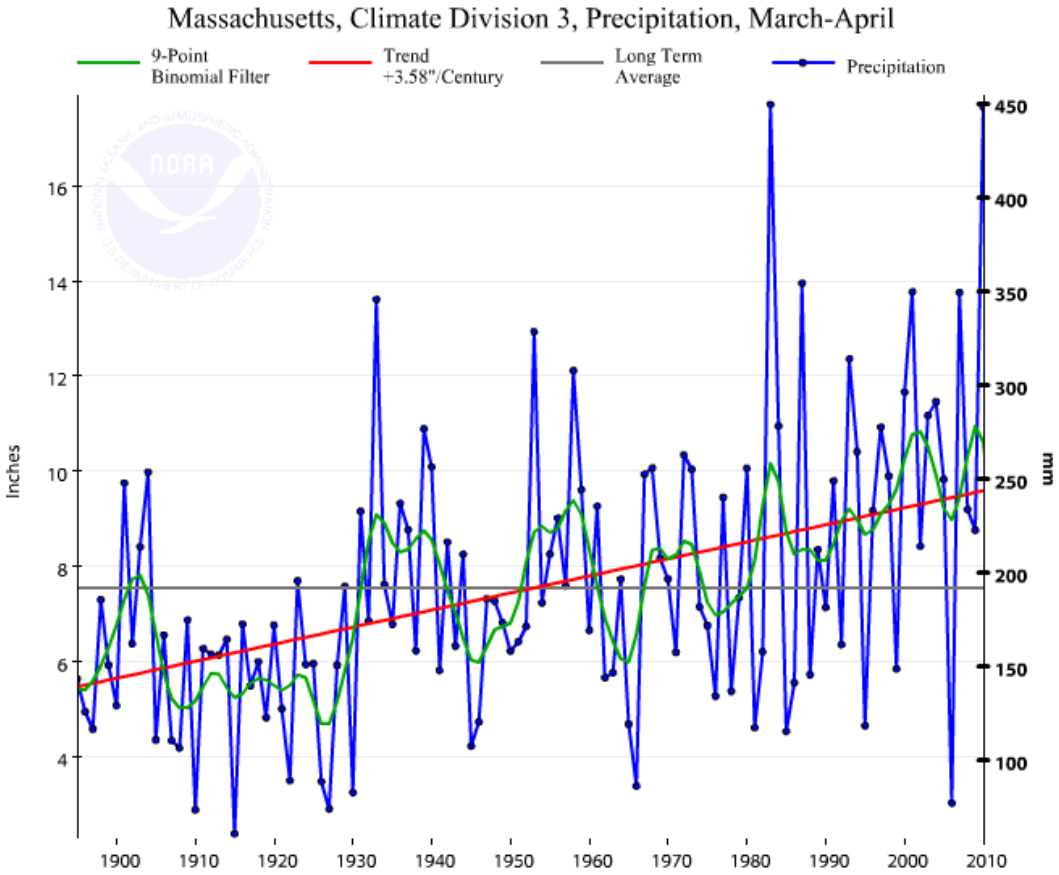


Massachusetts – Climate Div 3 (Cape and SE)

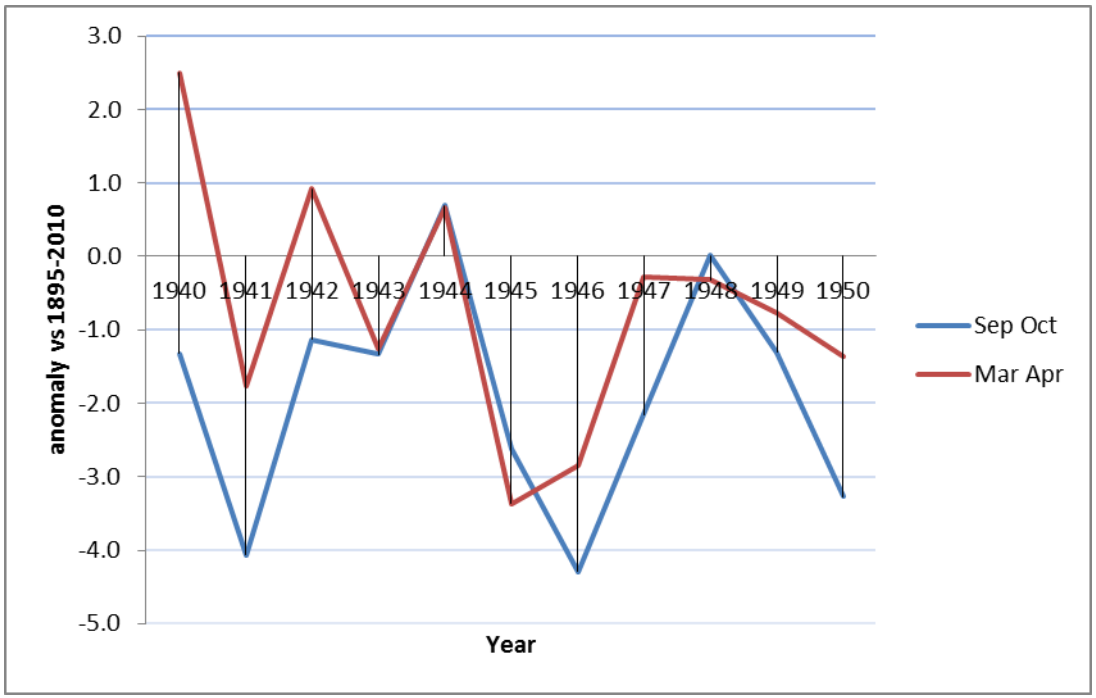
The 1940s stand out as a prolonged period of Sept – Oct rainfall that remained below average for most of the decade. The teens and early 20s were also dry in the fall. Until the 90s, there seems to be a pattern of a period of subnormal fall rainfall every two decades. Over the entire period, average rainfall has risen.



As for spring rainfall, the severe fires years of 1946 and 1947 were actually much milder than the extremes of previous decades. Note that not since 1990 have the moving averages fallen below the full period's's average.

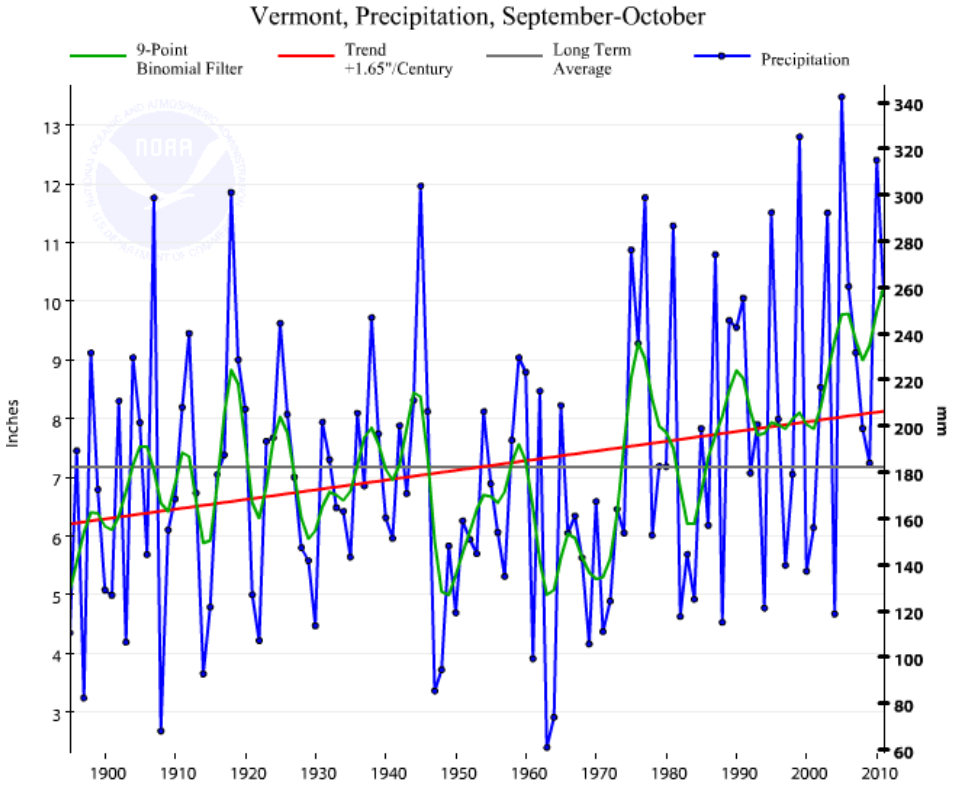


During the late 1940s, fire season rainfall anomalies were severe in 1941, 1946, and 1947, but not in 1944 when area burned was roughly the same as in 1941.

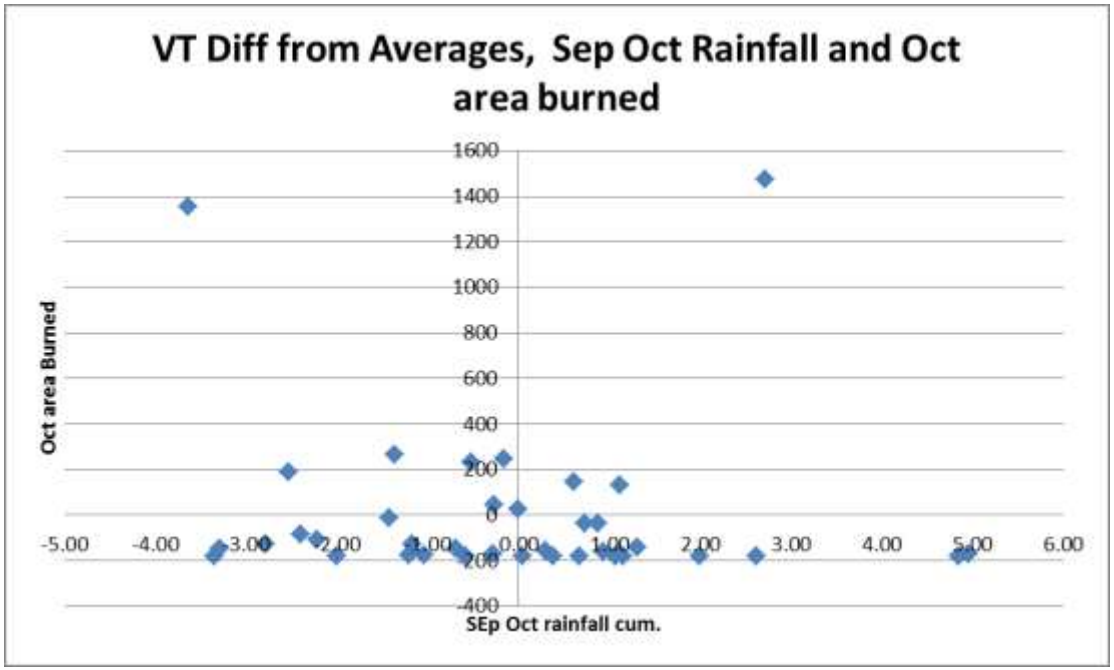


Vermont

Vermont did not experience an exceptional fire year in 1947, but it did have an exceptional October, as we saw above. Accumulated Sep and Oct rainfall was well below longterm averages, tho not as low as in the Great 60' s Drought. Annual average precip for VT is rising at a rate of 1.65" for century, one reason why the post-70s years have seen few fall fire seasons with unusually low rainfall.



Using the monthly data provided by Richburg and Patterson we can chart monthly areas burned for October, by years, against accumulated precipitation. Here, we present the chart in the form of anomalies or differences from longterm averages. Longterm average rainfall 1913-1950 in Vermont in October was 7.01 inches. The chart shows that factors other than drought affect burning. The fall of 1938 actually saw more area burned than did 1947, but rainfall was more than 2" above normal. Except for 1938, there has never been a bad October anytime that rainfall was roughly 1" above average. This illustrates how fire activity can be strongly affected by many factors other than drought.



References

Anon. Maine fire damage survey, Report on the survey of timber damage by forest fires in Southwestern Maine Oct. 1947, Northeast Forest Experiment Station (NEFES) Jan. 30, 1948. 11 pp. processed.

Anonymous, 1948. Centerville-Jonesboro fire area (Washington County, Maine). EE-NE Special Maine fire damage survey. Jan. 30. 4 pp. mimeo.

Banks, W. G. and M. D. Ostrander, 1952. The Southwestern Maine fire area – four years Later. USADA FS NEFES Res. Note No. 18. December. 4 pp.

Joyce Butler. 1987. Wildfire loose: the week Maine burned. Camden: Downeast Books. (Detailed interviews, press clips, two maps.)

------ May 28, 1984. Inventory of the Eberly Collection, 1947 Fires (Misc Coll. No 34). A listing by Butler of items assembled by H J Eberly, who supervised part of the firefighting. Brickstore Museum, Kennebunk.

Coolidge, P. T. History of the Maine woods. Esp. pp 175 ff.

Dibble, Alison C., C. A. Rees, P. E. Sendak, and J. C. Brissette. 2004. Vegetation of forested uplands in the Massabesic Experimental Forest. USDA FS Northern Res Sta. Gen Tech Rept NE-320 74 pp.

Fox, Catherine, 1985. “The Great Fires in the Woods”: A case study in ecological history. Unpub. MA thesis, Univ of Maine Orono. 85 pp.

Forest Survey, Div of Forest Economics. 1948. Maine fire damage survey, Report on the survey of timber damage by forest fires in Southwestern Maine Oct. 1947, Northeast Forest Experiment Station (NEFES) Jan. 30, 1948. 11 pp. processed. (copy in author files)

Daniel J. Grenier, 2006.Integrated Fire Mgt Plan, Camp
Edwards Training Site. Mass ARNG April. 207 pp. Unsigned copy on web,

http://states.ng.mil/sites/ma/resources/erc/IFMP/IFMP-Final-Feb-2007.pdf

Maine Historical Society 2001. Memo concerning holdings related to Wildfire Loose: The Week Maine Burned Maine's 1947 Forest Fire Disaster By Joyce Butler

Coll.: 2032
Acc.: 2000.10
8 linear feet
Portland, Processed.

Processed: February-April, 2001
By: Heather Shea, intern
Date range: 1947 - 2000

Maine Dept Inland Fisheries and Wildlife. Status of the York County Burn: analysis of deer kill and woody plant regeneration and growth. Project W-37-R-6. October 1947 to Dec. 1956.

Maine Forest Service. 1948. 27th Annual Report of Forest Commissioner. Augusta. Contains daily calendar of the fire season, organized by counties.

Maine Forest Service. 1997. The fire of 1947: The year Maine burned. CD with video of commemorative film, 1978. Available from Kent Nelson, Forest Protection Division.

Maine Forest Service. 2012. 1947 Fires and Beyond… interviews with Chief Garner, Jonesboro, ME Jan. 18., 2012.

Available from Kent Nelson, Forest Protection Division.

Northeast Forest & fire Mgt LLC, Wildland fire protection and preparedness plan for Maple Hill Swamp… Sandwich Mass. 4 June 2009. 82 pp.

Nutting, A. D. James C. Rettie, and Wayne C. Banks. Rehabilitation of fire-damaged forest lands in southwestern Maine. NEFES Station Paper No. 33. Feb 1949. (Al Nutting was later State Forester) (copy in author's files) 25 pp. processed.

Wilkins, A. H. 1948. The 1947 Forest fire disaster. P. 72- 83 in MFS 1948 report.

Wilkins, A. H. 1948. The story of the Maine forest fire disaster. Journal of Forestry August 1948. (similar to the version in Commissioner's report)

Wilkins, A. H. 1978. Ten million acres of timber. Woolwich, TBW Books. Important background.

At p. 307 he reproduces the Governor's Proclamation for 1947. Appendix contains state's fire data 1903-1972.
Interestingly, I cannot find reference to the '47 fires in this volume, and he does not cite his own papers on the subject in references.

Wilkins, A. H. n.d. Anniversary of the 50th Maine Forest fire disaster: recollections. On SWOAM website.

"Staff Ride" for fire professionals – valuable website --

http://www.fireleadership.gov/toolbox/staffride/library_staff_ride7.html

U.S. Geological Survey Water-Supply Paper 2375
National Water Summary 1988-89--Floods and Droughts: section on floods and droughts in Maine.

Seeking copies –

Crosby Hoar and Edward Ritter. Report on forest fires in Maine, Fall of 1947. USDA FS Eastern Division, Dec. 1947

H. J. Eberley. The Maine forest fire disaster. USFS Eastern Div, Div of Cooperative Forest Fire Protection. Nov 1947.

Appendix – Maps –

Maps from Butler Book……

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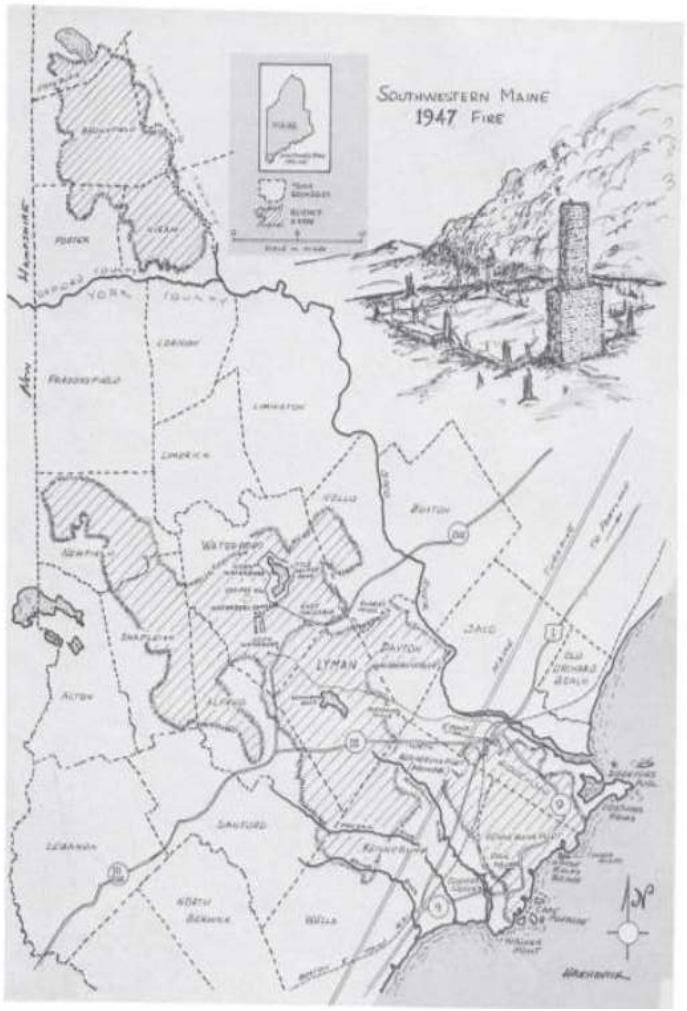
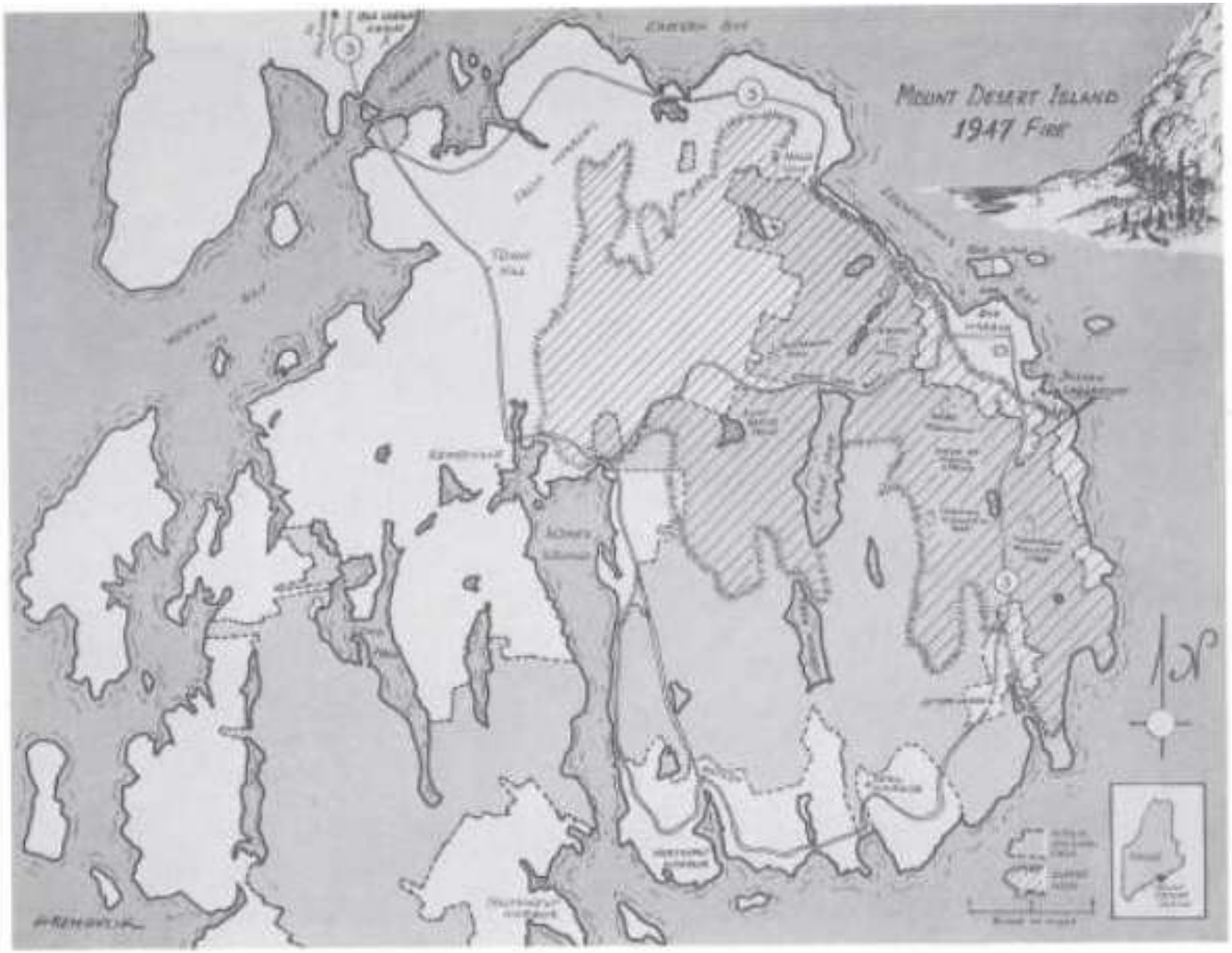
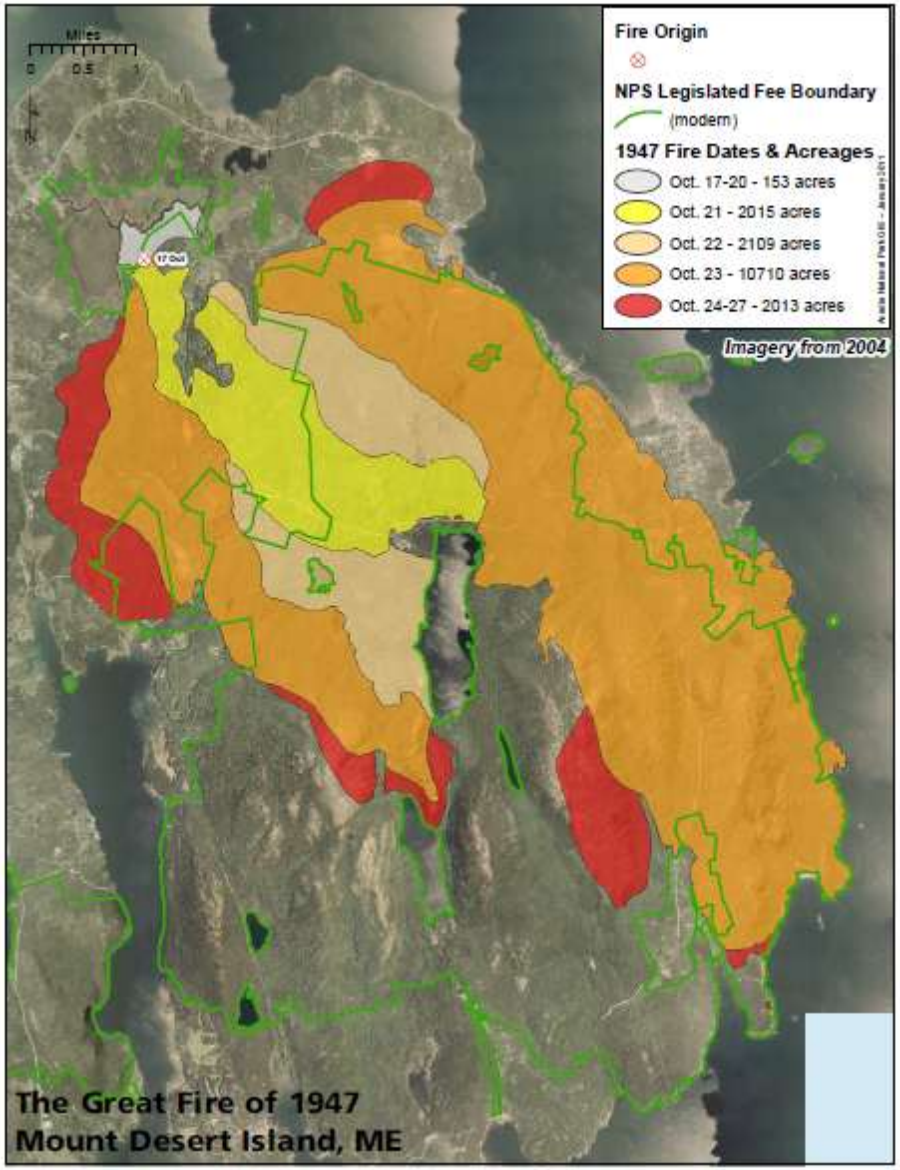
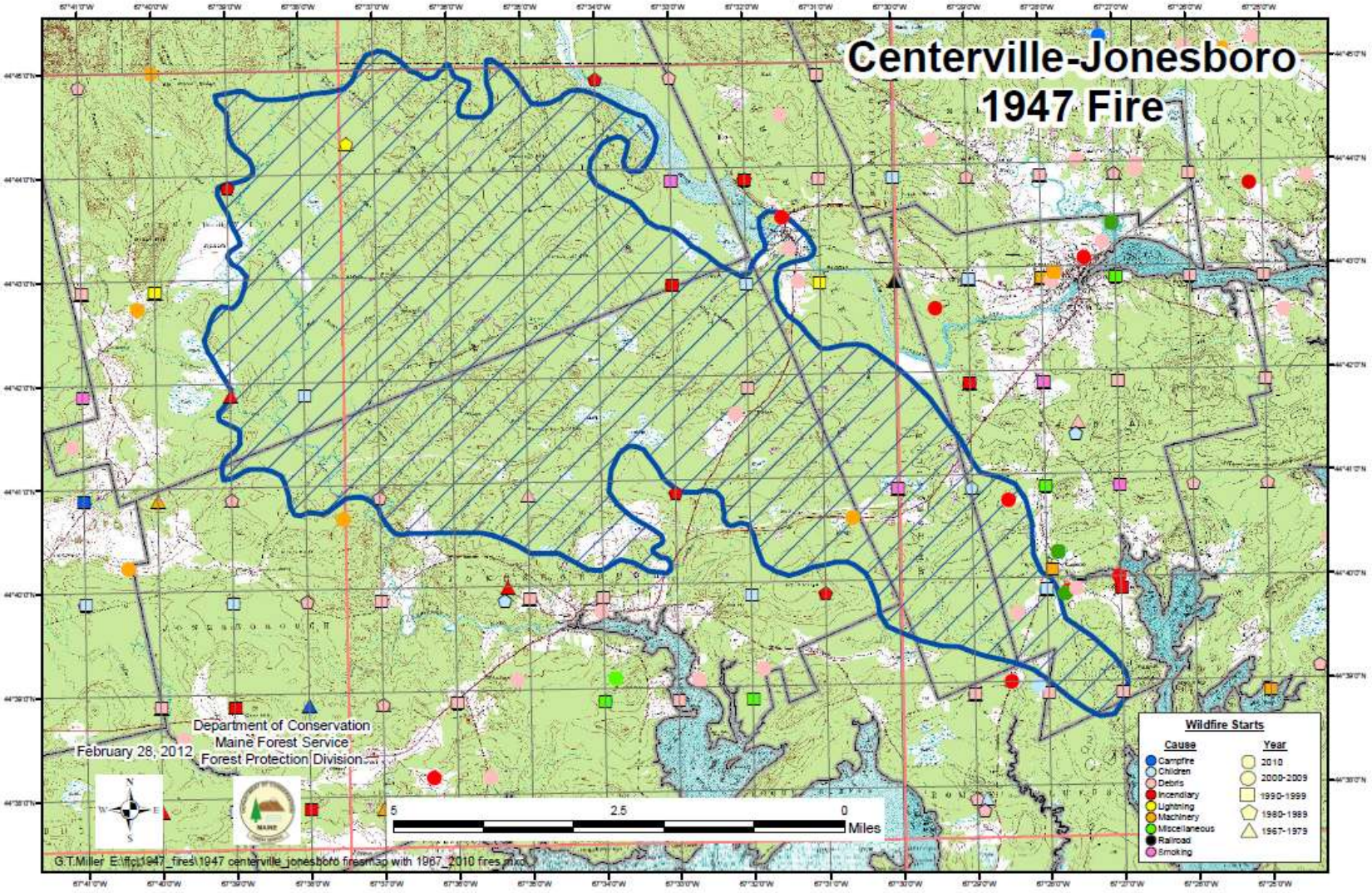




208

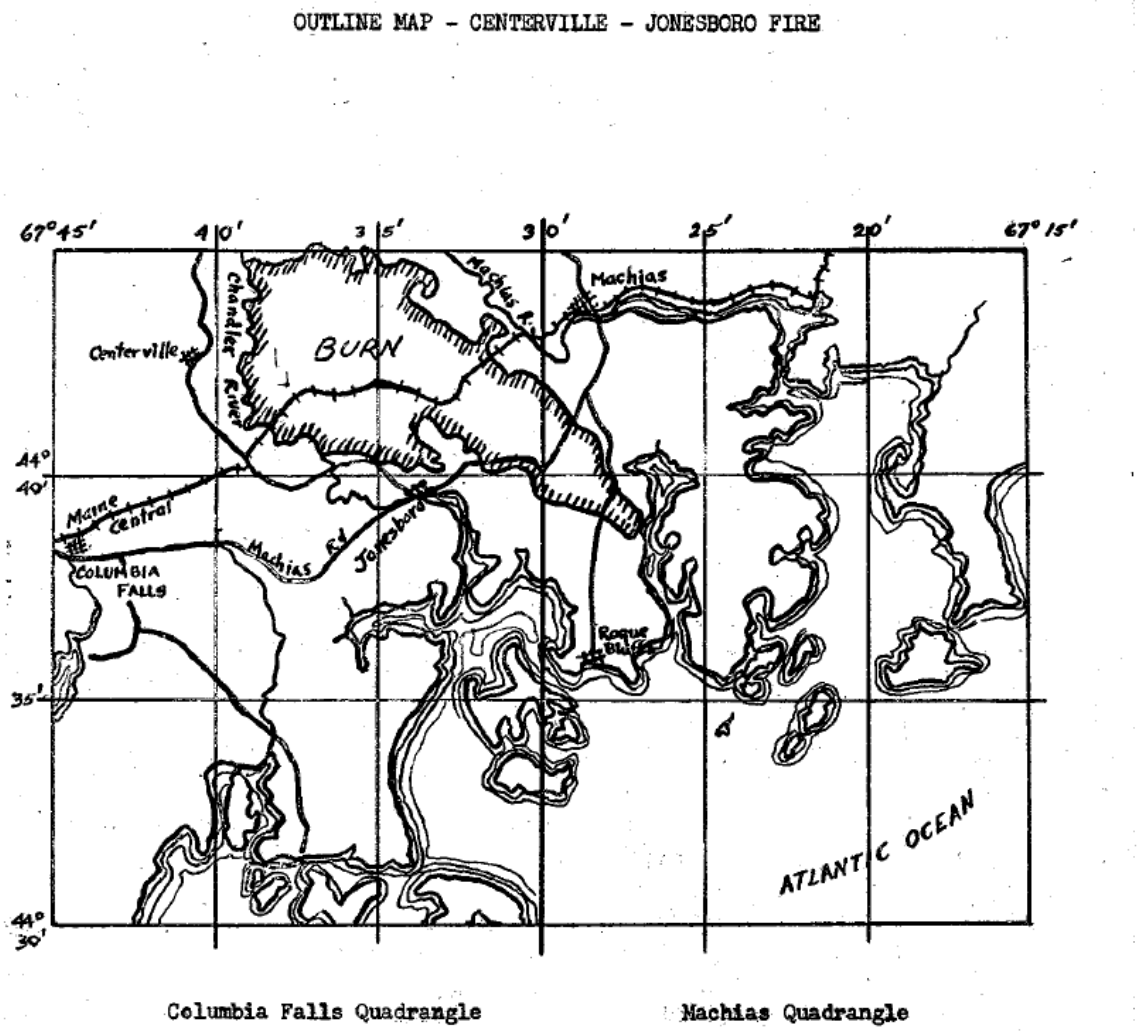
Fire Progress Chart, 1947 Bar Harbor Fire. From Andy Mitchell, FMO, NPS, ANP. Fall 2011.



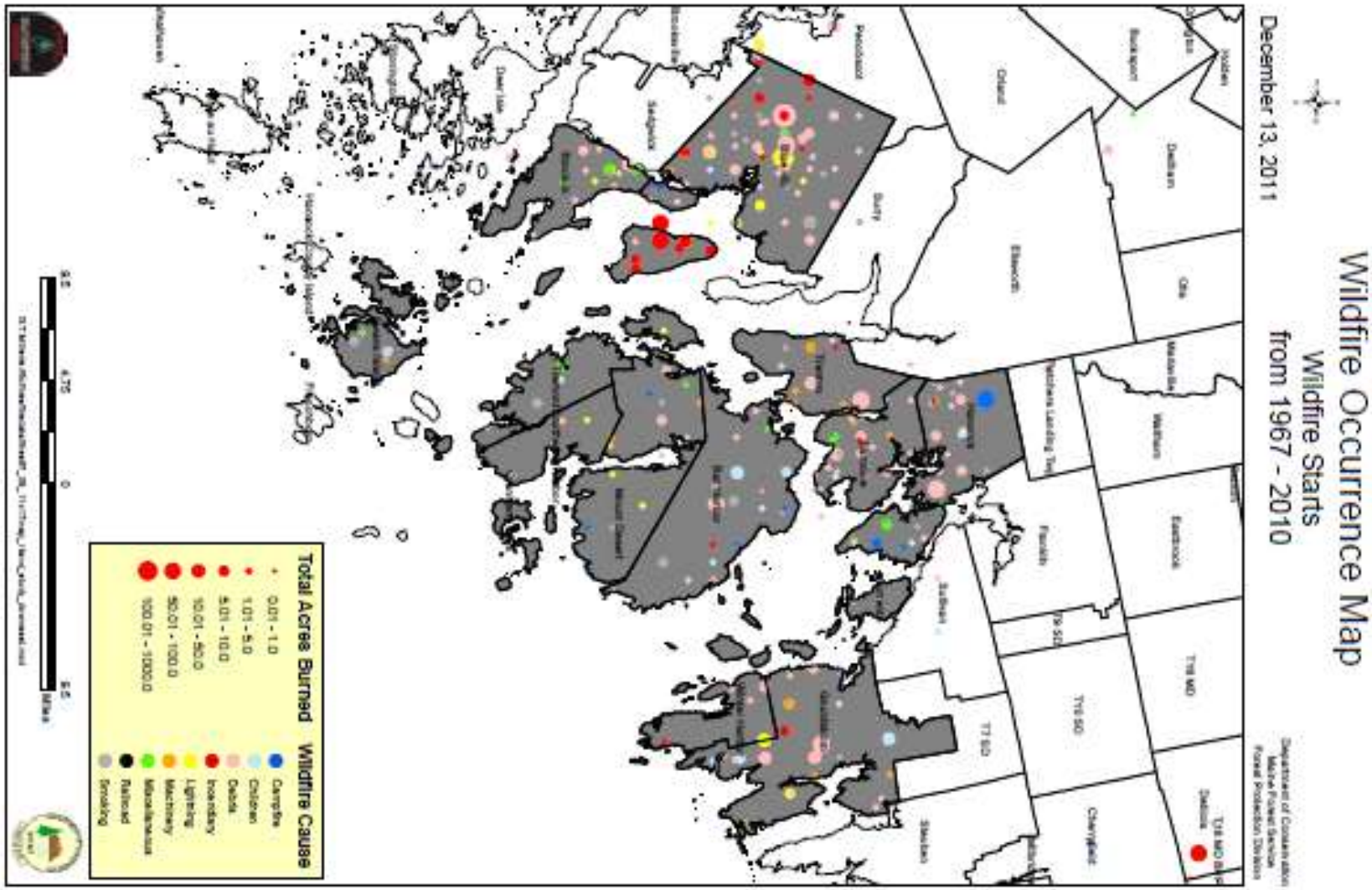


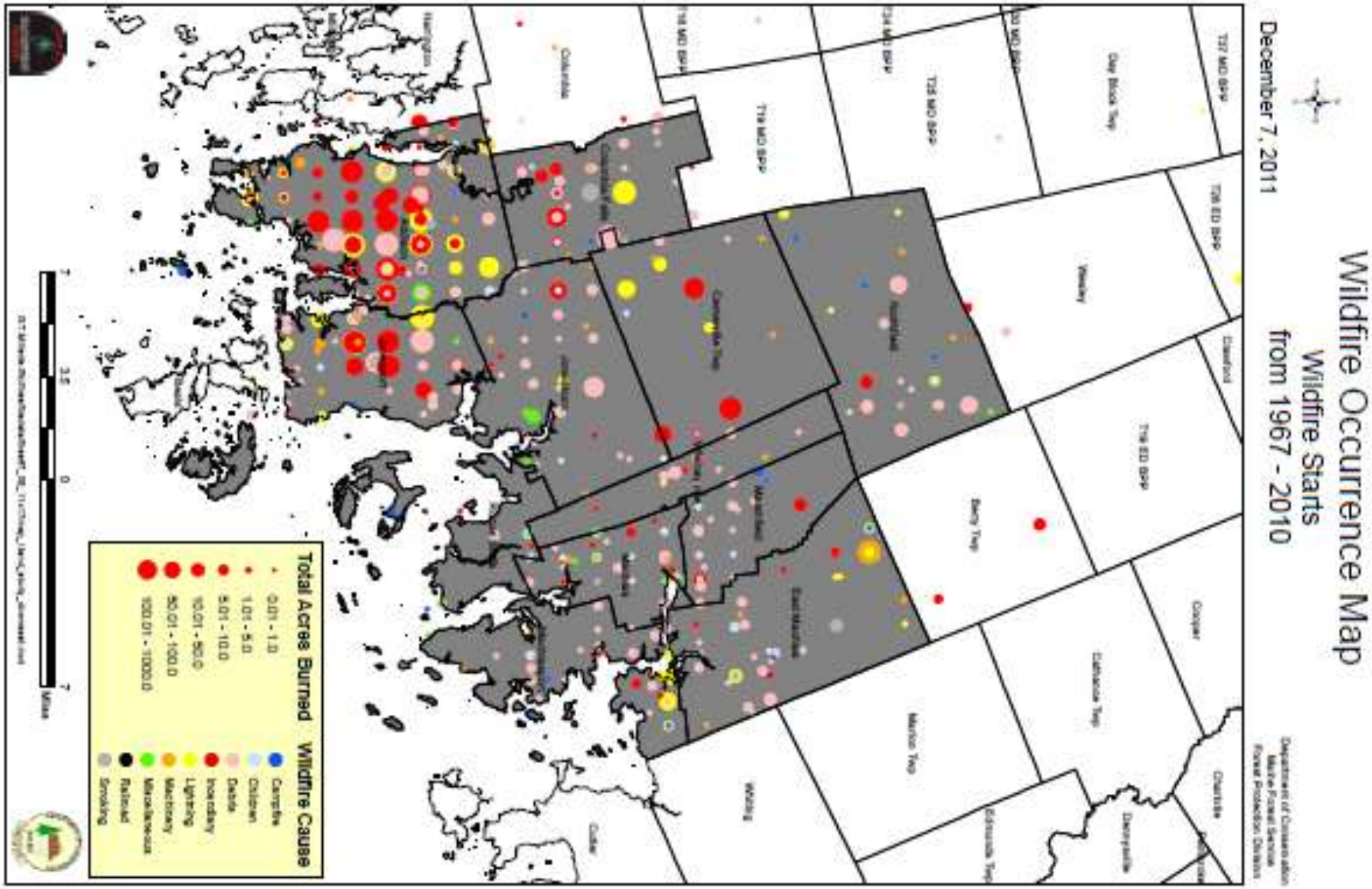
Map by Greg Miller, Maine DOC 2012. Dots represent fires 1990-2011.

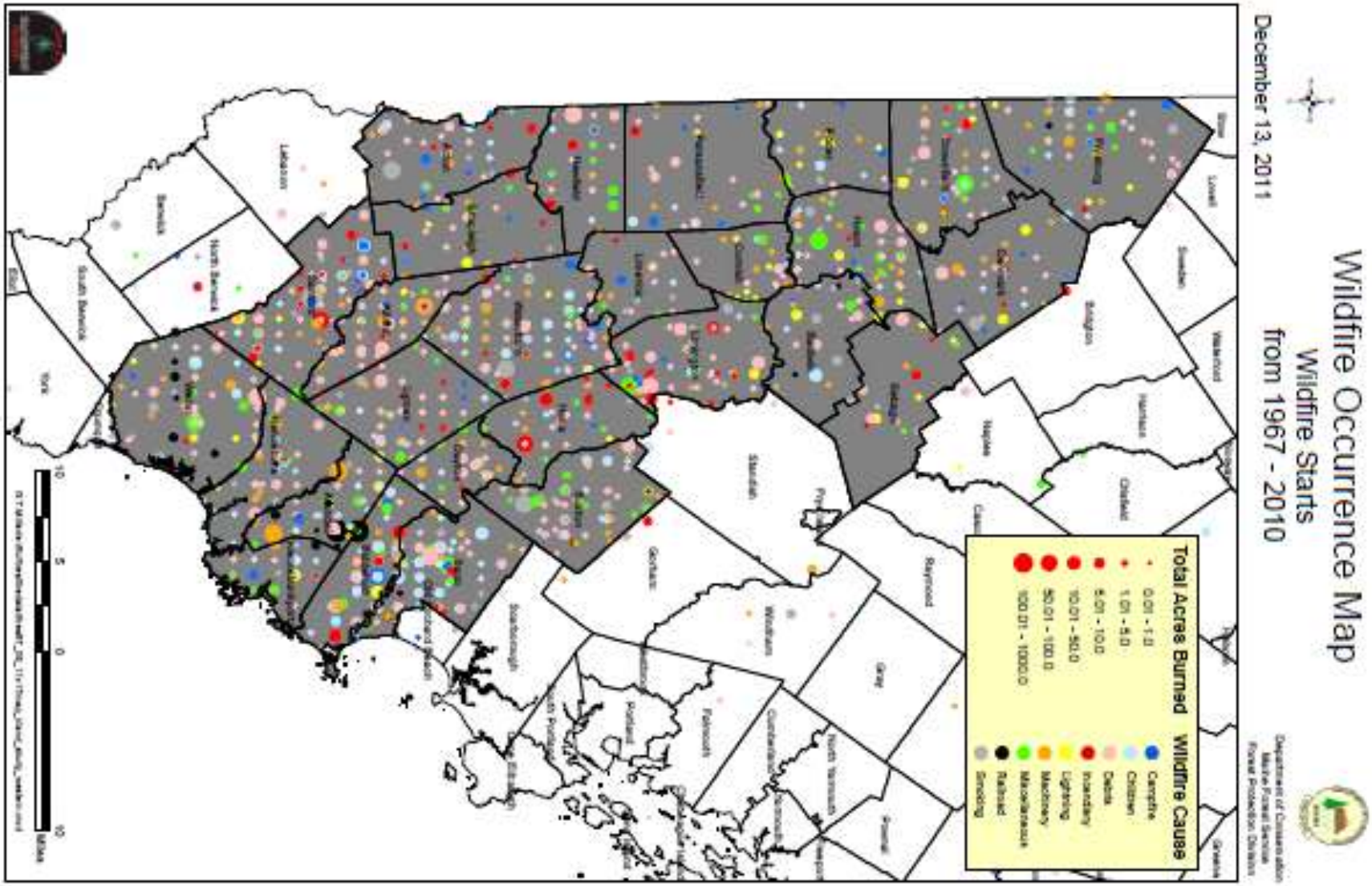
Map from Anonymous, 1948.



More maps of 1947 “footprint” since 1990 by Greg Miller, MFS




Wildfire Occurrence Map
Wildfire Starts
from 1967 - 2010
December 7, 2011
Total Acres Burned
0.01 - 1.0
1.01 - 5.0
5.01 - 10.0
10.01 - 50.0
50.01 - 100.0
100.01 - 1000.0
Wildfire Cause
Campfire
Children
Debris
Incendiary
Lightning
Machinery
Miscellaneous
Railroad
Smoking
Miles


Wildfire Occurrence Map
Wildfire Starts
from 1967 - 2010
December 13, 2011
Total Acres Burned
0.01 - 1.0
1.01 - 5.0
5.01 - 10.0
10.01 - 50.0
50.01 - 100.0
100.01 - 1000.0
Wildfire Cause
Campfire
Children
Debris
Incendiary
Lightning
Machinery
Miscellaneous
Railroad
Smoking
10
5
0
10
Miles