NE Compact Fire Analysis

Canada Four Jurisdictions

Lloyd C. Irland, The Irland Group

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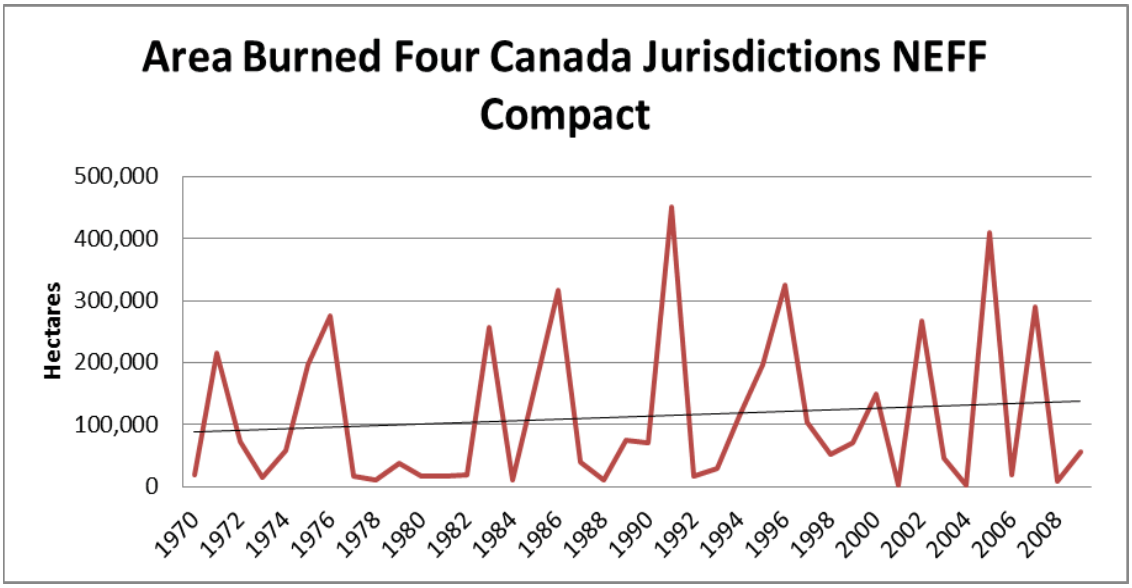
I would like to do a comprehensive Compact-wide analysis but am still uncertain as to a few data details. For the moment convention will rule and I'll offer separate analyses of the US and Canada data. We may also get some much better statistical ideas. Consider this a first step.

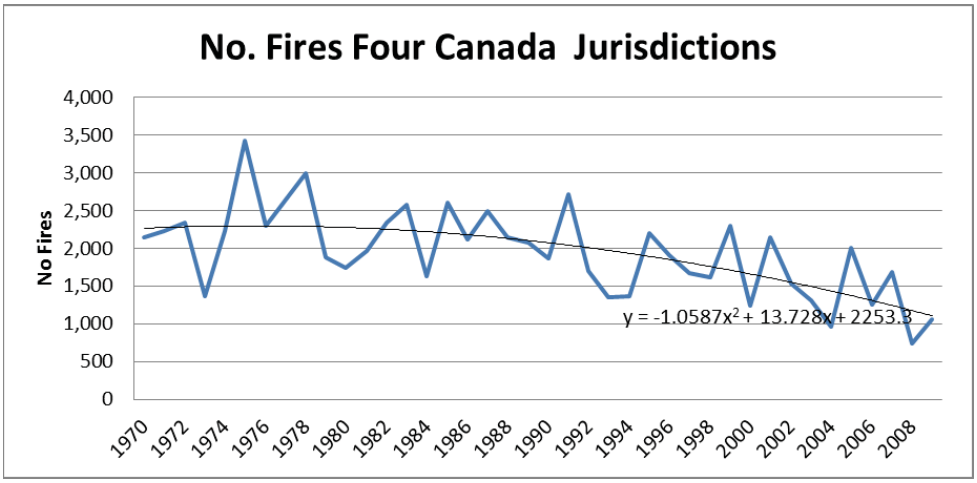
I am using Data on NB, NS, and Nfld/ Labrador from NR Canada and on Quebec for the intensively protected zone only from Sopfeu[1]. I may receive revisions on this account from others and will revise accordingly. I thought it useful, tho, to let you in early results. On these figures, Compact wide area burned in Canada has trended irregularly upward since 1970. The period average was 133,000 Ha/yr; since 1995, it has been 1333,000, and the variability slightly higher.



In 9 years, area burned exceeded 200,000 ha, at least twice each decade.

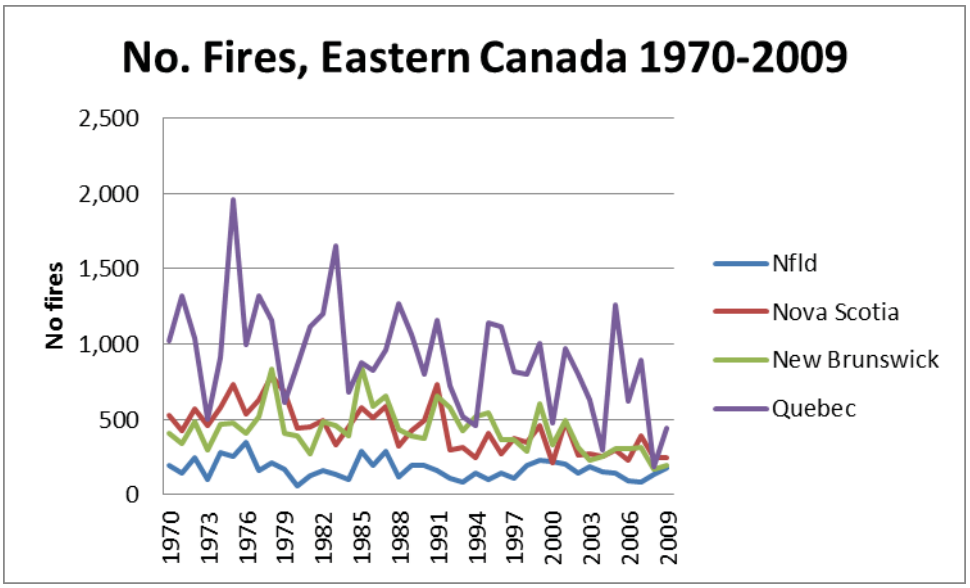
[1] I have data back to 192 for Quebec and would welcome some way of getting similar longterm data from other jurisdictions, even if not fully comparable across provinces.

The number of fires for the same period saw a slow decline, averaging 1,949 for t he full period, and 1,578 since 1995. Not since 1992 have 2500 fires been exceeded.



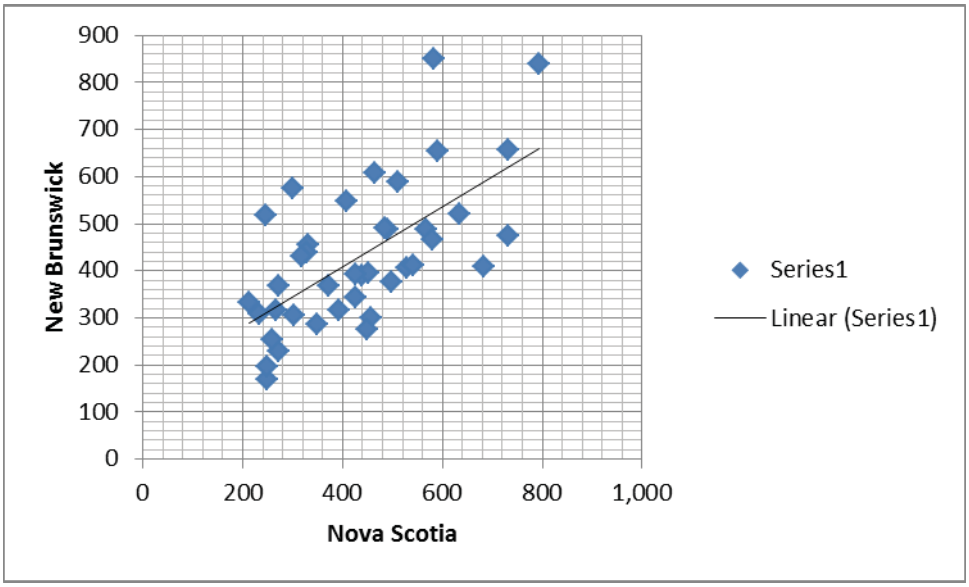
Comparisons Among the Jurisdictions

A number of comparisons suggest themselves. First, there is a clear interest in seeing whether "bad" fire years tend to coincide across the region or whether they do not. Generally, they don't. This rather busy chart shows that since 1970, peaks in **fire**



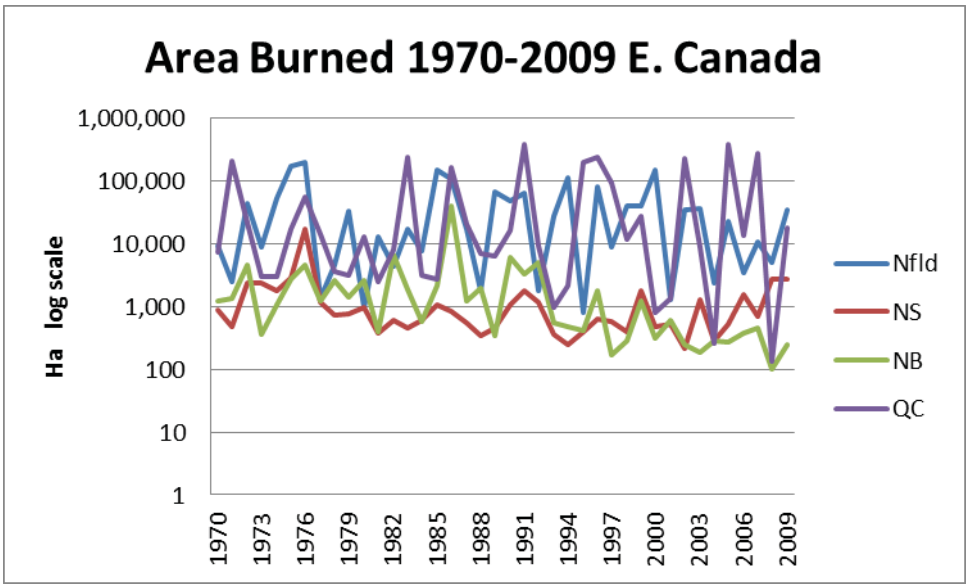
numbers have generally, though not uniformly, been out of alignment. The graph suggests a rough similarity, though, for NB and NS. Similarities in fire weather and fuel conditions are plausible for sections of these areas.

No. Fires, NB and NS :

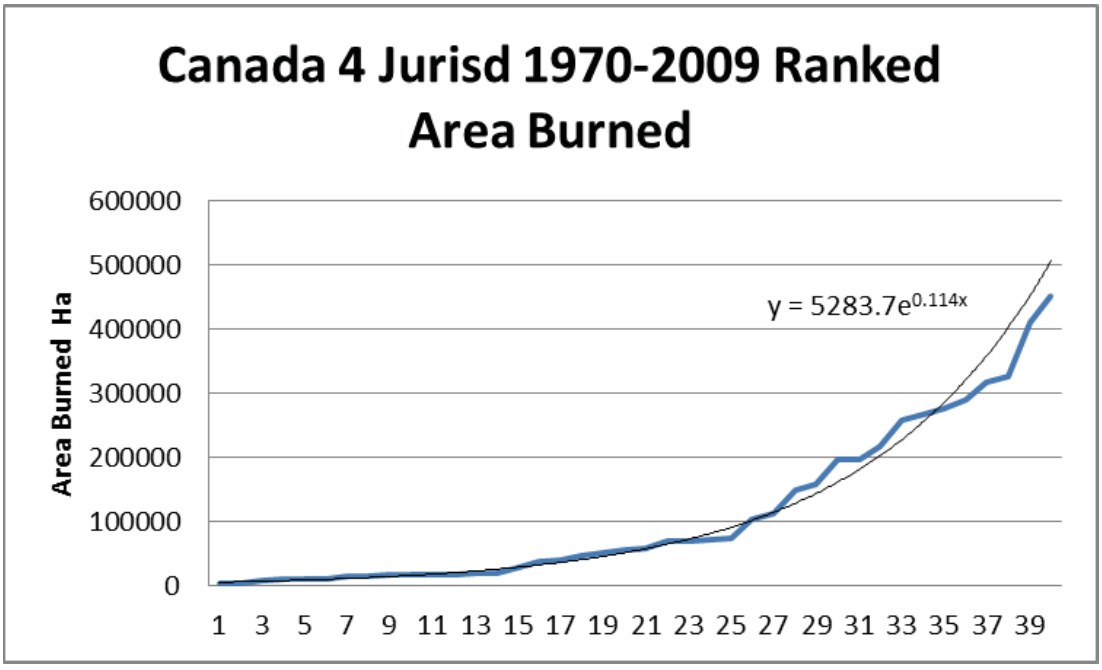


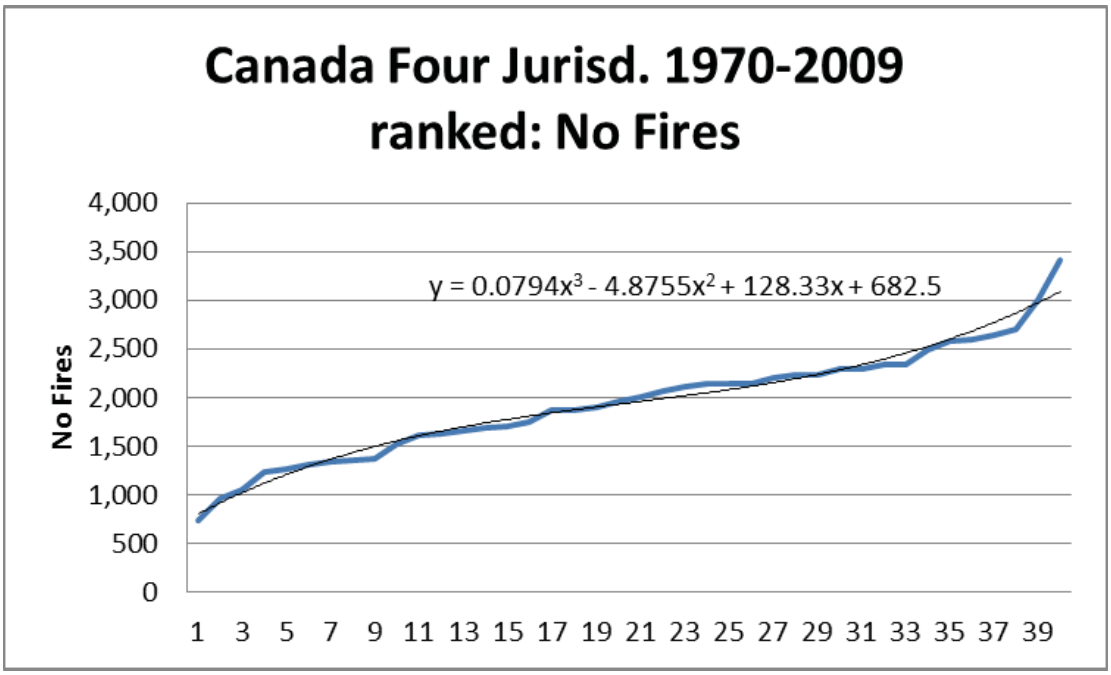
For **area burned**, the picture is similar. (this is a lot easier to see on the table, which is a separate spreadsheet) This chart does not seem to show strong associations that are consistent across the period. Further analysis might be useful – especially if we had longer time series to work with[2]. Looking only at the 3 peak years for each jurisdiction, no other provinces experienced any of their peak 3 years at the same time as did Quebec. Two of Newfoundland and Labrador's peaks coincided with 2 Nova Scotia's top 3. With the geographic and climatic diversity of this large region, this is not a big surprise.

[2] Arguably, if our data series were not precisely comparable from jurisdiction to jurisdiction, that would not necessarily compromise general results of such an analysis, it would, however, if there were large differences in definitions/collection methods/coverage over time.



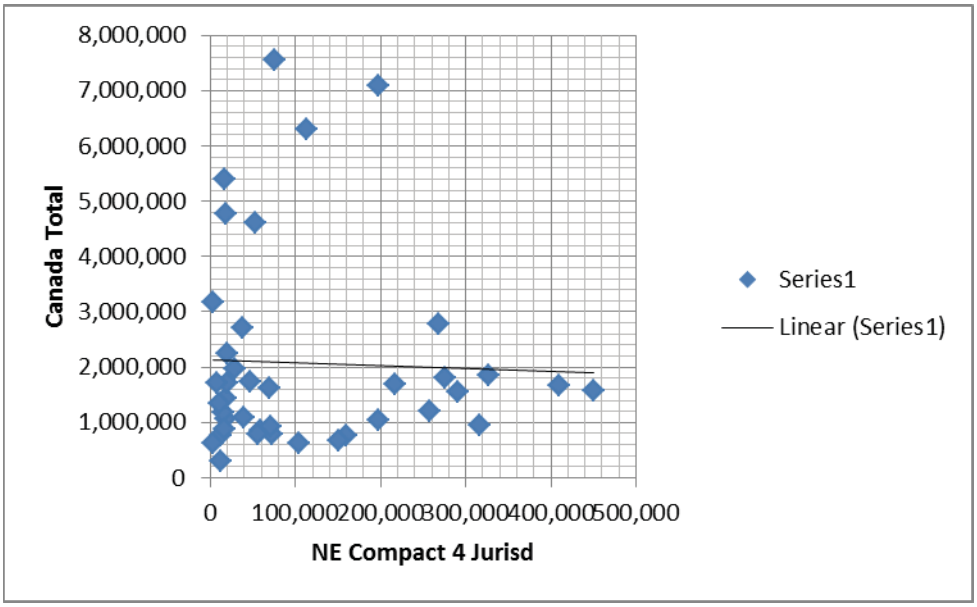
Insight is gained by ranking the fire years from low to high, to highlight extreme values. Analyzing the ranked Compact totals, shows patterns similar to experience elsewhere. That is, the distribution of area burned by years shows the tendency to steepen as the areas are larger.




Canada Four Jurisd. 1970-2009
ranked: No Fires
No Fires
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
y = 0.0794x³ - 4.8755x² + 128.33x + 682.5
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39

Comparison to Canada:

Of particular importance is the question: do bad fire years in the East correspond with bad ones in the West? The answer, according to this dataset, is generally not.



(Better to re-run using totals for West only inst. of Canada total)

None of Canada's 3 worst years for area burned coincided with the 3 worst for the Compact or for Quebec. Also true for 4th and 5th years.

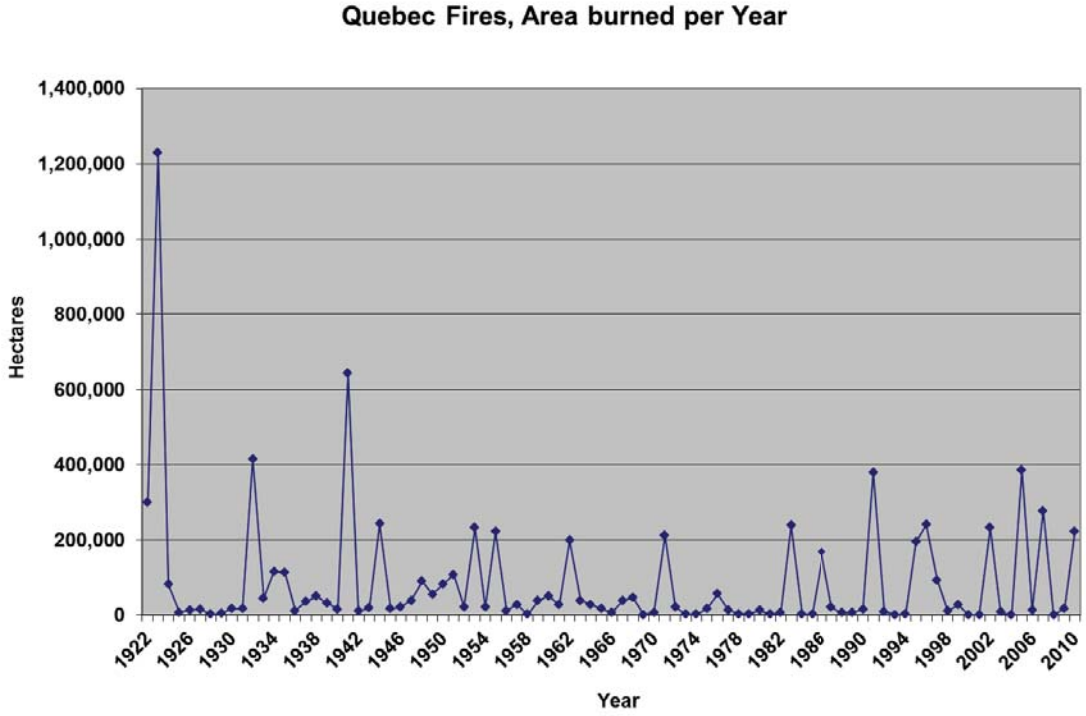
When the Compact has a busy year, though, its area burned is large relative to the entire nation.

Quebec Patterns of Longterm Fire History[3]

Because Quebec is a major supplier of important capabilities to the Compact, as well as an occasional major source of demand, it is analyzed separately here. Also, this is because we have the longest term dataset of the Canada jurisdictions at the moment.

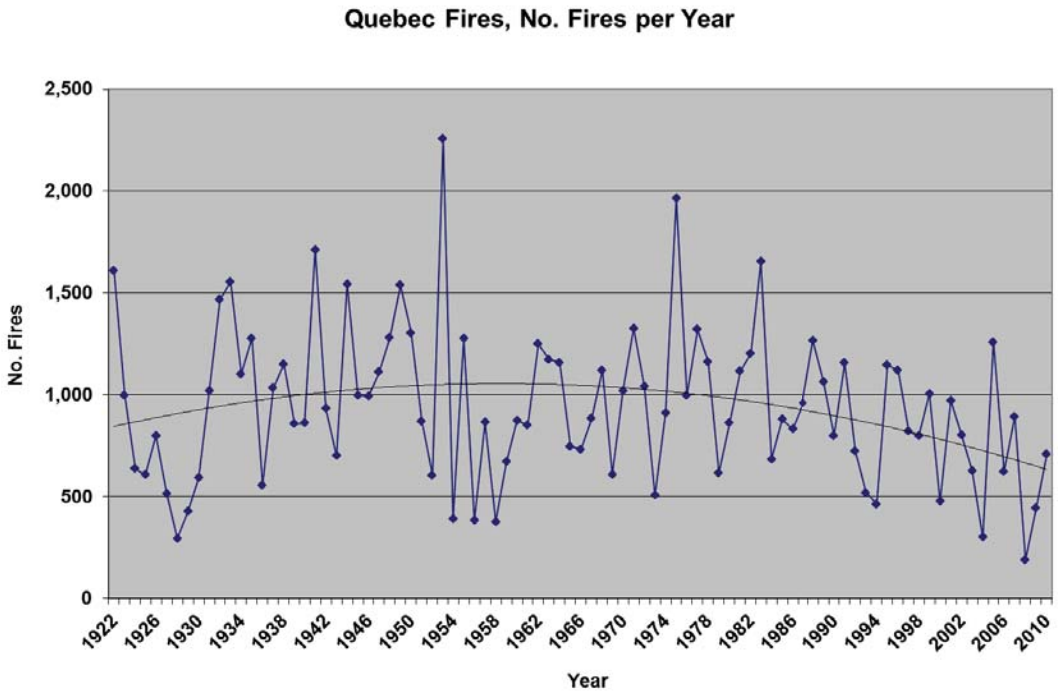
For area burned, Quebec is similar to nearby areas in that its very worst years were a long time ago. Quebec's record year in 1923 coincided with a bad year in Maine, where 70,000 acres burned. (could both of these been due to budworm?) Interestingly, since then, bad years in nearby Maine did not coincide with those in Quebec.

From 1924- to 1990 there occurred only 8 years exceeding 200,000 acres burned in the intensively protected zone. Since 1990, there have been six such years.

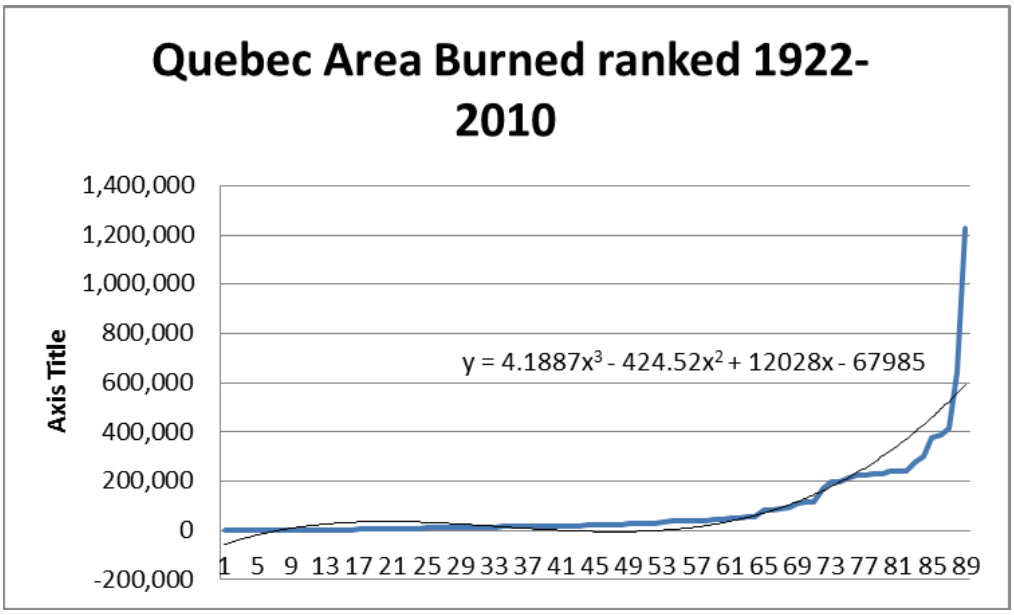


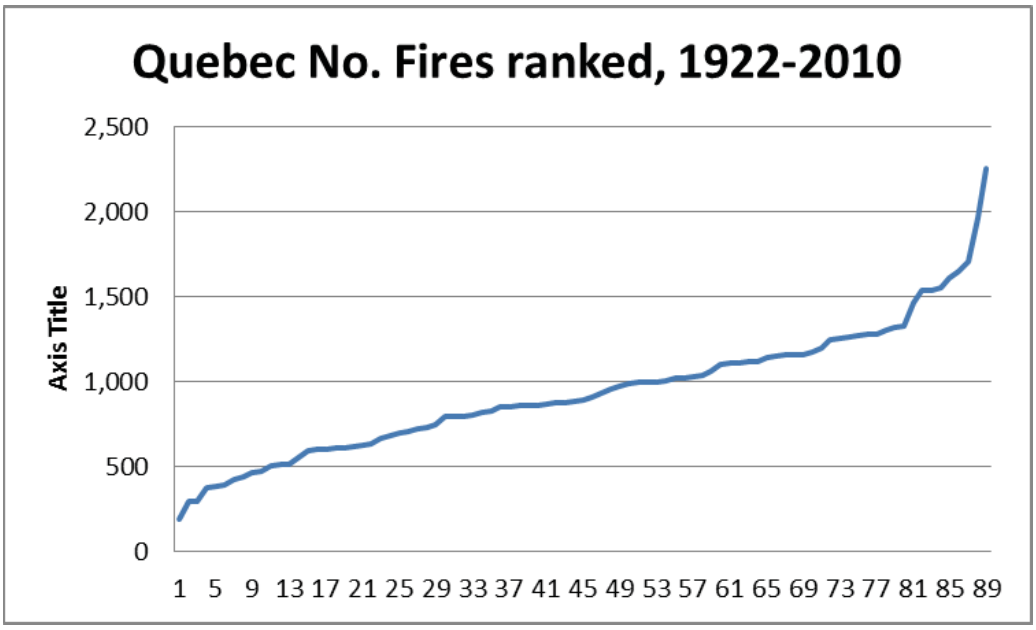
Not surprisingly Quebec's curve of number of fires looks a lot like the Compact total. Since the mid-80's. Quebec has not had another 1,500 fire year.

[3] We will check further to see if this history is biased by changes in protected area or recording practices.



Continuing our stylized extreme value analysis, Quebec's experience shows the tendency of past relationships to break down when you reach the extremes.





Some Highlights on Canada from Above:

A few thoughts emerge subject to further analysis and also to building this information into a Compact-wide analysis.

1. The four Compact jurisdictions as a whole have seen somewhat higher average area burned, and a burst of high acreage years recently,
2. This has been due to larger fires, not greater numbers of fires.
3. While there is a loose association in no of fires between NS and NB, generally the peak years in area burned within the region do not coincide.
4. Further, peak years for Canada arise from extreme fire years in the West that do not coincide with the peak years in the East.
5. For further statistical analysis of fire histories, it is worth asking whether data back to the 1920's or further are helpful or not, but also whether going back to 1970 is long enough. We will consult the scientists on this.