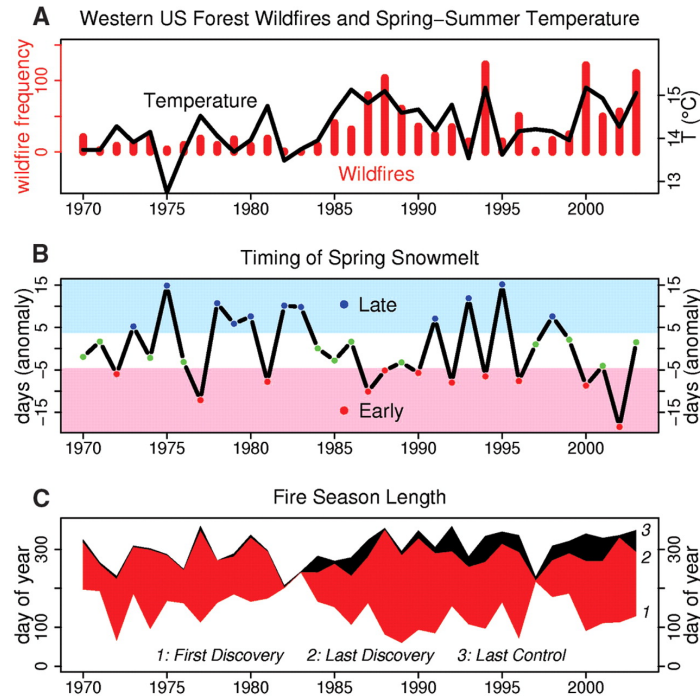


Bob Parmenter, featured in the bio, works with researchers who are trying to look for trends in the Valles Caldera National Preserve study area. Bob and his fellow scientists need to monitor several variables in order to understand the impact of wildfires and evaluate risk to life and property. The data shown in the graphs below shows change over time in temperature, timing of snowmelt and fire season length. Study the graphs below and answer the following questions:

Fig. 1. (A) Annual frequency of large (>400 ha) western U.S. forest wildfires (bars) and mean March through August temperature for the western United States (line) (26, 30).



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Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity

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Questions for the graph:

The first graphs show the relationship between wildland fire frequency and temperature. What is the trend shown in the graph?

What year(s) had the most wildland fires and what are the corresponding high temperatures?

How does the timing of snow melt (being early or late) impact the fire? You'll need to look at both the top and middle graph to answer this question?

What do you think may have caused the change of wildland fires when there is an early spring snow melt?

On the last graph, you can see that the fire season length of time is displayed in days of the year and also you can see when the first fire of the season was discovered (1) and when the last fire was put under control (3). What years had the longest fire seasons?

How do the long fire seasons compare with the years of warmer temperatures?

As you can see by the graphs one change can impact other changes. Thinking with a “Systems” approach to the Earth and its spheres what would be the impact to the following spheres if the wildfire trends continue. Think of both positive and negative impacts.

- Atmosphere
- Biosphere
- Geosphere
- Hydrosphere

In summary, the following paragraph is from **Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity** L. Westerling^{1,2}, H. G. Hidalgo¹, D. R. Cayan^{1,3}, T. W. Swetnam⁴

If wildfire trends continue, at least initially, this biomass burning will result in carbon release, suggesting that the forests of the western United States may become a source of increased atmospheric carbon dioxide rather than a sink, even under a relatively modest temperature-increase scenario (38, 39). Moreover, a recent study has shown that warmer, longer growing seasons lead to reduced CO₂ uptake in high-elevation forests, particularly during droughts (40). Hence, the projected regional warming and consequent increase in wildfire activity in the western United States is likely to magnify the threats to human communities and ecosystems, and substantially increase the management challenges in restoring forests and reducing greenhouse gas emissions.

Although wildland fires will add to carbon release into the atmosphere there is a delicate balancing act to preserve healthy forest by not eliminating fire. Creating a healthy fire regime requires management of fires with prescribed burns as well as allowing natural low-intensity burns so the fuel load doesn't build up and become fuel for a high-intensity fire.

After reading the paragraph describe in your own words what you think is the overall trend and what will be the consequences of more wildland fires and what should be done about it?