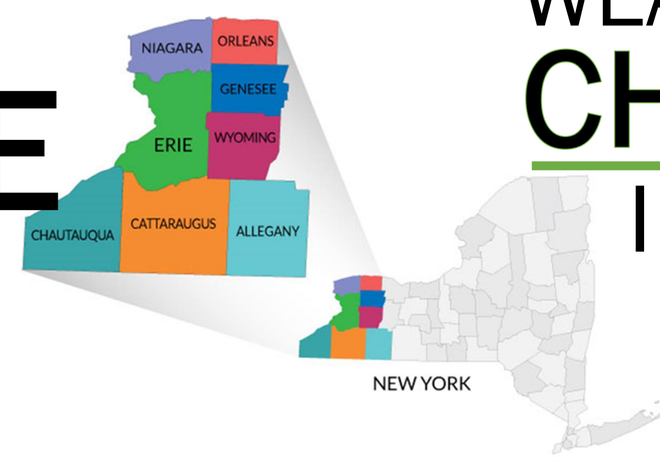
A LOOK AT CLIMATE CHANGE IN WNY



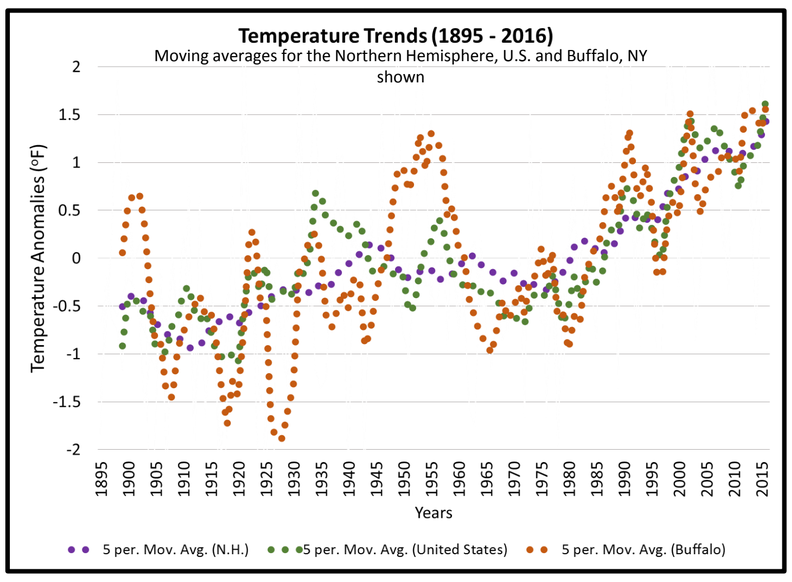
WEATHERING CHANGE IN WNY

Interpreting Our Findings

There is a canon of science supporting both global climate change and the environmental responses to these changes. There is also well documented evidence of changes occurring at regional and local scales. It should not be taken, as a matter of course, that regions will respond to global warming equally or with similar intensity. The question addressed here is solely the climatic response of Western New York (WNY) to global climate change – our region's environmental response to climate change in not addressed here, nor is the environmental response within our region that spills over from climate changes occurring outside our region (bird migration, disease vectors, etc.). Understanding regional responses, and nonresponses, are critical in considering adaptation strategies, and to take advantage of potential opportunities.

Methodology

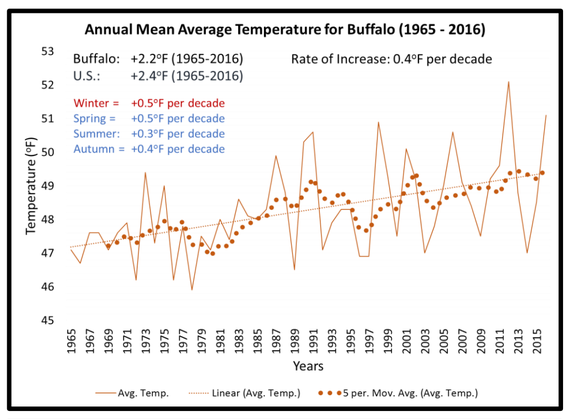
Climate change was examined using yearly data, time series trend analysis, and a moving average (5-year) filter. The moving average smoothens year-to-year variability. The significance of a trend (decision criteria) - whether the observed observations would be likely to occur by chance alone -.was determined using the non-parametric Mann-Kendall test, at the 95-percent confidence level.

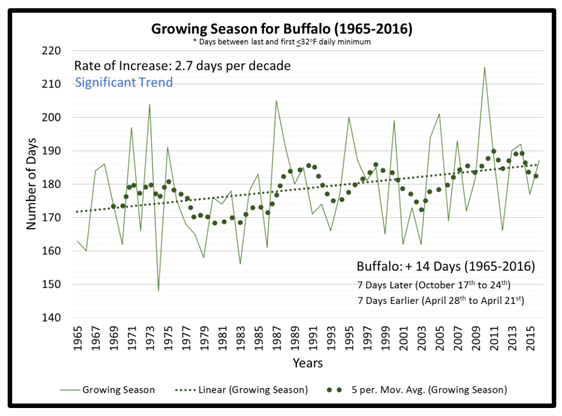


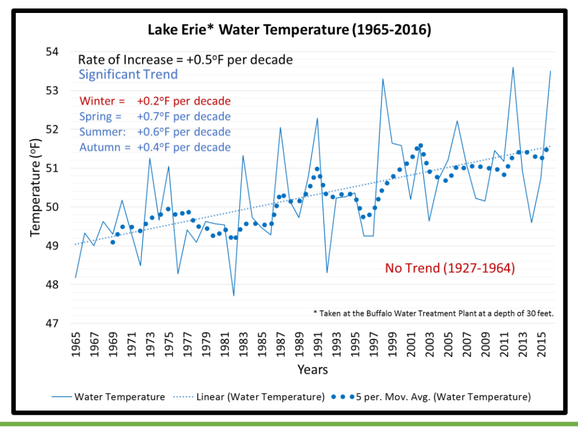
*The period 1965 to 2016 was chosen for study, as in this period the direction of temperature change is more consistent (fewer regional short term anomalies) and aligns with the U.S. and Northern Hemispheric changes – changes best attributed to greenhouse gases.

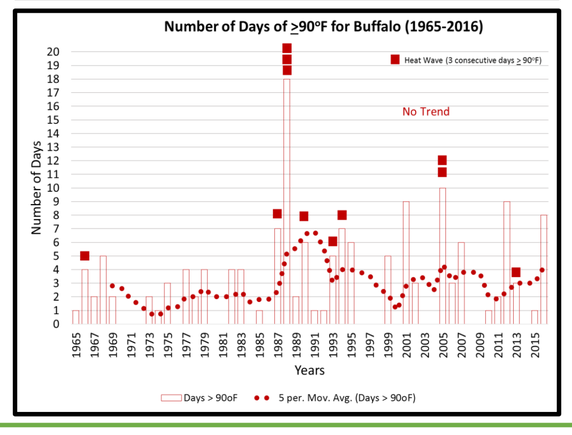
Temperature

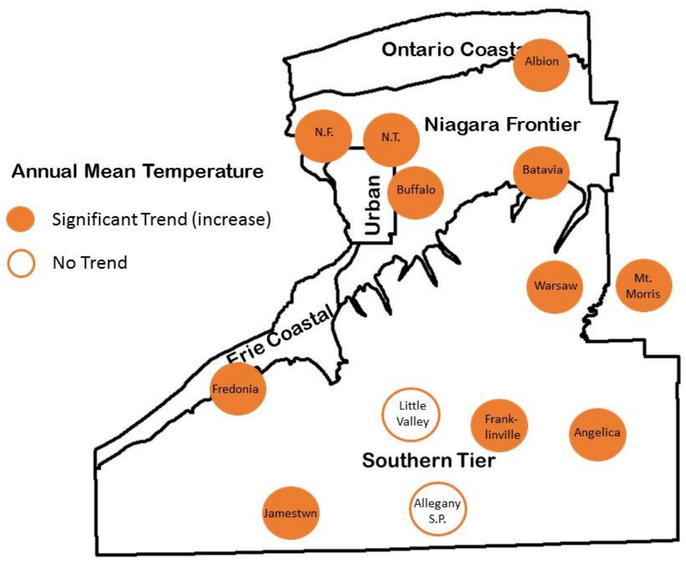
Our findings show that WNY is warming, and warming at a rate that is just slightly below that of the U.S. average. This warming can be seen in both maximum and minimum temperatures, but not equally divided between seasons and places. For example, summer daytime highs are not expected to increase appreciably (don't expect more 90°F days), and places along the Lake Erie coast (Fredonia, NY) might see increases in minimum temperatures outstripping maximum temperatures in all seasons. Our growing season is lengthening (about 2 weeks since 1965). Lake Erie's temperature is also increasing.



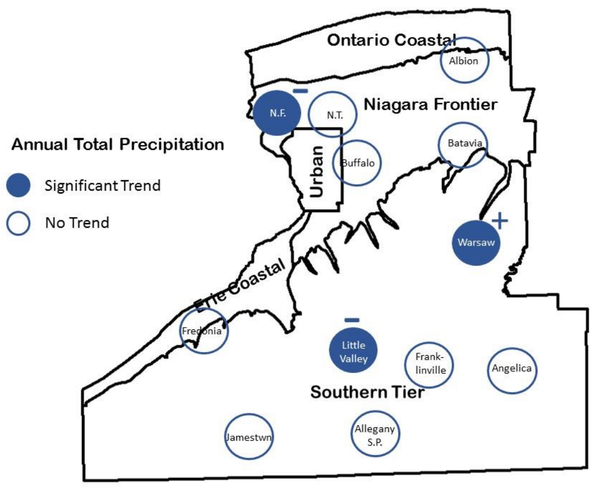




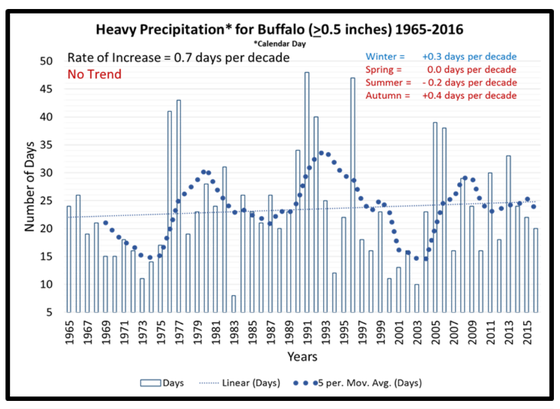


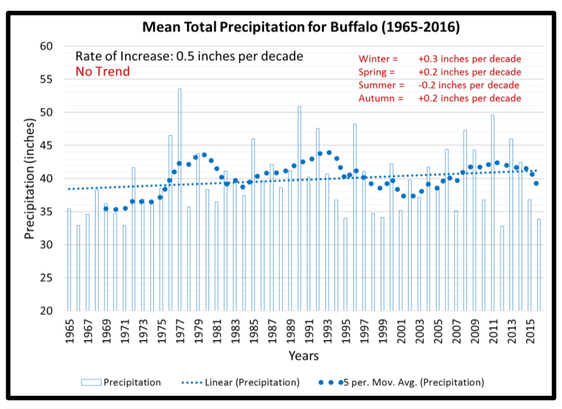


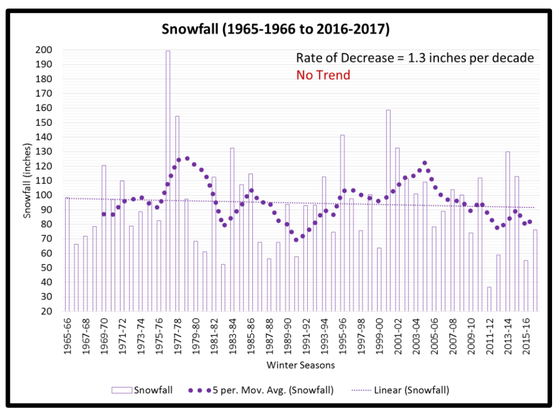
Precipitation

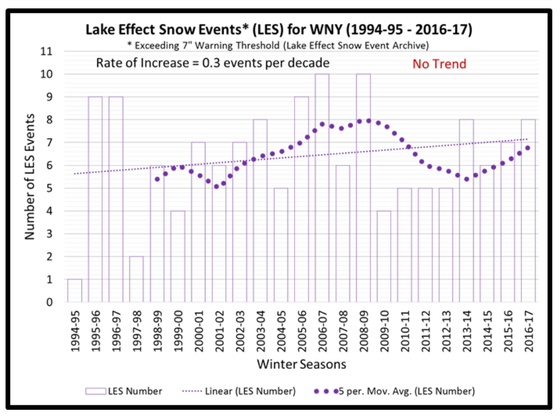


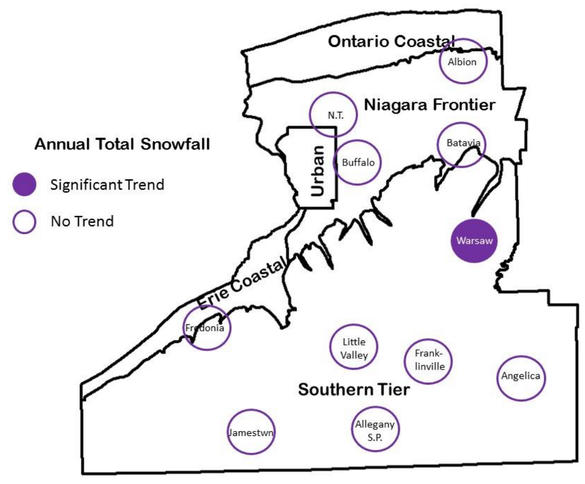
Precipitation rates (amounts & intensity) show no significant change over time at most monitoring sites, nor does the frequency of lake effect snow events.







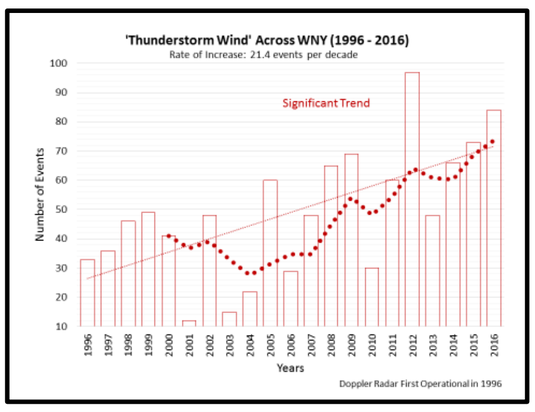


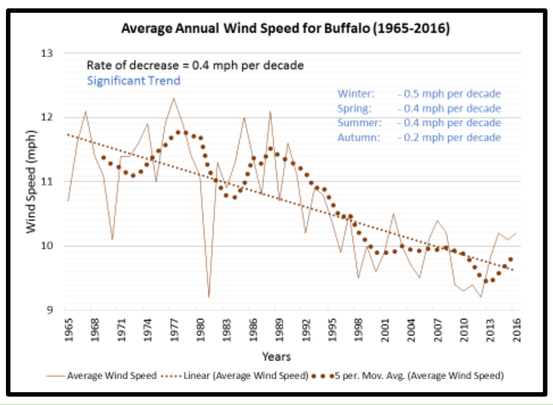


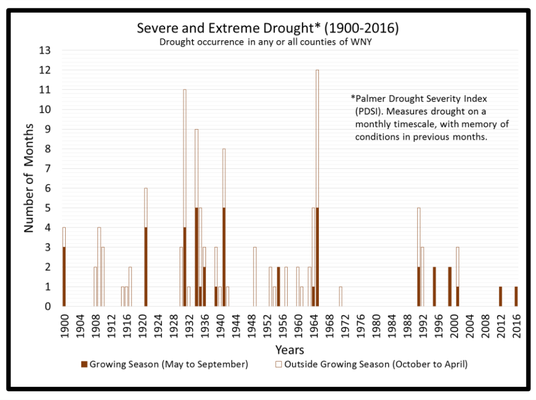
With the exception of Warsaw, there is no significant change in snowfall amounts across WNY. Having said this, a number of the Southern Tier stations have experienced modest increases in snowfall since the mid-1980s.

Severe Weather

Thunderstorms and high winds have been identified as typical severe weather in WNY. The severity of thunderstorms, especially thunderstorm winds, may be increasing, while average wind speeds are decreasing. The occurrence of drought also appears to be decreasing. Other forms of hazardous weather found in WNY (hail, tornadoes) do not appear to be on the increase.







Conclusion

Western New York (WNY) clearly shows itself to be impacted by climate change – a climatic response chiefly seen as a rise in temperature. Temperatures are warming at a rate about that of the U.S. average (0.4° to 0.5°F per decade). This warming can be seen in both maximum and minimum temperatures, but not equally divided between seasons and places. For example, summer daytime highs are not expected to increase appreciably (don't expect more 90+oF in Buffalo), and places along the Lake Erie coast (Fredonia, NY) might see increases in minimum temperatures outstripping maximum temperatures in all seasons. As a result of this warming, WNY's growing season is lengthening at a rate of between 2 to 3 days per decade. And, Lake Erie's water temperature is warming too, resulting in earlier ice out dates (3 days per decade) and less ice cover. Precipitation rates (amounts and intensity) show no significant change over time, nor does the frequency of lake effect snow (LES) events. However, while the frequency of LES events appear unchanged, the increasing snowfall in the southern tier hints at a strengthening of these LES events over time. And severe and extreme droughts are less likely over time. Average wind speeds appear to be decreasing, however the severity of thunderstorms, especially thunderstorm winds, is one form of hazardous weather that may be on the rise in WNY.

DESIGNING SUSTAINABLY

GEOGRAPHY & PLANNING BUFFALO STATE

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