Is Vernonia's Weather Changing? *continued from front page*

for decades – but the averages stay the same, about 60 inches a year, with no clear annual trends in the data.

I also reached out to Chip Bubl, the Oregon State University Extension Service agent for Columbia County and asked him if he has any proof of weather change in the region.

"The weather in this region is definitely variable over different terrains," says Bubl, "but weather change is on everyone's minds, especially after the fires last year. One of the major predictions for the Northwest corner of Oregon in climate change modeling is that, although our rainfall totals were not going to change drastically, the way the weather systems and patterns come through this area, and how moisture is held in the soil was going to change. The prediction was that there would be more intense storms, dropping a lot of water at one time. But when the rain falls that way, it doesn't stay in the soil and percolate down to the lower levels, it runs off the land into the streams and rivers, and out to the ocean. And that is proving out to be true."

With the data showing consistent annual rainfall totals, and with winter rains proving reliably inconsistent on a month-to-month basis, I decided to take a look at Buxton's data for spring rainfall and test Bubl's observations and the climate models.

According to Buxton's 30-year averages, he receives an average of 15.82 inches of rainfall during the months of March-June. Over the last five years, here's what he's documented during those four months:
2016 – 15.43
2017 – 19.89
2018 – 12.14
2019 – 8.92
2020 – 10.18

The average for those four months for the last five years is 13.31, about 2.5 inches less than the 30-year average.

The rainfall to date so far this spring for March and April, which is what is causing a lot of the concern around the state right now, also looks bleak for the Vernonia area, especially when compared to the 30-year and five-year averages (2016-2020):
2021 total – 5.39
5 year average – 10.36
30 year average – 11.07

Even more significant is the average over just the last three years (2019-2021) for March and April, including this year:
3 year average – 5.54

Whether these changes are an ongoing trend, or just part of normal, long-term fluctuations in precipitation, remains to be seen. But the implications for the Vernonia area are concerning – potential draught conditions, wildfire danger, and dying trees.

Bubl also discussed changes in temperatures, and what is called "growing degree days," (GDD) which includes the minimum development threshold temperature that must be exceeded for growth in plants to occur, and is of particular interest to farmers and gardeners. This minimum development threshold is called a base temperature. Corn, sorghum, and soybeans have a base temperature of 50 degrees Fahrenheit. Below a crop base temperature there is little growth occurring.

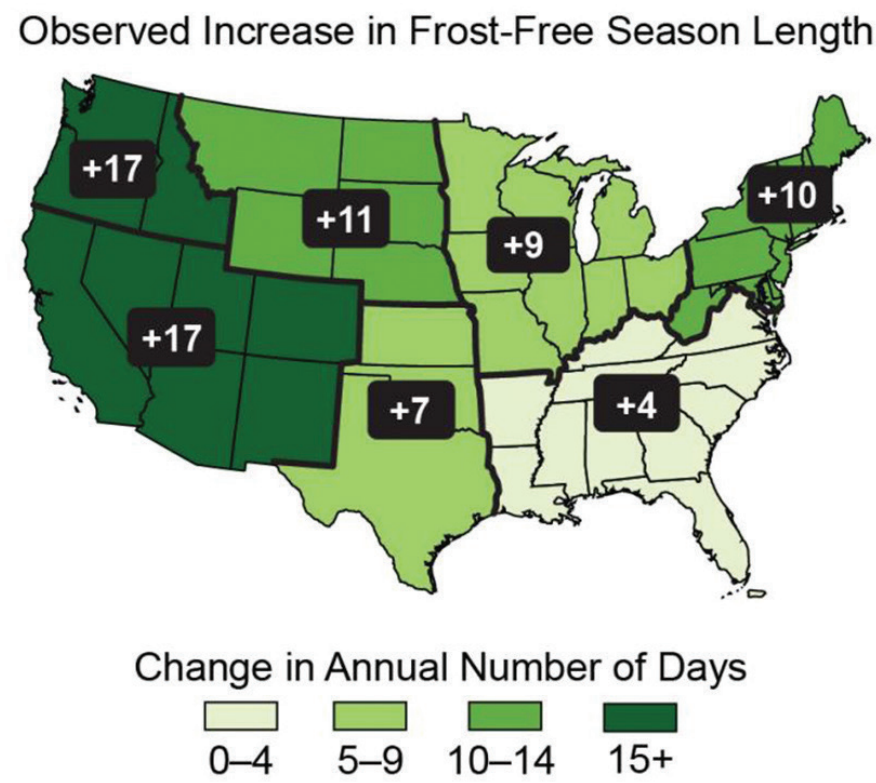
To calculate GDDs you first need to record the mean temperature; this can be done by adding together the high and low temperature for the day and dividing that value by two. If the mean temperature is at or below the base temperature for a crop, then the GDD value is zero. If the mean temperature is above the base temperature, then the GDD equals the value of the mean temperature minus the base temperature. GDD for each day for the growing season between April 1 and October 31 is then totaled to give you the seasonal GDD.
Example:
Recorded high temperature: 80°F
Recorded low temperature: 60°F
Corn base temperature: 50°F
Mean temperature = 80°F + 60°F ÷ 2 = 70°F
GDD = 70°F – 50°F = 20

"We have consistently been above the average of 2,000 growing degree days in every growing season in recent years," explains Bubl. He said he recently looked over the data going back 30 years for a presentation he was making and saw a significant trend. "Starting 10 years ago, the further back you went, you almost never saw totals over 2,000. But you never saw totals under 2,000 going forward for the last 10 years. To me it was pretty dramatic evidence that we are warmer on a consistent basis."

Bubl pointed me toward another online tool, a calculator for cooling degree days. I used the Energy Star website, which pulled weather data from a station in Kelso/Longview when I typed in the 97064 zip code. This site calculates how much cooling (you can also calculate heating days) is necessary to keep a building at 65 degrees and is calculated in a similar fashion as the growing degree days figures – the average of the high and low daily temperatures, minus 65 as the base number, so the hotter the daily temperatures the higher the data number reported and accumulated. Here are the numbers generated for cooling over the last 30 years (as far back as the data goes) – I randomly chose every five years to see if there was a trend:
1990 – 24
1995 – 107
2000 – 84
2005 – 125
2010 – 81
2015 – 303
2020 – 207

The average of the seven years I checked over a 30-year period was 107.2. The data showed a slight trend of warming temperatures, at least in the years selected. To further confirm this trend I looked at each year between 1990 – 2020 and found an average of 105.5. Next I averaged the number by decade for comparison:
30-year average 107.2
1990 – 2000 average – 98.0
2001 – 2010 average – 149.3
2011 – 2020 average – 183.4

Those figures show a clear and steady increase over the past decades. What was even more dramatic was the increase over the last six years:
2015 – 2020 average – 222.3



Source: updated from "Chapter 2: Our Changing Climate" in Climate Change Impacts in the United States: The Third National Climate Assessment, 2014.

Bubl had one more suggestion for a way to frame these weather pattern changes. He shared a map which show increases in the growing season across the United States based on average changes from when the last frost occurs in the spring at the start of the growing season and the first frost at the end of the season in the fall (see map above). This difference expressed on the map is the change in the average number of frost-free days between 1986–2015 compared to 1901–1960. "The national mapping has indicated that the Pacific Northwest region is now operating with a 17 day increase, which basically means it's warmer earlier and warmer later each season," Bubl explains. "It's a broad brush stroke for a big region, but it's still an interesting overall look at what's going on."

A longer growing season for vegetables might not sound like a bad thing, especially here in Vernonia where the season is generally especially short. "In agriculture it's going to allow some people to grow things they couldn't grow before, so it could potentially be a good thing, in kind of a weird way," said Bubl.

But that led Bubl to circle back to talk about the concerns around western red cedars dying in the region. "We've had plant pathologists from OSU who have spent an inordinate amount of time, from Corvallis and north, looking for evidence of pathology or disease in these trees, and they're just not finding it," he says. "It's not impossible that they're not finding something because they weren't looking for that exact thing. But the consensus in the forestry and scientific communities is that it's the lack of moisture heading into the typically dry months that is killing them."

So, what does all this data and information tell us? First of all, it shows us that identifying trends can take time, and that we may not know what's actually happening with some of these current changes for many more years. Also, it reminds us there are so many different ways to look at data, and that different people might reach different conclusion from the same information. Maybe it helps us all be more aware of how we use, conserve, and save our water resources, and encourages us to spend some time observing the environmental conditions where we live, work, and recreate. Hopefully we'll all be a bit more cautious this fire season and think about how we're interacting when we're on the land. And, of course, it's probably in our best interest to continue to monitor the data for rainfall and temperatures and pay attention to these potential trends.