Understanding our Changing Climate – Our friends the Insects

Windshield surveys. These are often used by all kinds of people to set context or get an idea of what is happening. This could be a farmer checking weeds in wheat, a scientist evaluating the extent of damage by wildfire, or just checking out the line at your favorite drive-through coffee shop. But there is another kind of windshield survey. It is judging the number of insects splattered on your actual windshield as you travel down the highway in the summertime. What I am noticing is there are fewer and fewer marks on the glass, and this has some major implications.

What we do know is that because insects have exoskeletons and cannot regulate their body heat like mammals, they are more susceptible to rapidly changing temperatures associated with climate change. Temperature regulates insects' physiology and metabolism. Increasing temperatures can increase insects' metabolic rates which leads to consuming more and growing faster. If temperatures climb too fast, life cycles can be damaged. Even though insects have evolved over hundreds of millions of years, the current rate of change in our environment has made changes in insect populations less predictable. This is having significant effects on all aspects of our lives from agriculture to wildlands to public health to our food supplies.

Some native insects such as bumblebees are shifting their ranges northward. Recent studies in northern California have found decreases in butterfly populations at higher elevations. Some non-native insects are finding new toeholds, sometimes with damaging effects. Forest insects, like bark beetles are expanding northward, and in some cases, are having two annual hatches instead of just one, due to longer summers and host species being more stressed. In the Gulf Coast regions, mosquitoes carrying diseases such as Zika and Dengue, previously thought to be more equatorial in range are increasing in frequency. West Nile disease, carried by mosquitoes, is also expanding its range into the Pacific Northwest. Pathogen carrying mosquitoes and ticks are expanding northward throughout the country and are surviving our milder winters.

What we eat is highly tied to pollinators. Recent research on pollinators by OSU has found that many pollinators are specially adapted to certain plants. When those plants bloom before the insects are able to utilize them, it can hamper plant reproduction as well as insect health.

Many bird species are dependent on rich insect populations as their main food source. Birds serve multiple roles in the environment, including pollination. Climate change risks, such as early spring heat waves, wildfire, and other habitat losses are affecting bird populations now. A recent article in *Science* magazine stated that breeding adult bird populations have plummeted in North America since 1970 by over 2.6 billion. Birds and insects are co-dependent, and changes to one affects the other. A report just released by the Audubon Society predicts that two thirds of our bird populations will be vulnerable to extinction by 2100 if we stay on our current climate change trajectory.

So, what can we do to enhance native insect populations? While it may be convenient for some to wait for others or governments to act, we all share in the responsibility for a changing

climate. Since insects are fundamental to the health of our ecosystems, including us as humans, there are things we personally can do to support healthy insect populations.

Healthy soils, the foundation for life, are closely tied to healthy insect populations. In our yards, on our farms, and in the wildlands, we can mulch, prevent erosion, reduce our dependence on chemical fertilizers and insecticides, and prevent damage by overgrazing and other land impacting activities.

We can plant native species in our yards and create diverse habitat. Ornamental and exotic plants rarely provide the food base for native insects, some of which have very specific dietary needs. Monarch butterflies, for instance, are in peril, and are very dependent on milkweed. The Master Gardener program, https://extension.oregonstate.edu/mg/umatilla, is a great resource for ideas for plantings. Several communities will have plant sales this spring as part of Farmer's Markets in partnership with the Master Gardener program.

In our yards, we can promote diverse bird habitat by planting a variety of native plants and trees. These promote healthy insect populations and help fend off invasive species.

Riparian areas and wetlands support some of the richest habitat for native insects by providing diverse food and shelter. Typically, these areas amount to less than 5% of the landscape. Protecting these areas can be a huge benefit to all those dependent on them.

Reducing our use of household chemicals including insecticides will create healthier homes for all of us.

And we can all do what we can to personally reduce our carbon footprint and greenhouse gas emissions, the major cause of our rapidly changing climate.

So, this summer, do your own windshield survey. Our native insects are essential to our food chain and our survival. Let's do what we can to support them.

Jeff Blackwood is a member of the Eastern Oregon Climate Change Coalition, a non-partisan, non-profit organization dedicated to sharing science-based information to help our communities cope with our changing climate.