80-90

Miles east of the Rocky Mountain Front that FWP wildlife biologists have recorded grizzly bears in recent years.

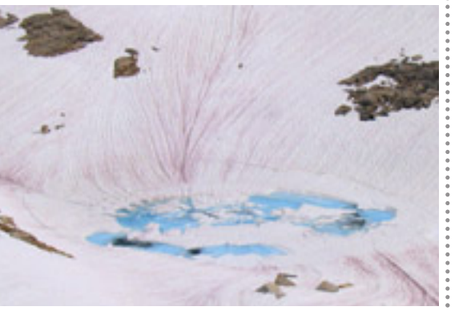
Don't eat the watermelon snow

Visitors to Glacier National Park and other high mountain areas often can't believe their eyes when they see what looks like pink or red snow on melting snowfields.

The color comes from countless one-celled algae containing bits of red pigment. According to Joe Giersch, an entomologist with the U.S. Geological Survey, the red pigment helps protect the algae from the sun's intense radiation. As the algae warms from the sun's heat, the surrounding snow melts, feeding the minuscule aquatic plant with water.

The melting snow also concentrates the algae enough to be visible as pink or red and occasionally emit a sweet scent.

This is no snow cone, however. Glacier National Park officials warn that eating snow laced with the *Chlamydomonas augustae* algae can cause stomach distress.



A bumblebee can visit (and help pollinate) 3,000 flowers each day. Bees, butterflies, and other insects pollinate almost all flowering plants and one-third of all food crop plants.

HABITAT THREATS

Insect apocalypse?

The swarms of mosquitoes in your backyard might indicate otherwise, but according to the May 2020 issue of *National Geographic*, insect populations throughout the world are seeing catastrophic declines.

"Where Have All the Insects Gone?" tells the story of a dedicated group of mostly amateur entomologists who have monitored insect abundance at more than 100 nature reserves in Germany since the 1980s. In 2014, the group, the Krefeld Entomological Society, began tracking trends over the previous three decades. What they found was alarming. For instance, in 1989, traps in one reserve collected 17,291 hoverflies from 143 species. In 2014, the traps captured only 2,737 hoverflies from just 104 species. Overall, the biomass of flying insects in many parts of Germany had declined by 76 percent, the group's analysis found.

Other entomologists worldwide are finding similar declines, and some warn that an "insect apocalypse" is under way. A global analysis of 452 species in 2014 estimated that insect abundance had declined 45 percent over the previous 40 years. In the United States, monarch butterfly numbers have fallen 80 to 90 percent in the last two decades. A study in the Netherlands showed that butterfly numbers were down by more than 80 percent over the past century. A recent study of mayflies in the upper Midwest found that populations had dropped by half since 2012.

In Montana, no one knows how the state's insect populations are faring. "Unfortunately, there's never been funding for the long-term monitoring necessary to determine trends," says Mike Ivie, associate professor of entomology at Montana State University.

Documented insect losses elsewhere, however, could be globally catastrophic if they continue. Bees, butterflies, and other insects pollinate one-third of all food crops. Renowned Harvard entomologist E.O. Wilson has said that "if insects were to vanish, the environment would collapse into chaos."

Widespread habitat loss from increasingly intensive agriculture worldwide, and the rapid increase of neonicotinoid pesticides, are causing the decline. According to a 2019 study published in the journal *PLOS One*, neonics, the most widely used pesticides on earth, kill not only pest insects but also honeybees, butterflies, and other beneficial bugs. Neonics remain deadly in the environment for up to three years.

"Plants and insects are the fabric of this planet," Scott Black, an Oregon-based invertebrate conservationist, told *National Geographic*. "We're ripping it to shreds, and we need to knit it back together." ■

CLOCKWISE FROM TOP LEFT: CARTOON BY MIKE MORAN; SHUTTERSTOCK; WIKIPEDIA

YOUTH CONSERVATION

Montana girls build app to save cutthroat trout

Four Kalispell-area students have created an app designed to help anglers protect native westslope cutthroat trout. The girls, ages 10 to 13, developed the web application as part of an after-school program called Code Girls United that teaches girls computer coding and business skills.

"We started the program in 2016 after learning that the number of women in computer science jobs since the mid-1990s has declined by 35 percent," says Marianne Smith, a former Lockheed and NASA engineer who teaches computer science at Flathead Valley Community College. Smith co-founded the all-volunteer program with six other tech and education specialists.

Through Code Girls United, students first learn to build apps using the M.I.T.-developed App Inventor. Next they form teams and choose community-related problems to tackle. "We wanted to do the westslope cutthroat because it's Montana's state fish, and Sylvia had gone on a field trip and learned that it's in trouble," says Amanda Hutchison, 13, who led her team, the Crystal Coders. Teammates are her sister, 12-year-old Trinity (both are homeschooled); Sylvia Blair, 10, of Kalispell Montessori; and Virginia Smith, 12, of Kalispell Middle School.

Adult volunteers assist the teams as they create business plans, conduct market research, develop app prototypes, and write marketing plans. "There's nothing more satisfying to me than listening to fifth-grade girls discussing competitive analysis like it's an everyday concept," Smith says.

Amanda Trinity Sylvia Virginia

The Crystal Coders' app, "Cutthroat Catastrophe," shows users how to identify pure-strain native westslope cutthroat, non-native rainbow trout, and non-native "cutbows" (cutthroat-rainbow hybrids). Montana Fish, Wildlife & Parks encourages anglers to harvest rainbows and hybrids in waters with pure-strain cutthroats to protect the species' genetics. Today, pure-strain westslope cutthroats exist in less than 10 percent of their native range.

The app includes a game for learning to identify the fish, a map showing several lakes in northwestern Montana where the trout live, and a way for anglers to share sightings of trout with other users. "This awesome app is just the type of creative thinking and can-do attitude we need to conserve Montana's native species," says Eileen Ryce, head of the FWP Fisheries Division.

The "Cutthroat Catastrophe" app is not yet available for public use, "but we're hoping to develop it to that state once we figure out how," Amanda says.

By learning about coding and business in a fun setting, the girls gain confidence using technology and presenting ideas. "Hopefully that will encourage them to take computer science and other technical courses in high school and college," Smith adds. "Then they can compete for high-paying tech jobs and be able to stay here in Montana with their families." ■

Listen to the Crystal Coders explain how their app works at youtube.com/watch?v=BBswTYwhK6Y. Visit the Code Girls United website at codegirlsunited.org.

MONTANA STATE UNIVERSITY/LUKE DURAN/MONTANA OUTDOORS

Boar's tooth or giant's nose?

When Lewis and Clark set out for the Pacific in 1805, they carried a rough map produced two years earlier by Washington, D.C., cartographer Nicholas King, who based it on native peoples' knowledge of the region. The map showed only five landmarks in what is today Montana. All five are located between Choteau and Helena along a route now known as the Old North Trail, where people had traveled for thousands of years. The map's southernmost landmark, "Boars Tooth," is along the Missouri River a few miles north of today's Helena. This landmark is clearly visible as you drive through Sieben Flats on U.S. Interstate 15. If or when you pass this massive rhyodacite protrusion now known as the nose of the Sleeping Giant, imagine not only the Corps of Discovery members poling their boats up the Missouri on the other side of the landmark, but also the indigenous travelers guided by the "tooth" as they followed this ancient route between Canada and Mexico.