'Benchmark glaciers' shrinking at faster rate, study finds

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Climate change is shrinking three of the nation's most studied glaciers at an accelerated rate, and government scientists say that finding bolsters global concerns about rising sea levels and the availability of fresh drinking water.

Known as "benchmark glaciers," the South Cascade Glacier in Washington state, the Wolverine Glacier on Alaska's Kenai Peninsula and the Gulkana Glacier in interior Alaska all have shown a "rapid and sustained" retreat, according to a report by the U.S. Geological Survey that was released Thursday.

"They are living on the edge," Ed Josberger, a USGS scientist based in Tacoma, Wash., said of the three glaciers. "We've crossed a threshold, and these glaciers along with those globally are shrinking."

For years, scientists have reported that glaciers around the world are melting, but the study offers some of the most definitive evidence to date. Because the three glaciers are in different climates and elevations, they can be used to help understand thousands of other North American glaciers.

At the beginning of the 20th century, when glaciers were at their last peak in terms of size, the mass, or volume, of the remote South Cascade Glacier was estimated to be half a cubic kilometer, or about 654 million cubic yards. By 1958, it had shrunk to half that size. The latest measurement, in 2004, found that it had shrunk by half yet again.

"We are getting warmer, and glaciers are shrinking," Josberger said.

With some exceptions caused by unique or unusual local conditions -- the glaciers on California's Mount Shasta, for example -- more than 99 percent of the country's thousands of glaciers are shrinking, said Bruce Molnia, another USGS scientist.

USGS scientists have been taking measurements and detailed pictures of the three glaciers in the study since 1957, including using ice-penetrating radar to map the bedrock beneath them. The studies, begun as part of the International Geophysical Year, were part of a Cold War-era interest in polar science spurred by the threat of war with another polar nation, the Soviet Union.

The result is a half-century's worth of data to use for modeling future changes, said Shad O'Neel, one of the USGS scientists based in Anchorage, Alaska, who worked on the study.

"These three glaciers have been losing mass since they've been studied, and that mass loss has gotten more rapid in the past 15 years," O'Neel said. "The most important thing about having a long record like this is that we can use these records to verify and validate models out into the future."

Although their data show a marked retreat in the sizes of the glaciers, changes to Alaska's many glaciers are also visible to the naked eye, O'Neel said. Gulkana Glacier is "markedly different than it was in the late 1980s," he said.

Worldwide, most glaciers are losing mass, and some are disappearing. Glacier National Park's namesake glaciers in Montana decreased from 150 to 26 over the past 99 years, and if current warming trends continue, scientists predict, they'll disappear entirely by 2030. Scientists also have

predicted that the famed snows of Africa's Mount Kilimanjaro could retreat by 2015.

Scientists at the USGS's Northern Rocky Mountain Science Center, who study the glaciers in Montana, point out that a drop in runoff means changes in water temperature for the creatures in the downstream ecosystem: insects, fish and the animals that eat them.

It also means less available drinking water, O'Neel said, pointing out that Anchorage's drinking water is derived from runoff from Eklutna Glacier. There's little threat to Anchorage's water supply, but Bolivia's Chacaltaya Glacier disappeared this year, earlier than predicted. Its disappearance worries scientists that other glaciers in the region could be melting faster than expected, potentially threatening water supplies for millions of people in South America.

The long-term study is "exactly the kind of science we need to invest in to measure and mitigate the dangerous impacts of climate change," Interior Secretary Ken Salazar said.

ON THE WEB

The USGS study: pubs.usgs.gov/fs/2009/3046/

Glacier National Park: www.nps.gov/glac

Northern Rocky Mountain Science Center: www.nrmsc.usgs.gov/research/global.htm

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