

Teams search for clues about ancient, recent fires

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Greg Pederson, left, of the U.S. Geological Survey and Tony Harwood from Confederated Salish and Kootenai Tribes Tribal Forestry prepare to take tree ring cores in the Mission Mountains on the Flathead Indian Reservation. Credit: Dave McWethy

On a quest to learn more about fires in the Northern Rockies, Montana State University, Salish Kootenai College and federal researchers are

looking to the trees, lakes and oral tradition for insights they can share with land managers.

David McWethy of MSU is now leading a team of students sampling sediments from several lakes on the Flathead Indian Reservation. At the same time, Rick Everett of SKC is leading a group of students collecting [tree rings](#) and fire scars.

The charcoal, pollen and other materials they expect to find in lake sediments will speak to the frequency and timing of ancient and recent fires, much like they have done in other MSU studies in Yellowstone National Park, New Zealand, Tasmania and elsewhere in the world, said McWethy, a Montana Institute on Ecosystems Fellow and paleoecologist in MSU's Department of Earth Sciences.

Tree rings and fire scars will reveal when fires occurred, how severe they were and information about what the climate was like during the life of the tree, said Everett, the overall project leader and a forestry professor at SKC.

The goal, according to the team, is to prepare for the future by reconstructing the past. They hope the lessons they learn from ancient and recent fire management will help land managers determine how management and restoration might best reduce the risk of hazardous fire activity while promoting the long-term resilience of native coniferous forests of the northern Rockies.

Working in conjunction with the Confederated Salish and Kootenai Tribes Tribal Forestry and Cultural Resources, the research team chose study sites with mixed-coniferous forests (primarily Douglas fir and Ponderosa pine) that hadn't been logged or disturbed by human activities, but contained individual trees that were scarred by fire. They looked for [forest](#) sites that could be paired with a lake where sediments

could be analyzed to add a much longer history of fire. Mixed-coniferous forests and their fire regimes are poorly understood in North America, Everett said.

After collecting [lake sediments](#), tree rings and fire scars, the research team will compare their findings with oral tradition about fires in the region.



Dave McWethy and Hannah Funke sample lakebed sediments on the Flathead Indian Reservation. Credit: Rick Everett

"The need for information is particularly compelling on tribal lands, where tribal members and forest managers have a strong interest in preserving historical continuity and incorporating traditional knowledge

in management strategies, Everett said.

The two-year project is funded by a USDA National Institute of Food and Agriculture Tribal Colleges Research Grant. Collaborating with McWethy and Everett are Emily Heyerdahl from the USDA Forest Service Rocky Mountain Research Station Fire Sciences Lab in Missoula, Greg Pederson from the U.S. Geological Survey in Bozeman, and 12 tribal students.

"There is a critical need to better understand the historical context for applying fuel treatments intended to reduce fire risk in mixed forest types across the western U.S., and to identify management strategies that may support resilient future forests," McWethy said.

By fuel treatment, he referred to methods of reducing fuel for fires, McWethy said. Managers might thin a forest by removing large diameter trees, for example. They could use prescribed burns to remove shrubs and grasses.

"Understanding what happened in the past under different conditions gives us an idea of what's going to happen in the future," he summarized.

Heyerdahl, a USDA research forester, said in the team's research proposal that land management agencies across the United States have started grand efforts to improve forest resiliency, reduce fire risk and reduce fuel, but they are missing historical context.

"Most fire history information comes from a narrow range of forest types, characterized by low-severity surface fires, and most of the supporting research has been undertaken on public lands," Heyerdahl said. "In contrast, our understanding of disturbance and stand dynamics in mixed-severity [forest types](#) is still rudimentary, despite the fact that nearly half of all acres targeted for fuel reduction and restoration on U.S.

federal lands occurs within forests that are broadly classified as such. Furthermore, little is known about the impact these fuel treatments have on forest ecosystems."



Written on this tree ring is the sample number and name of the site (Hellroaring) where it was obtained in the Mission Mountains on the Flathead Indian Reservation. The lines indicate the general location of fire scars within the tree. Credit: by Dave McWethy

The unique collaboration that joins a university, tribal college and federal agencies should produce that context, Heyerdahl said. The researchers added that the collaboration is valuable, because of the research it will yield and the relationships it cements.

"This work really formalizes a growing relationship that has occurred over the last three years between SKC, MSU, the USGS and the Rocky Mountain Research Station, forming a network for both engaging our undergraduates with leading researchers in the region and expanding the college's (SKC) research capacities in forest and fire ecology," Everett said.

"As program director of a new option with our bachelor of sciences program in Forestry, Wildland Fire Science, this also opens up lines of communication between my program and researchers performing applied works in fire sciences and both forest and fire ecology," Everett said.



Greg Pederson of the U.S. Geological Survey examines a tree ring core from the Mission Mountains on the Flathead Indian Reservation. Credit: Dave McWethy

McWethy – whose collaborations also include a project in Lebanon – said the group will not only learn about [fire](#) management in the Rockies, but its findings could add to the knowledge about the increasing incidence of large fires in the world.

"An increase in large fires is a global phenomenon," McWethy said. "Although we've had large fires in the past, they didn't affect people as much because there were fewer people across landscapes in the western U.S."

Provided by Montana State University

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