Western researchers study wildfires in Siberia

Aspect of climate change focus of effort

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Special to the Times

Courtesy
Western faculty member Jennie DeMarco is pictured conducting research in Siberia.

Researchers attempt to protect themselves from an onslaught of bugs in the wet environment.

Gunnison and Siberia are similar in their climates, but some say the way you know you're in Siberia is by how much bug spray you find yourself wearing.

Jennie DeMarco, a soil scientist and faculty member in the School of Environment and Sustainability at Western Colorado University, compared the location of her research in Siberia to Gunnison by their quickly changing weather patterns.

"Alpine systems here in Colorado are not too different from arctic systems in Siberia," DeMarco explained. "Both are extreme ecosystems that are 'living on the edge' of their range and are vulnerable to changes in climate and disturbances such as forest fires."

As part of a research team that includes collaboration with four universities across the United States, Western students and DeMarco found themselves sleeping on a barge drifting down the Kolyma River in Siberia. Their purpose was simple: collect soil samples from burned sites onshore and get a little muddy while they were at it.

In the Siberian arctic there are few roads, so the rivers are used as a main source of travel and a way to access burned forests. The strategic sampling from different sites would allow a better understanding of what is occurring in the arctic.

These frigid regions, such as in Siberia, are home to some of the most unique carbon-filled soils in the world. The soils below the surface freeze over, creating a frozen environment called permafrost. The permafrost stays frozen year-round and sequesters huge amounts of carbon dioxide — as much as twice the amount that is in our atmosphere today.

Wildfires come through these territories and alter the albedo, or reflectiveness of the ground. With burns happening more regularly, darker ecosystems become increasingly abundant and absorb more sunlight and heat.

It is unclear if the forests will change from the fires or if the same tree types will return. A different species could alter the soil temperature and permafrost of these forests. This is what DeMarco and her research team are in Siberia to find out: Will the forest return following fire and how much carbon will be lost in the process?

As the arctic begins to warm, the permafrost begins to thaw. This causes the stored carbon dioxide to be released back into the atmosphere, which in turn thaws more permafrost and then releases more carbon dioxide.

This is a positive feedback loop, where one action builds off of another to create a cycle of continual warming. This affects everyone; what happens in the arctic, does not stay in the arctic.

In order to study the phenomenon, DeMarco applied for and was awarded a $165,000 grant from the National Science Foundation, which funds her and a graduate student from Western to complete research in the Siberian arctic over a four-year period.

Aaron Lewis, a recent graduate of the Master of Environmental Management (MEM) program at Western, had the opportunity to join DeMarco last summer in Siberia. He noted that although their days were spent in mosquito-infested mud pits, "It simply was profound to travel to one of the seemingly most untouched places on the planet and to bear witness to climate change's grasp."

"Nowhere is safe," Lewis continued. "And I feel honored to have worked with these scientists — to wake up each morning, prepare for the field, navigate our way to the next fire, establish our study sites, and just go to work."

Clark Thompson, a recent graduate in Communication Arts at Western, also joined Lewis and DeMarco in Siberia last summer. Lewis and Thompson are currently finishing a documentary about the experience of conducting research in the Siberian arctic.

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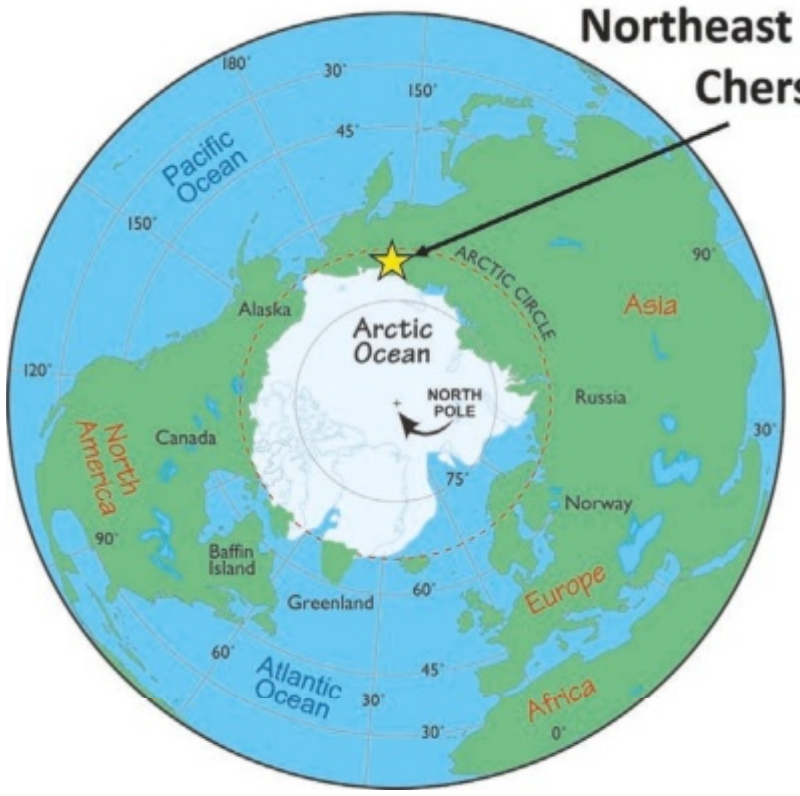

This map shows the location of the group's work.

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Looking at DeMarco's "Rite in the Rain" field notes, you'll observe bugs and blood marks squished between the pages to confirm the abundance of mosquitoes. But to her, the mosquitoes are just a part of the ecosystem — nothing that will hinder data collection.

DeMarco has a passion for these unique and extreme ecosystems. That passion is necessary, she said. It's what drives scientists to continue in the face of many challenges and unforeseen circumstances that come with traveling to another country for research.

DeMarco shared a particularly difficult day in which she and her team had to change the location of their soil sampling due to flooding. The area they had originally planned on visiting was under multiple inches of silt which made it difficult to get to the soil.

Now preparing for her second year of research in Siberia, DeMarco is anticipating sampling more burn sites to look at changes that are occurring in the forests and to potentially set up future models. Joining the team this year will be second-year Western MEM student Jill Young.

Young loves learning almost as much as DeMarco loves soil and is eager for the opportunity to work with local researchers in the arctic in order to aid in environmental management and sharing the lessons to promote better science communication.