

SCIENCE BEYOND

Decades of devotion to the Crown of the Continent

BY KELSEA HARRIS-CAPUANO | MISSOULA, MONTANA

DURING GRADUATE SCHOOL, Erin Sexton ran around a ranch in southwest Alberta, Canada, with her fellow classmates pretending to be ranchers and wranglers. But their fun was cut short at the sight of a cow starting to froth at the mouth. Snorting and heaving, it laid down and died in the pasture.

Sexton was on a six-week Crown of the Continent tour looking at environmental challenges of the region up close. Known as one of the most diverse intact ecosystems on the continent, the Crown of the Continent region encompasses more than 10 million acres that include part of the Rocky Mountains where Alberta, British Columbia and Montana meet.

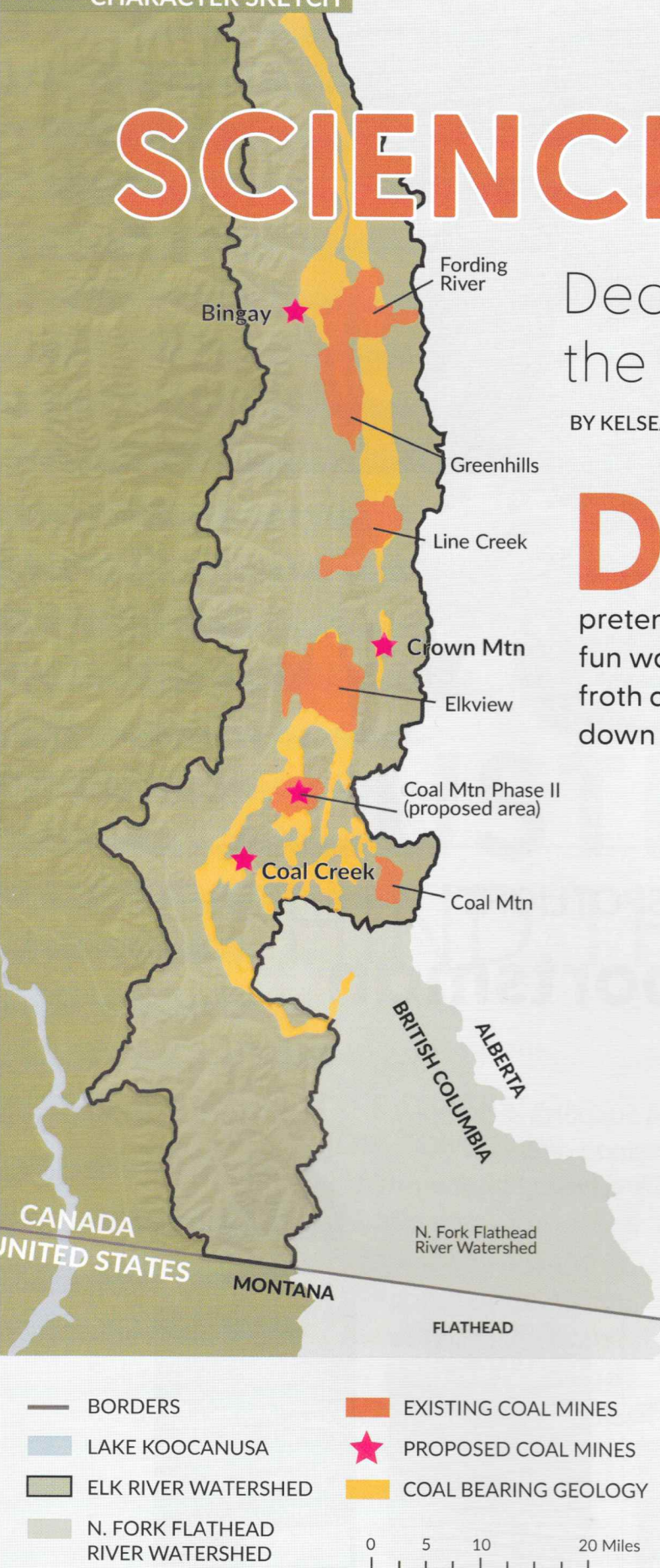
The ranch sat next to a gas plant under the shadow of the Canadian Southern Rockies. Gas plants clean raw natural gas to make it usable. One of the byproducts of the process is sulfur dioxide, an airborne toxin. Even short-term exposure can affect respiratory system function. The ranch was one of the last in the area that hadn't been sold off to the Shell Corporation for development. And the cows were paying the price.

It's been more than 20 years since Sexton saw that cow die. "That experience really struck me," said Sexton.

That ranch experience and Crown of the Continent tour deeply connected Sexton with the landscape and sparked her interest in environmental issues that cross human-made boundaries. Sexton, now a senior research scientist at the Flathead Lake Biological Station (FLBS) in northwestern Montana, is still a champion for complex transboundary issues. And she's dedicated most of her professional career to using science to help inform policy and decision-making and protect the environment.

PATH TO SCIENCE

Sexton has an easy but confident presence — it's a self-assuredness that suggests she's used to talking about science and explaining her work. She usually sports a pair of dangly silver earrings that peek out from long dark hair that has streaks of gray.



BOUNDARIES

Growing up in Salt Lake City, Sexton skied, hiked and backpacked all over Utah. Then she went to college at the University of California, Santa Cruz, longing for an ocean experience. Loving natural history courses and time in the field, environmental studies and biology seemed like a natural fit for her undergraduate studies.

After graduating in 1999 with a B.S. in biology and a B.A. in environmental studies, Sexton started working field jobs, like studying bird mortality rates on some of the early wind farms and surveying the endangered spotted owl in the Southwest.

She laughed while recounting one of her jobs tracking the endemic and endangered Hawaiian honey creeper on the big island of Hawaii. It involved spending her days running around a volcano trying to find the small finch-like birds.

Those early jobs strengthened Sexton's desire to use science for applicable problem solving and decision making. But she quickly realized that the path from science to decision making isn't straightforward.

The spotted owl, a fairly well-known symbol of controversy during the 1990s, was a great example of this. The data Sexton and fellow scientists found was clear. The habitat of an endangered species was being destroyed by the timber industry. Enter forest management, industry interests and politics, and things quickly got complicated.

"In reality there are several more steps between scientific evidence and management outcomes," said Sexton. "Having that good data doesn't guarantee a protective management decision."

RESEARCHING THE NORTH FORK FLATHEAD

Quality science is important. In graduate school, Sexton became interested in studying the East Kootenay coal fields that underly both the North Fork Flathead River Basin and the nearby Elk Valley. She realized there was little to no scientific data about the region.

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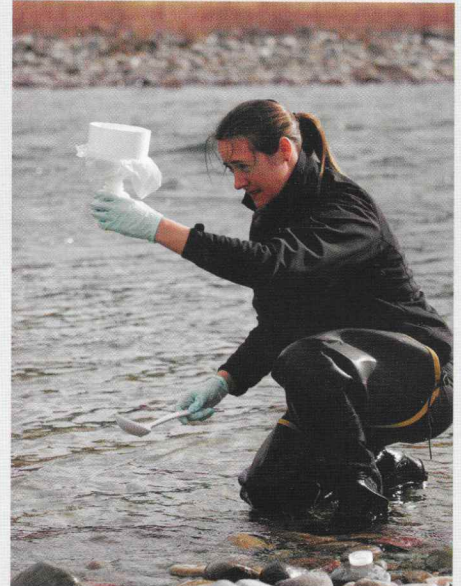
Known as the Flathead River in Canada, the area is referred to as the North Fork Flathead in the U.S. That's because the Flathead has three named headwater tributaries; two lie within the U.S. and start within wilderness areas, while the North Fork lies partly in Canada.

The nearby Elk Valley has a decades-long history of coal mining development, and Sexton wanted to know what would happen to the North Fork Flathead if it, too, was developed for mining.

The North Fork Flathead is undeveloped and considered to be a pristine river ecosystem with high water quality and ecological diversity and remains that way today. When the North Fork Flathead River crosses into the U.S., it forms the northwestern boundary of Glacier National Park.

Shortly after Sexton graduated from the University of Montana with her master's degree in 2002, Canadian mining company Teck Resources proposed coal bed and mountain-top removal mining gas development in the East Kootenay coal fields. The proposal included putting a coal mine in the Flathead where Sexton conducted her graduate research. After she finished her degree, she kept working in the area as a transboundary science coordinator, hired by the National Parks Conservation Association.

"I threw all of my time into figuring out what mining in the Flathead would mean," said Sexton.



Erin Sexton conducts sampling in the headwaters of the Flathead River in British Columbia. Photo by Ronni Flannery

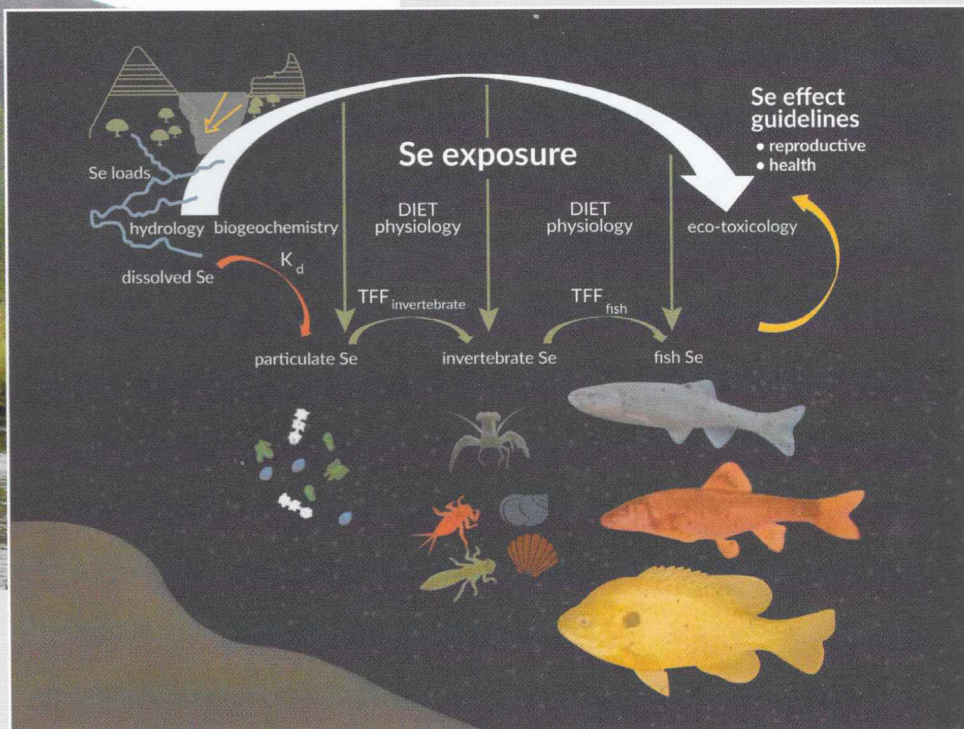
The Flathead and Elk Rivers sit within Ktunaxa Nation territory, a Canadian First Nation tribe. Downstream from the Flathead are the Confederated Salish and Kootenai Tribes (CSKT), the Kootenai Tribe of Idaho and Glacier National Park. Sexton collaborated with many interested parties including representatives from Glacier National Park, Montana Fish Wildlife & Parks, the U.S. Fish and Wildlife Service, the CSKT and the Ktunaxa Nation.

The headwaters of the Elk and North Fork Flathead Rivers that start in British Columbia are both part of the Columbia River system. Underneath those headwaters are high quality metallurgical coal (or coking coal) deposits. Steelworkers need metallurgical coal with its high carbon content to create coke, ideal for steelmaking. More than 70 percent of the world's steel is produced using coal.

Canada's mining sector has long been interested in the mining potential of the North Fork Flathead. Teck owns five open pit coal mines in the nearby Elk



Sexton recording data downstream of one of Teck's mine waste rock piles.
Photo by Casey Brennan



Valley, and four are still active. The valley is North America's largest coal-producing region. Close to 40 percent of the world's steelmaking coal currently comes from the East Kootenay coal fields.

Open pit coal mining became popular in the 1970s. The process involves blasting off the top of a mountain or surface area to expose the coal underneath. Tons of waste rock is excavated and usually dumped in nearby valleys, leaching contaminants into local water sources.

In their proposal, representatives from the Canada-based Cline Mining Corporation argued that they could mine the North Fork Flathead Basin without any significant impact on the fishery, wildlife and downstream ecosystems.

But concern grew over the potential impact a mining development in an untouched basin would have on the Crown of the Continent ecosystem and surrounding areas. Sexton said she was baffled by Cline's statement. How could Cline representatives demonstrate that their mine would have no impact without data on the region?

"If you don't know what your baseline condition is, how can you possibly claim that you'll have no impact on the environment?" Sexton said.

BUILDING A TEAM

Sexton worked for the National Parks Conservation Association for two years

before joining FLBS as a research scientist so she could do more field work. Sexton said that joining FLBS was an easy move, and it felt like a perfect fit for the work she wanted to do.

Backed by Montana legislators and federal congressional delegates, Sexton collaborated with agencies to raise \$3 million over three years to fund data collection in the North Fork Flathead Basin and Elk Valley.

With this funding, Sexton hired interns at FLBS and worked with volunteers to collect water samples every summer from 2005-2011.

"I have a photo of a friend putting monitoring probes in the stream, with Coal Mountain mine right behind him in the background," said Sexton, a smile in her voice. "All of this work has always been an effort of so many."

Along with collecting water samples from the North Fork Flathead, Sexton and her team worked as close to the mines in the Elk Valley as they could — collecting water samples from all the major tributaries immediately downstream from the mine's runoff.

Her team also took water samples from the headwaters of the Elk River, which is part of the Canadian Rockies on the continental divide punctuated by mountain peaks and vast landscapes with high mountain lakes.

"It was really amazing work to do, drive across the international boundary, deep into British Columbia, and collect all this water quality data that I knew didn't exist," said Sexton.

Sexton and her team gathered data on water quality, fisheries and macroinvertebrates, (animals lacking backbones), all indicators of ecosystem health.

Heavily impacted from years of development, the Elk River showed increased levels of selenium, nitrates, sulfates and cadmium — all byproducts of mining.

In contrast, her team discovered that the North Fork Flathead Basin showed almost no inputs from unnatural or manmade sources. It was a healthy and unimpacted system.

SCIENCE GUIDES POLICY

Sexton's years of research made her an expert on the North Fork Flathead and transboundary mining issues in the region. During that time, she became a scientific advisor to the state of Montana and worked closely with the Montana Department of Environmental Quality (DEQ), Department of Natural Resources and Conservation and natural resource advisors in the governor's office.

She not only had the role of a field scientist, but also wore the hat of advisor and science communicator.

"There are such politically contentious issues at every turn," said Sexton. "Every scientific question had a political consequence. Whenever these political discussions were taking place, everybody needed to have the science right in front of them."

Collaborative scientific work along with significant political pressure led to Montana, British Columbia, the CSKT and the Ktunaxa Nation to sign a memorandum of understanding (MOU) in 2010. The MOU prohibited the mining of oil, gas and coal in the British Columbia Flathead and the North Fork Flathead River Basin in Montana.

Following the MOU, British Columbia's legislature passed the Flathead Watershed Conservation Act in 2012. Similarly, the U.S. passed the North Fork Watershed Protection Act in 2013 to protect the watershed from energy development.

The closeness of two well-loved national parks, Glacier and Waterton Lakes, helped push the protective legislation on both sides of the border.

Through her journey, Sexton learned a lot about the U.S. and Canada's political landscapes. She said the experience gave her a crash course in environmental and international law, which she felt was necessary to understand the best way to make her science applicable.

Similar to her experience early in her career with spotted owls, Sexton found herself up against significant barriers between scientific evidence and protective management decisions.

"If you want to have impact with your science, you have to understand the decision-making landscape that you're in," said Sexton.

Having a hand in passing protective legislation for the North Fork Flathead Basin on both sides of the border felt like a real victory.

But Sexton's fight wasn't over. She turned her attention to the nearby Elk Valley, where mining pollution was making its way across the border and impacting downstream communities and ecosystems.

ONGOING BATTLES

About six years ago, British Columbia granted Canada-based mining company Teck Resources a permit to expand several of its mines in the Elk Valley.

As Sexton now focused her efforts on protecting the Kootenai watershed, she

wondered what kind of protection could be accomplished. With a strong established mining industry in the region, this was a completely different beast.

The Elk River is a main tributary of the Kootenai. The Kootenai River flows through three tribal nation territories and two U.S. states before heading back into British Columbia and ending up in the Columbia River.

Of the contaminants Sexton found in the Elk River, she said the increased levels of selenium were most concerning. Selenium is an essential element most people get through diet. It's found in some nuts, a variety of seafood including a lot of salt and freshwater fish, and some grains.

But the window between a healthy and unhealthy level of selenium is very small. Higher levels of selenium cause reproductive failure and deformities in wildlife.

Joe Skorupa, an environmental contaminants specialist for the U.S. Fish and Wildlife Service for more than 35 years, has witnessed firsthand what toxic levels of selenium can do to wildlife. In fish, he's seen stunted growth, deformities of the spine and missing gill plates (a bony flap that protects the gills and aids in breathing). And in birds, eggs that failed to hatch, malformed wings, and in extreme cases, brains that developed outside of the skull.

Skorupa's expertise is in selenium pollution, and he's defended his science in court nearly two dozen times over the years. He stresses the importance of a solid scientific process to address pollution problems. He's followed the Elk Valley pollution problem and admires Sexton's work.

"Erin Sexton is one of the good guys in this whole process," Skorupa said. "She's a scientist working in the public's interest."

And Sexton is one of the longest standing professionals in the selenium pollution conversation, which she says is both fascinating and hard for her. She's built relationships and watched people come and go (including three Montana governors) since she started working on protecting Crown of the Continent watersheds.

FRUSTRATION AND PATIENCE

Sexton became more familiar with international and environmental law over the years, and she said it was a shock to learn about the mine permitting process in

British Columbia and the differences in environmental assessment and protection on the two sides of the border.

In their environmental assessment processes for mining permits in British Columbia, government officials don't require environmentalists look at impacts to an entire ecosystem. Sexton said that for each permit, Teck would limit the scope of its assessment by drawing a circle or square geographically that ignored the potential impacts downstream or across the international boundary.

"I've always had this fundamental issue with that, it's inherently opposed to how we know rivers work," Sexton said.

Sexton has actively participated in Teck's many environmental assessment processes, which are part of acquiring mining permits. The processes have left her frustrated by the lack of objectivity as well as the

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exclusion of impacted parties in the decision making.

During a two-year environmental assessment from 2012-2014 for one of Teck's mine expansion proposals, Sexton traveled around Canada attending meetings in British Columbia, Vancouver and Alberta.

One meeting in particular stood out to her. Teck was front and center, while some parties, including the CSKT, were relegated to "observer" status. Observers were even physically distanced, placed at a table behind the committee.

"The tribes, the first people on the landscape, were relegated to observer status. And then you have industry up front leading the process," Sexton said.

Sexton was deeply offended by that particular meeting and its colonial feel. But despite the negative experience, Sexton said she would rather keep showing up to the table to fight for the Crown of the Continent than not participate at all.

"It's in our backyard, our watershed and it is a shared landscape," she said. "I'm deeply concerned."

In 2012, U.S. officials listed Lake Koocanusa, a manmade reservoir located about 60 miles downstream of the Elk Valley Mines, as threatened under Environmental Protection Agency (EPA) standards. The lake straddles the border of Montana and British Columbia. Scientists from both sides have worked collaboratively to address the selenium pollution from the coal mines.

But the Teck mines in the Elk Valley have had minimal environmental oversight. Selenium levels, along with other contaminants, have increased over the years.

Lars Sander-Green, who works for Wildsight, an environmental non-profit based in southeast British Columbia, said that this is largely because British Columbia's government has been hesitant to set regulations that protect the environment. Regulations that do exist aren't enforceable or enforced at all. Sander-Green said that in the case of Teck mines in the Elk Valley, the lack of regulation has to do with coal's contribution to the economy and Teck's political power. In 2013, outside of its revenues from coal extraction, the Elk Valley coal operations spent more than \$1 billion on goods and services in British Columbia.

"There's a lack of political will from the [British Columbian] government to deal with this problem," said Sander-Green.

Sander-Green said that another problem with the current regulation process is that Teck provides their own science. The law doesn't require the science to be independently verified. Teck officials can set their own limits based on how much pollution their company researchers say is safe, then they're allowed to monitor their own compliance.

Currently selenium levels are monitored under the Elk Valley Water Quality Plan, which was approved by the British Columbian government in 2014. Under this plan, Teck can continue mining as long as the company is working towards a long-term plan to stabilize selenium levels by 2023 and reduce levels after 2030.

Failure so far to make significant headway in stabilizing or reducing selenium in the valley's waterways hasn't stopped British Columbia from granting the company operating permits.

MONTANA STEPS IN

Downstream at Lake Koocanusa, Montana officials are collaborating with their Canadian counterparts to protect the shared lake. Montana DEQ's Board of Environmental Review had a special

meeting near the end of September 2020 to discuss implementing criteria for selenium levels in the reservoir before the year's end.

Montana is considering setting a lower standard than the EPA regulation in favor of a site-specific one. The current national EPA standard for lakes or reservoirs is 1.5 micrograms per liter. The DEQ has recommended 0.8 micrograms per liter, a level that scientists think will best protect Lake Koocanusa's ecosystem.

Setting and monitoring selenium levels is complicated. Selenium accumulates in animals as it moves through the food chain. How this happens can differ site-to-site depending on wildlife type, diet and water characteristics. The proposed standard was developed based on the unique characteristics of Lake Koocanusa.

Montana's Water Policy Interim Committee (WPIC) also met and discussed the proposed rule-making process and standards.

Recent meetings included long and robust public comment and discussion. Sexton and others argued for the need to protect the shared watershed and spoke to the integrity of the scientific process. Others said there needs to be accountability outside of British Columbia.

Several attendees opposed stricter regulations, though. Vicky Marquis, a lawyer representing Teck, argued that the science wasn't sound. Others like Montana Sen. Mike Cuffe said the process was rushed, and the science didn't show an immediate threat. Still others didn't see the point of a regulation that couldn't be enforced upstream across the border.

After a virtual public hearing in November, the DEQ's Board of Environmental Review will vote on the proposed rule by the end of the year. When the Montana state legislature reconvenes in 2021, lawmakers can allow the rule to stand or vote it down.

In Sexton's opinion, if the legislature rejects the proposed rule, it would unravel years of work.

Selenium levels in Lake Koocanusa exceed the proposed standard. Approving them would put Canada in violation of the International Boundary Waters Treaty of 1909 and Montana in violation of the U.S. Clean Waters Act.

Sexton said enacting the new standard would create precedent for legal action. She sees this as an exciting step forward.

Watching the cow die on that Canadian ranch all those years ago, Sexton wondered what evidence could link the dying cow to the nearby gas plant. What kind of science could hold those responsible accountable and protect the environment?

Those are questions she's still asking and answering with her work with more than two decades spent devoted to protecting the Crown of the Continent.

Sexton loves field work, but her science away from the field has had incredible impact, too. She's missed field work and still has the itch to get back out into the landscapes she loves. She would especially love to venture back into the Canadian Rockies for more data collection.

But she still gets out for adventures, sharing the Crown of the Continent with her two boys. Now that they're 12 and 10, the idea of getting back out into the field for work seems more accessible. "I spent so much time in the field in these beautiful landscapes," Sexton said. "It's why I do science."

— Kelsea Harris-Capuno is a writer, outdoor adventurer, educator and current fall OWAA intern.