

OUTDOOR ED 101

# Science rises from ashes

*California school builds curriculum around local forest*

**S**idney Deschenes is still haunted by the Moonlight Fire of 2007: The clouds of choking smoke that blew down from flaming mountains onto the valley that's been her home since kindergarten. The rain of embers that ignited spot fires near homes at the edge of the forest and forced her family to evacuate three times.

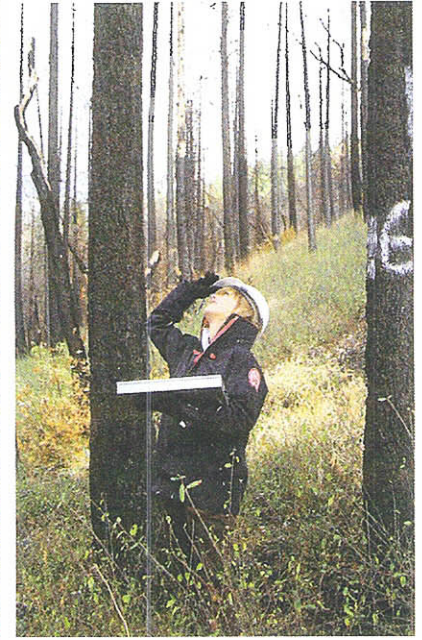
The trees were still smoldering, the air still acrid when Deschenes, a slim high school senior with a light-brown ponytail and a shy smile, first visited the 65,000-acre burn in California's northern Sierra Nevada. Shaken by the sight of mountainside after bleak black mountainside, she and a busload of classmates resolved to act. "What we really wanted was to fill up a truck with pinecones to sprout and replant," says Deschenes.

Instead, the students transformed that charred expanse into an outdoor laboratory, where young researchers could help scientists and land managers understand how forests recover from wildfires. It's part of a unique natural resources program designed to connect students to the land while imparting on-the-ground skills that could lead to careers in forest and watershed stewardship.

Greenville High, Deschenes' school, located about 160 miles northeast of Sacramento, is home to 125 seventh- through 12th-grade students. Teachers were already developing an experimental program the year before logging equipment sparked the Moonlight Fire. They wanted to create a curriculum that would help students relate their own rural landscape to the larger concepts of physics, math and literature. When the fire forced the school to close for four days, its value as a study area became obvious, explains science teacher Travis Rubke. Rubke, who graduated from Greenville in 1974, has



Greenville High School students at the site of the Moonlight Fire. At left, Haley Fox and Sidney Deschenes take snapshots from an established photo point. Below, Arantxa Olaizola records data in a snag-longevity plot. JANE BRAXTON LITTLE



helped shepherd some 40 students to the burn twice a year for the last three years: "Here was something that impacted all of the students' lives."

**O**n a bone-chilling November morning, Deschenes and sophomore Tucker Willits scramble up a steep ash-strewn slope carrying a digital camera and a small square of whiteboard. Willits writes the time, date, elevation and geographic coordinates on the board while Deschenes focuses her lens on the bare slopes that stretch from the toes of her boots all the way to the horizon. She frames the board into a corner of the picture, then clicks. "One more shot for science," she mutters with a grin. It's the fourth time in three years Deschenes has photographed this exact vista — one of five photo points selected to document landscape variations in the months and years after the fire.

Across the hillside, John Hindorff and Arantxa Olaizola tromp over loose lava rocks on a quarter-acre plot where 38 blackened trees loom like ghosts in a cemetery. Hindorff, a burly young linebacker, calls out observations to his diminutive partner, who jots them down on a clip-

board: "Number 27 — still standing. Top's gone. No bird nests. No wildlife. Fifty percent bark remaining." They move on to the next tree, eventually cataloging every one in the plot. Another group monitors vegetation in a 10th-acre-sized plot, recording standing trees by species, height and crown volume, along with every oak shoot, manzanita shrub and clump of grass. Other students document woody debris.

This data will go to Plumas National Forest, which manages most of the land affected by the Moonlight Fire. Forest Service officials helped Rubke develop the program; now, his students' findings will help establish a baseline for this part of the Sierra Nevada, says Mike Donald, a local district ranger. The data — which range from how long dead trees remain standing to how soon wildlife returns — will continue to be collected by future students and will also be valuable elsewhere, he says. Scientists have long argued over whether and how much to log burned trees, but few have tackled the process of post-fire ecosystem recovery through decades, says Jerry Franklin, a professor of forest resources at University of Washington. The work the Greenville

**"To see a boy come running up to tell you he's just seen a flicker. ... It's not just a dumb bird anymore."**

—Laurie Wann, natural resources program coordinator for Greenville High

BY JANE BRAXTON LITTLE



**Greenville High School students Geoffrey Guthrie and Sidney Deschenes get tips from Jonathan Kusel (center) on finding a photo point.** JANE BRAXTON LITTLE

High students are doing on the Moonlight Fire will help land managers understand how fire affects ecosystems over the long term, says Norm Christensen, an ecology professor at Duke University who studies fire and other forest disturbances.

Back in Rubke's science classroom, the students review what they saw on the burn, recording their observations in journals and transferring their data to computer and hard-copy files. In their technology class, they use computer spreadsheets, tables and GIS mapping software to analyze their field data. They are looking at relationships within and between their snag and vegetation plots and trying to answer fundamental questions: Why are some trees still standing and others are not? Which plants are the first to resprout? How long does it take cavity-nesting birds to return, and which species are the earliest? The students also write press releases to share their research with the local newspaper. In natural resources applications, the third of the program's core classes, they learn the fundamentals of botany by growing vegetables and fruit trees in planters constructed in the school shop. They sell the produce, using the proceeds to fund the program, which will eventually include native tree species to be planted on the Plumas Forest.

The natural resources program, now in its fourth year, includes other general curricula. English students, for example, read Pearl Buck's *The Good Earth* and Aldo Leopold's *A Sand County Almanac*. Math students learn geometry by calculating tree height, diameter and circumference. The overall goal is to use this

particular forest and this particular fire to introduce general concepts of restoration, sustainability, natural balance and working landscapes — the big-picture issues that will affect these students throughout their lives, says Laurie Wann, a business and finance teacher who coordinates the natural resources program. "This is an opportunity to explore their natural world — to not just take it for granted but ask the tough questions."

The Greenville program offers a model for other rural public schools seeking to connect students to the working landscapes that support them, and perhaps encourage them to return to the community as adults, says Jonathan Kusel, who represents the area on the Plumas Unified School District board. The program has attracted school superintendents from neighboring areas and from out of state who are interested in developing programs that link education to forest and land stewardship, Kusel says.

Despite its success, Greenville's unique curriculum faces challenges, including the threat of school closure. Like other rural schools around the country, Greenville suffers from declining enrollment and funding. Greenville is the smallest and most vulnerable of the four high schools in its district. The state program that paid for planning, equipment and field trips during the first four years has been discontinued. Recently, school district officials shuffled \$61,000 of what remains into a district-wide reserve fund instead of allocating it to Greenville's natural resources program. That has infuriated

teachers as well as students. "Here you have a school that's already challenged by issues beyond its control ... Why would you cut the artery?" says Dan Brown, who teaches math and the natural resources applications class.

Still, Brown and his colleagues remain optimistic and are already expanding the program beyond the three core classes. Working mostly within the school's general budget, they are planning advanced placement classes in natural resource science and technology. They're inspired by the excitement they've witnessed in classrooms and field trips. Students are engaged, comparing traditional Maidu Indian practices to contemporary federal forest management, challenging the value of fire suppression, and questioning the effects of public pressure on Forest Service management practices. And they're responding to what's out there. "To see a boy come running up to tell you he's just seen a flicker. ... It's not just a dumb bird anymore," says Wann.

During the three years since the fire, Deschenes has also seen the changes in her classmates, even the formerly uninspired ones, she says. "Get them out in their backyard. Give them something hands-on and they have more of a feeling for it. They retain more information. Why not use what they've grown up with to get a better education?" □

*POSTSCRIPT: Deschenes graduated last June. She is now enrolled at Arizona's Prescott College, a liberal arts institution committed to social justice and the environment.*