

BY STACIA MOMBURG

A WILDFIRE THAT COULD HAVE SPELLED disaster for Cal Poly's Swanton Pacific Ranch instead is fueling an academic renaissance, as faculty and students prepare to take an unprecedented look at the aftermath of a major blaze.

In August, the Lockheed Fire in Santa Cruz County swept through the ranch. The fire devastated 1,100 of the ranch's 3,200 acres, and the property off Highway 1 in Davenport was evacuated.

"There hadn't been a wildfire of this magnitude at the ranch since 1948," said Brian Dieterick, Cal Poly faculty member and ranch director.

The fire swept through the ranch's Little Creek watershed and across Lion's Flat Ridge, burning 92 percent of Little Creek and leaving behind a wasteland of blackened ground and fallen, burned-out trees.

Dieterick said the fire was devastating but created opportunities for students in the Natural Resource Management and Forestry Management programs to participate in once-in-a-lifetime research.

"This is an exciting time at Swanton Pacific Ranch," he said. "We have several studies planned and are looking forward to finding outcomes for fire mitigation and post-fire forest management."

When the ranch received the evacuation order at 10 p.m. Aug. 12, Dieterick followed the ranch's emergency operation plan, securing utilities and locking facilities. All ranch personnel and animals were moved to the property's shipping corral area near Highway 1, outside the evacuation area. Cal Fire worked with the Swanton team when they surveyed the land during and immediately following the fire. "They relied on our local knowledge of the area to conduct post-fire reporting," Dieterick said.

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A HOTBED OF

STUDENTS AND PROFESSORS
STUDY THE EFFECTS OF A FIRE
AT SWANTON PACIFIC RANCH

A photograph of a man in a green shirt and cap crouching in a forest of bare trees. The man is looking towards the left. The forest is filled with many thin, bare tree trunks and branches, suggesting a winter or late autumn setting. The ground is covered with fallen leaves and twigs. The word "RESEARCH" is overlaid in large white letters on the left side of the image.

RESEARCH



Cal Fire lifted the evacuation order Aug. 18. With everyone safe and sound, the Swanton crew got back to work.

Steve Auten (Natural Resources Management, 1999), the ranch's resources manager, said vegetation was still on fire.

"Stumps were smoldering, and in some cases we had to open stumps because fire burned down into the root systems and continued to burn underground," Auten said. "It was amazing to bust open a stump and have a huge plume of smoke and ash burst out."

After the fire, Dietterick received calls from federal and state agencies that study pre- and post-fire mitigation and from other universities with natural resource and forestry management and programs, including UC Santa Cruz, Cal State Monterey Bay, and Oregon State University.

"Everyone in the region that studies fire has called and asked to partner with us, because we have a forest that is easily accessed and that serves as a living lab," Dietterick said.

STUDIES UNDERWAY

Dietterick got post-fire studies underway almost immediately.

"We began with post-fire observations as we assessed damage and cleared roads," he said. "I realized we had a real opportunity for our students to learn first-hand about post-fire mitigation."

All of the studies underway will provide valuable information on post-fire mitigation practices and forest management following wildfires, Dietterick said. They include:

- a pre- and post-fire sediment erosion study
- research on tree mortality and survival based on fire behavior
- a hill-slope erosion study.

The pre- and post-fire erosion study began as a pre- and post-harvest sediment export study. From 2000-07, students and faculty studied the erosive effects that timber harvesting had on the Little Creek watershed. Researchers spent seven years creating baseline measurements for a three-year study, which began in 2008. The researchers were in their second year of the study when the Lockheed Fire ripped through the watershed.

The team regrouped, tacked the 2008 data to the baseline and shifted to begin a three-year look at erosion after a wildfire.

"We have the benefit of a comprehensive pre-fire baseline period to study post-fire events," Dietterick said. "Our initial observations show a tremendous amount of darker sediment, which indicates high level of ash – something we expected."

What the group didn't expect was a major storm that would hit the coast of California just two months after the fire. The mid-October storm dumped 11 inches of rain on the higher elevations of the ranch and about four inches in the valleys.

Following the rain, researchers found that only about an inch of topsoil, underneath the burned vegetation, was infiltrated by the rainfall.

"As a result we found that the overland water flow was quickly delivered to stream channels that created an extreme erosive effect on the channel sediment in Little Creek, thus widening and deepening the channels," Dietterick said.

Dietterick hopes to learn whether the post-fire erosion amounts are consistent with sediment export that occurs following disturbances from other land-management activities. Studying tree mortality and survival following a wildland fire

Soil samples students and faculty are using to research sediment erosion at Swanton Pacific Ranch.



is also important to the timber harvest operation at the ranch. Swanton's forest is comprised of Douglas fir, redwoods, Manzanita, knobcone pine and other varieties of trees.

The study will look at various conditions that lead to tree mortality and survival based on fire behavior. The findings could lead to changes in how the ranch manages its annual timber harvests.

Early observations found that redwoods seemed to be more fire resistant. "We believe that the redwood's thicker bark and higher moisture levels insulated the trees from the fire," Dietterick said. From the Swanton timber management perspective this was good news, because redwood timber is most valuable.

The hill-slope erosion study came together quickly as the Swanton crew prepared for the mid-October storm. "We knew the storm was coming, and we worked quickly to get nine one-meter square wood boxes set up on Lion's Flat Ridge," Dietterick said.

The study will reveal where overland water flow occurred and where the water was transported. "We're measuring the water coming off the one-meter squares, as well as the amount of sediment mass being moved," Dietterick said.

Findings will help the researchers identify sources of sediment that have might be delivered to the streams, thus determining how local salmon habitat might be affected. This could also help determine how to mitigate post-fire sediment runoff that would adversely affect the salmon population.

More studies are already underway on the working ranch and many more are planned. Next on the list is determining how to salvage the trees that survived the fire and how to manage the number of fir trees that will die as a result of it.

A FACE LIFT FOR SWANTON PACIFIC RANCH

FOR THE PAST THREE YEARS, faculty, staff and students living at Swanton Pacific Ranch have been working on a three-phase, \$1.5 million facilities upgrade.

The project, now in Phase 3, was set in motion by former Ranch Director Wally Mark and Dave Wehner, dean of the College of Agriculture, Food and Environmental Sciences.

The first phase began in 2004 and included running two miles of internet and phone conduit to the ranch and connecting it directly to the university. "It was a huge undertaking that improved our operations exponentially," said current Ranch Director Brian Dietterick.

Phase 1 also included upgrades to the bunkhouse, the conversion of the Al Smith House garage into a classroom, upgrades to the Casa Verde offices and the completion of the Little Creek House conference center.

Phase 2 of the upgrades focused on increasing classroom space and educational programs, as well as a complete remodel of the Al Smith complex. The Al Smith House carport was converted into the Al Smith Board Room. There is also an outdoor event center for special events.

Dietterick said the upgrades were necessary to help with staff retention and, more importantly, provide students with good educational facilities and opportunities.

The third phase includes building 12, two- to four-person cabins, a central comfort station and mess hall at the Staub Field Camp.

Doug Piirto, head of the Natural Resource Management Department, is pleased with the quality of the upgrades. "The team at the ranch has done an incredible job, and Dean Wehner's support of the project is amazing. We are realizing our goal, and donor Al Smith's goal, which is to provide a comprehensive living laboratory, a working ranch and quality facilities for students to experience Cal Poly's learn by doing tradition."

