

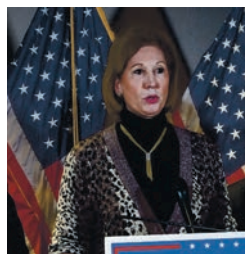
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Santa Cruz Sentinel

Partly sunny
H: 58 L: 38
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UC SANTA CRUZ

BOTANISTS ASSESS WILDFIRE DAMAGE



PHOTOS BY ARIC CRABB — BAY AREA NEWS GROUP

Survey members move across a steep hillside inside a burn zone of the CZU Lightning Complex Fire on Dec. 7, near Davenport. Students from UC Santa Cruz conducted a survey of soil conditions and plant life at the Swanton Pacific Ranch-Cal Poly to assess fire damage and recovery in the forest.

By Cypress Hansen
Bay Area News Group

DAVENPORT » Beneath a stand of badly burned Monterey pines tucked behind the coastal prairies that line Highway 1, Todd Keeler-Wolf slid down a steep, ashen hillside cradling something in his hand.

Arriving at the base of the hill with binoculars, a camera and a rangefinder swinging from his neck, he opened his soot-covered palm and showed his younger colleagues a couple of Monterey pine seeds, unharmed except for their lightly toasted wingtips.

"These seeds rained down recently when the ground was still pretty hot," said Keeler-Wolf, a retired vegetation ecologist, who explained that Monterey pines release their seeds after fires when plants that compete for light and water have burned away.

In the wake of the late summer wildfires that tore across California, Keeler-Wolf assembled a team of enthusiastic botanists from UC Santa Cruz's Arboretum and Botanic Garden to conduct one of the only post-fire assessments in the state aimed at evaluating how

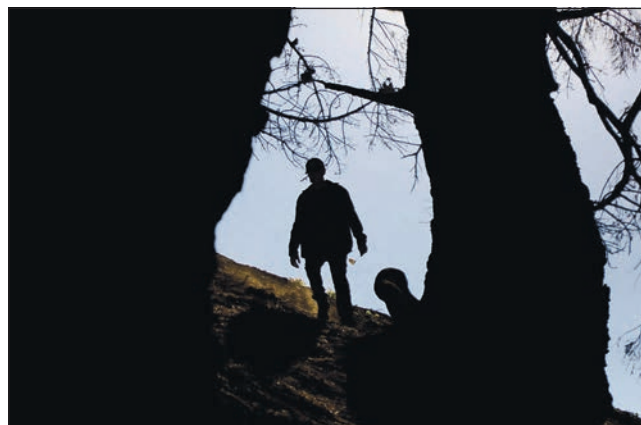
the Golden State's different plant communities respond to varying levels of burn severity.

By trudging through burn scars in the Santa Cruz Mountains, Point Reyes National Seashore and Mendocino National Forest, the team hopes to learn precisely how the wildfires burned the land and how the damage will influence future generations of plants.

"Each forest stand has different species, different properties, different fuels, different flammability, different fire cycles," Keeler-Wolf said. He said he believes it's impossible to accurately measure the severity of a fire without getting your hands dirty in the field and paying attention to the stories plants tell.

"Todd's work is great because typical fire assessments are more about fuel loads and less about species — and they're certainly not about how these plant communities are changing," said Lorraine Parsons, a vegetation ecologist at the Point Reyes National Seashore who is not currently involved in the project.

Last Monday, the scorched hillside overlooking the



Alex Hubner marks a survey site with flags on a steep hillside inside a burn zone of the CZU Lightning Complex Fire on Dec. 7 near Davenport.

highway north of Davenport was the team's first assessment plot of the day.

Tori Bauman, an undergraduate intern at the arboretum, began by pushing white flags into the ground in a 25-meter-wide circle. Bauman and Keeler-Wolf then poked around in the duff, the decaying vegetation on the forest floor.

They examined the tiny sprouts of poison oak and blackberries whose reddish green leaves stood out against the charred soil. They called out findings to Lucy Ferneyhough, the arboretum's native plant project manager, who took notes on a clipboard and made her own observations. The group examined dead branches and new growth, checking for fallen seeds and digging their hands into the soil in search of clues.

Alex Hubner, a native plant specialist at the arboretum, pulled a chunk of soil out from under a carpet of flame-roasted pine needles. Instead of the chocolate brown you'd expect healthy soil to be, his dirt clod was a pale peachy-orange and let out a metallic clinking sound when he tapped it.

BOTANISTS » PAGE 3

PANDEMIC

COVID-19 vaccines shipments arrive in US

By Martha Irvine and Morry Gash
The Associated Press

PORTAGE, MICHIGAN » The first of many freezer-packed COVID-19 vaccine vials made their way to distribution sites across the United States on Sunday, as the nation's pandemic deaths approached the horrifying new milestone of 300,000.

The rollout of the Pfizer vaccine, the first to be approved by the Food and Drug Administration, ushers in the biggest vaccination effort in U.S. history — one that health officials hope the American public will embrace, even as some have voiced initial skepticism or worry. The first of two shots are expected to be given in the coming week to health care workers and nursing home residents.

Quick transport is key for the vaccine, especially since this one must be stored at extremely low temperatures — about 94 degrees below zero. Early Sunday, workers at Pfizer — dressed in fluorescent yellow clothing, hard hats and gloves — wasted no time as they packed vials into boxes. They scanned the packages and then placed them into freezer cases with dry ice. The vaccines were then taken from Pfizer's Portage, Michigan, facility to Gerald R. Ford International Airport in Grand Rapids, where the first cargo plane took off amid what airport officials called a "jubilant" mood.

VACCINES » PAGE 4

DEMONSTRATIONS

Vandals hit Black churches during pro-Trump rallies

By Michael Balsamo and Ashraf Khalil
The Associated Press

WASHINGTON » Vandals tore down a Black Lives Matter banner and sign from two historic Black churches in downtown Washington and set the banner ablaze as nighttime clashes Saturday between pro-Donald Trump supporters and counterdemonstrators erupted into violence and arrests.

Police on Sunday said they were investigating the incidents at the Asbury United Methodist Church and Metropolitan A.M.E. Church as potential hate crimes, which one religious leader likened to a cross burning.

RALLIES » PAGE 3

POLITICS

Biden needs to build team that meets all goals

President-elect Joe Biden has a lot to accomplish in building out his administration once he becomes president. PAGE A6



PANDEMIC

California county begins door-to-door testing

Officials say a Northern California county has begun a door-to-door coronavirus testing pilot program. PAGE A6

IN MEMORIAM

Remembering the father of modern Aptos

"Mark Holcomb was one of the founding fathers of modern Aptos," said Paul Bailey, longtime resident. PAGE A2

SOCIAL MEDIA

Santa Cruz Sentinel videos on YouTube

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**TODAY IN HISTORY**

**1799**

The first president of the United States, George Washington, died at his Mount Vernon, Virginia, home at age 67.

**1911**

Norwegian explorer Roald Amundsen and his team became the first men to reach the South Pole, beating out a British expedition led by Robert F. Scott.

**1988**

President Reagan authorized the U.S. to enter into a "substantive dialogue" with the Palestine Liberation Organization, after chairman Yasser Arafat said he was renouncing "all forms of terrorism."

**2005**

President George W. Bush defended his decision to wage the Iraq war, even as he acknowledged that "much of the intelligence turned out to be wrong."

**2012**

A gunman with a semi-automatic rifle killed 20 first-graders and six educators at Sandy Hook Elementary School in Newtown, Connecticut, then committed suicide as police arrived; the 20-year-old had also fatally shot his mother at their home before carrying out the attack on the school.

**Birthdays**

Singer-actor Abbe Lane is 89. Entertainment executive Michael Ovitz is 74. Singer-musician Peter "Spider" Stacy (The Pogues) is 62. Actor Cynthia Gibb is 57. Actor-comedian Michaela Watkins is 49. Actor Vanessa Hudgens is 32. Rock/R&B singer Tori Kelly is 28.

**Star report**

**Jerry Seinfeld shares comedy bits in new book**

Jerry Seinfeld ushers fans to tap into his new book, sharing 45 years of comedy bits. The most valuable things Seinfeld owns are the thousands of pieces of paper — yellow, scribbled over, sometimes crumpled — that for years he's been cramming into those brown accordion folders that were once a staple of storage until something better came along called the laptop computer. They contain the jokes Seinfeld has been writing and telling since that first day he walked into a New York nightclub as a 21-year-old wannabe comic who accepted free hamburgers in lieu of a paycheck. — The Associated Press

**LOTTERY**

**SATURDAY'S WINNING NUMBERS**

**Daily 3 Afternoon:** 0, 1, 5

**Daily 3 Evening:** 9, 7, 0

**Daily 4:** 6, 4, 9, 8

**Fantasy 5:** 21, 28, 32, 33, 36

**Daily Derby**

**1st:** 5, California Classic

**2nd:** 4, Big Ben

**3rd:** 8, Gorgeous George

**Race Time:** 1:46.53

**SUPER LOTTO PLUS**

**Saturday's drawing:** 1, 13, 24, 26, 39

**Mega Number:** 17

**Wednesday's estimated jackpot:** \$15 million

**MEGA MILLIONS**

**Friday's drawing:** 19, 31, 37, 55, 67

**Mega Number:** 25

**Tuesday's estimated jackpot:** \$291 million

**POWERBALL**

**Saturday's drawing:** 17, 54, 56, 63, 69

**Mega Number:** 20

**Wednesday's estimated jackpot:** \$287 million

**Botanists**

**FROM PAGE 1**

The dirt had been vitrified, literally turned into glass, much like how a kiln turns clay into ceramic dishes. "What we can say from this is that the fire stuck around here for a while," Hubner explained. "It burned hot and it burned long enough to completely remove any organic matter and chemically alter the soil."

Because the scientists couldn't be there when the fires burned, they rely on evidence like baked dirt and freshly fallen seeds to determine exactly how ferocious the blaze was as it spread across the landscape. Some spots burned so hot that the only evidence of entire trees are underground tunnels where their roots had been. "It's like someone snapped their fingers and the tree was gone," Hubner said.

**Fine details**

But a wildfire isn't typically a wall of flames that bulldozes everything in sight. Vaporized trees "will be right next to a patch of entirely unburned terrain," Hubner said. Understanding why that happens and how different plants resist or succumb to fire offers greater insight for prescribed burns and predicting mudslides.

Hubner said he hopes that getting a more granular picture of how an ecosystem burns will help land managers and researchers know what to expect as they shift their stewardship practices away from fire suppression. Repeated mild burns, he said, prove helpful in controlling invasive species and promoting a diverse understory, the layer of vegetation beneath a forest's main canopy.

While Hubner examined tiny seeds under a magnifying loupe he keeps on a chain around his neck, others in the group of eight excitedly shared their plant discoveries, calling out Latin names such as Toxicodendron diversilobum (Pacific poison oak) and Baccharis pilularis (coyote brush).

When the team members finished its analysis of the Monterey pine stand, members jumped



CYPRESS HANSEN — SANTA CRUZ SENTINEL  
Todd Keeler-Wolf examines Monterey pine seeds.



JANE TYSKA — BAY AREA NEWS GROUP  
Burn scars from the CZU August Lightning Complex fire are seen from this drone view along Highway 1 north of Davenport on Wednesday, Dec. 9. The wildfire burned inconsistently through the area in late August, leaving some areas untouched while others look like a moonscape.

into their Toyota Tacomas and drove deeper inland along a bumpy dirt road.

Keeler-Wolf, 69, exchanged witty jokes with the other self-proclaimed "old guys" on the trip: Brett Hall, the 65-year-old director of the arboretum's native plant program, and Jim West, a 76-year-old self-taught botany savant who knows the Santa Cruz Mountains like the back of his hand.

Lifelong professionals but volunteers on this project, the senior scientists shared a wealth of knowledge and an appreciation for learning opportunities. Each of them frequently stopped what they were doing to examine the fine details of a rare species or relay interesting tidbits to the younger researchers, who listened

closely, asked questions and absorbed the new information.

"I'm actually feeling quite good about the young people coming up into the world of ecology," Keeler-Wolf said. "It makes us old guys feel like it's worth it."

After eating a quick lunch while standing around a box of pine cones that West had collected for Ferneyhough's studies, the team drove onward to the last assessment spot.

On the meandering walk through sedge prairies and manzanita scrub, West explained that more than 200 plant species could be found within 1,000 feet of where they stood. "Diversity equals flexibility equals multiple options to any given problem," he quipped, pointing his finger in the air.

**Flexibility**

Nothing says flexibility in the face of fire like coastal redwoods. If their flame-resistant bark doesn't save their trunk and branches from wildfire, they can resprout from surviving roots and burls below ground. The team is confident the torched trees in nearby Big Basin Redwoods State Park will recover, though it may take decades or centuries for the sprouts to grow into trees again.

"Every single plant has some way of dealing with fire, whether it's capable of resprouting or not," Hubner said. "And so far, we've found that just about everything that resprouts has resprouted already."

Some species appear to be sprouting here for the first time in recorded history. Often called "fire followers," some species of wildflowers, including the sweet-scented phacelia, have never been seen in the Santa Cruz Mountains until now, Hall said. "There's a lot of things that come up after a fire and then we don't see them again until the next fire," he added.

Unfortunately, it's not just rare native plants that take advantage of the cleared understories and pulse of nutrients that fires provide. In heavily burned spots where the slate has been wiped clean, invasive species can swiftly take over, outcompeting native grasses, wildflowers and saplings.

The younger botanists, however, expressed optimism for the future of the burned forests, their faith in the inherent wisdom of plants made stronger through studying fire's consequences.

"Seeing the plants cleared out and coming back so immediately is pretty cool," Ferneyhough said. "Maybe we have a chance now to maintain the land in a way that's less dangerous to humans."

Hubner agreed, noting that people may have a thing or two to learn from the plants his team is studying.

The plants "know what to do with fire," he said. "We are the ones who need to figure out how to exist here. We're still trying to understand our relationship with fire. But the plants have already figured that out."

**Rallies**

**FROM PAGE 1**

"This weekend, we saw forces of hate seeking to use destruction and intimidation to tear us apart," District of Columbia Mayor Muriel Bowser said Sunday. "We will not let that happen."

A video posted on Twitter showed a group of men appearing to take down a BLM sign at the Metropolitan A.M.E. Church as others in the crowd shout, "Whose streets? Our streets." Another video showed people pouring an accelerant on a BLM banner and setting it ablaze in the street as others

cheered and cursed antifa. Someone walks up about a minute later and uses a fire extinguisher to put out the flames.

"It pained me especially to see our name, Asbury, in flames," the Rev. Dr. Ianther M. Mills, the senior pastor at Asbury church said in a statement Sunday. "For me it was reminiscent of cross burnings. Seeing this act on video made me both indignant and determined to fight the evil that has reared its ugly head."

"We will move forward, undaunted in our assurance that Black Lives Matter and we are obligated to continue to shout that truth without ceasing," she added.

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