

# National Study Taking Place At Livermore Woman's Ranch

By Jeff Garberson | Posted: Thursday, July 23, 2015 12:00 am

The Sagehorn Russell ranch lies some 200 miles north of Livermore, not far from the town of Willits. Dry brown grass covers its hills and valleys. Lichen-covered rocks poke up through the soil.

Deer roam there, and sometimes elk. Mice and ground squirrels hide in the undergrowth from hawks. Bobcats prowl among stands of madrone and Manzanita while cattle seek shade under dusty looking oak trees.

In short, the Sagehorn Russell ranch looks much like any other working cattle ranch in the drought-stricken hills of Northern California at this time of year.

Closer inspection shows that it is anything but average, however. Owned by Marilyn Russell, a retired Livermore High School field biology teacher, it has become an important part of a nationwide scientific effort to understand the "outer skin" of the Earth, the part that carries ground water, surface soil, animals and vegetation, up through the tree canopies.

It's the part of Earth where we live, and for that reason has come to be known as the Critical Zone.

In the words of the National Science Foundation, "It's where rock, soil, water, air and living organisms interact to shape Earth's surface." NSF recently announced an effort to better coordinate the efforts of its 10 critical zone research sites. Similar efforts are now taking place in Europe, China, Australia and other parts of the world.

In this country, the sites, called observatories, are located at diverse sites from Pennsylvania to Arizona, from Illinois to Idaho. The Northern California site, called the Eel River Critical Zone Observatory, includes the Sagehorn Russell ranch.

Sagehorn Russell is near the headwaters of the southern branch of the Eel, which flows north toward Humboldt Bay.

Scientists from the University of California at Berkeley visit the river's drainage regularly, including Russell's ranch, studying its geology for comparison to the geology downstream, nearer the Coast. They bring equipment to record the movement of tree sap, test for moisture in soil and in leaves, and make myriad other measurements to determine the health of the critical zone.

Early next month, they plan to bring in a drill rig to take soil samples to better understand the structure of the subsurface and link it to the movement and storage of water, perhaps – depending on where they find bedrock -- to a depth of 100 feet.

They hope eventually to expand the study to include the south-flowing Russian River drainage, according to William Dietrich, a principal investigator in the effort and an earth and planetary science professor at Berkeley.

Dietrich says that more is known of the earth thousands of feet beneath the surface, because of oil exploration, than is known about the near subsurface, at depths of a few tens of feet.

"But its critical...that's where we get our water," he said. "It's what we live on. It's what mediates our climate by returning water to the atmosphere. It's where waste goes when we accidentally spill things."

Dietrich considers it a substantial windfall to be able to study the Sagehorn Russell ranch, which unlike many of the areas downstream is in a mostly natural state. Apart from a major fire that swept the region more than 60 years ago, it is in essentially the same condition as when Marilyn Russell's father bought the property in 1949.

That's because Russell has insisted on the ranch's preservation; she has been fortunate to be able to lease the property for the past two decades to a man – Paul Holleman II -- who practices sustainable cattle ranching methods.

These include taking the trouble to pipe water from springs to ridge top troughs that are widely spaced so that the herd spreads out into small communities instead of collecting in a small, low lying area where it can trample vegetation and foul streams.



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UC Berkeley professor Bill Dietrich and Marilyn Russell near a meteorology station establish on the Sagehorn Russell ranch as part of a "critical zone" research project

In contrast to Sagehorn Russell, much of the Eel River drainage downstream has been altered by traffic, residential development, industrial scale cattle ranching and marijuana cultivation. The ranch's relatively undisturbed state creates an opportunity for detailed scientific comparison of how a modern civilization has been affecting its environment, especially its use of water.

It's not a given that the researchers would have access to the ranch for their studies. Russell notes that ranch owners commonly guard their privacy, resisting efforts by the government or anyone else to intrude into their lives.

She has some of these feelings herself. "It was definitely a stretch" to allow outsiders – however well intentioned -- access to the ranch, she said.

She overruled the privacy reflex, she said, because of her conviction that the future of the land and its wildlife are well served by scientific study and documentation.

Russell learned about the Eel River study when she encountered Mary Power, a Berkeley integrative biologist who is one of its principal investigators, at a meeting last fall. They discussed the controversial proposal to expand the Carnegie off-road-vehicle park in San Joaquin County into an undeveloped site called Tesla just across the border in Alameda County.

The two women quickly discovered commonalities of interest, from enjoying horseback riding to believing in the value of studying and understanding nature. Not surprisingly, they were united in their opposition to large scale motorized recreation on an undeveloped site that provides both natural beauty and habitat for many species of wildlife.

Russell offered to allow her and the other Eel River researchers to visit her ranch to evaluate its potential as a study site. Visits have continued and now bring both professional scientists and students considering careers in the natural sciences.

One of Dietrich's graduate students is pursuing his PhD by focusing on water consumption and flow in the geology and plant life of the Sagehorn Russell ranch.

He aims to develop a model that will "help guide sustainable management of water resources" at a time of global warming in a region beset with increased demands on water due to development and agricultural practices, including water-intensive marijuana farming, according to his PhD proposal.

Making her ranch available to serious scientific researchers is part of Russell's way of preserving it and looking to the future. The ranch is precious to her for many reasons, not least of which is that she grew up there.

That meant being surrounded by natural beauty and the kind of peaceful quiet that city dwellers might only dream about. It also meant hard work and no luxuries. The land lies mostly above 1,800 feet, and Russell remembers helping her father try to save starving animals following an autumn snowstorm when she was only 5, shortly after they moved in.

Economic disaster followed less than two years later, when a fire swept through the ranch, burning 4,000 acres and destroying their uninsured cattle herd. It was a hardscrabble life; Russell recalls feeling poor during her childhood.

Homeschooled, often lonely, she would sometimes ride a horse three hours or more to Willits to visit friends.

She attended Cal to study zoology and history and to get a teaching credential, finding a job teaching biology and life science at Livermore High in 1967. She soon discovered a passion for teaching students out of doors, in nature – showing them "what was here, what was in their own backyard."

The instinct to teach remains with her today and is evident when the earth scientists from Berkeley visit her ranch, according to UC's Dietrich. As they explore the site, Russell identifies plants for the visitors and they identify rocks for her. "It's really fun," he said. "She's had a lifetime of a very personal relationship with her land, and she likes to talk about it."

She has also remained close to nature in other ways, particularly through horseback riding.

Stamina developed through years of hard work on the ranch helped prepare her to compete in grueling endurance events like the 100-mile Tevis Cup ride in California and Chief Joseph ride in Oregon, Idaho and Montana.

Injuries and the passage of years have forced her to ease up on competition, but she still joins local friends for rides in the Livermore hills as well as occasional visitors for long rides around her ranch.

Having grown up, lived and worked on the ranch and made it available for scientific research, Russell's passion now is to preserve

and protect it. She intends to put it in a trust, such as the Rangeland Trust, that will guarantee that it will never be subdivided or developed commercially.