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Wildfire and Climate Change

A new collaboration targets
innovative management solutions

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Wildfire and Climate Change in the West

Bren School Strategic Plan leads to a major new faculty collaboration.
The goal: innovative approaches to wildfire management.



A fire in Southern California threatens houses and infrastructure at the wildland interface.

Since receiving its first students in 1996, the Bren School has established itself as a leader in interdisciplinary teaching and research, and collaborative approaches to environmental problem-solving. The school's future success will depend on its continued ability to adjust, adapt, evolve, expand and improve. Early in 2013, after a faculty-led process of self-study, a new Bren School Strategic Plan emerged. One important component articulated in the plan is the Strategic Environmental Research Initiative (SERI), which is intended to generate interdisciplinary collaborations and yield innovative solutions to some of the grand environmental challenges of our time.

"We have a highly interdisciplinary faculty at the Bren School, and we've done a lot in terms of focusing on the value of collaborative efforts for solving environmental problems," says **Dean Steve Gaines**. "But I think everybody's sense in the strategic planning exercise was that the opportunity for

collaborative research here is much bigger than what has materialized so far. The idea was to bring together faculty from the Bren School and other UCSB departments, as well as experts from outside the university to think collaboratively about how we can tackle big problems in new ways and develop creative solutions."

The subject of the inaugural SERI, begun this past summer and continuing at least through the 2013-14 academic year, is Wildfire and Climate Change, particularly at the urban-wildland interface in the western United States.

SERIF (SERI Fire) will be led by three Bren School professors: political scientist **Sarah Anderson**, resource economist **Andrew Plantinga**, and hydrology, mountain-watershed, and modeling expert **Naomi Tague**. The collaborative group will include other faculty at the Bren School, at UCSB, and beyond and will focus on synthesizing existing research from various disciplines to generate new

approaches to fire management. Each of the Bren professors brings relevant experience to the project.

Some of Anderson's research focuses on how public and political factors affect decisions regarding the management of wildfire fuels, such as brush and undergrowth. Plantinga has a degree in forestry and has done work on policy analysis as it relates to forest policy, and the economics of forest management in the context of climate change. Tague is involved in projects to better understand the effects of fire on water resources and other ecosystem services; to improve the ability to predict how the frequency of fire may change under a warming climate; and, with fellow UCSB professors, to investigate how quickly landscape nutrient cycling and water use recover following fire, using recent Santa Barbara fires as a case study.

The wildfire theme will be integrated throughout teaching and research within the Bren School. It will be woven into the master's curriculum through the writing workshop for entering students and through readings and case studies in some courses. Fire will be the central topic of a master's course on climate change impacts in winter quarter. It will be included in the PhD faculty-to-faculty seminar course, and in the required PhD collaborative research seminar, taught by Plantinga and Tague. The theme will be treated further through the public colloquium speaker series, which will include experts on fire subtopics. As part of the public outreach and education component, the Bren School is seeking to partner with UCSB's Davidson Library for a joint public event in spring.

"I see our purpose as trying to understand how the integrated natural and human system works, because there's a lot we don't know," says Plantinga. "Once we understand the system in a qualitative way, we will be in



the position to send out grant proposals to fund further research. In that next project, we would quantitatively test our understanding of the system in order to come up with specific fire management and policy recommendations.”

The Case for Fire

In their proposal, Anderson, Plantinga, and Tague addressed numerous facts and circumstances that make fire a good theme for the initial SERI.

There is abundant evidence that climate change is causing an increase in the frequency and intensity of wildfires. Meanwhile, population growth and associated land-use changes are resulting in fires’ being far more costly in terms of property and lives. Together, those dynamics create a complex management challenge.

“We don’t mind so much when there’s a fire back in the wilderness,” says Anderson. “The management problem comes at the wildland-urban interface, where humans have the most interaction with fire and you need to think about managing tradeoffs among such things as the ecological benefits we know come with some fire, houses that might burn, and infrastructure that might get shut down as a result of fires.”

Additionally, fire management remains controversial, and agreement is hard to achieve even on such standard practices as controlled burns. Fire regimes also vary greatly across distance and time — naturally — and are now driven also by climate change.

“This is a problem where climate change really matters and where what worked in the past may not work in the future,” says Tague. “A lot of fire management has evolved around how frequently fires occurred historically, under the natural fire regime. But that doesn’t make sense in a changing climate, which, we’re pretty sure, will cause more, and more intense, fires in the western U.S.”

The complexities arising from that temporal and spatial variation of wildfire are at the heart of the problem, Tague adds. “It makes sense to do a controlled burn in some forests, but in other forests in different parts of the West, it

doesn’t. What works for a high-elevation Sierra forest is not necessarily what you should do for a chaparral, and it can even vary quite locally. The right thing to do isn’t the same everywhere, and climate change causes further changes over time.”

In addition to ecosystem-based considerations, a lot of work remains to be done in terms of quantitative social science that analyzes the *institutional* barriers to more effective fire management.

“Fire is a subject that we think about in fragmented ways,” says Gaines. “It involves plans for land use and

“**Fire is an area just calling out for forward-looking synthetic research.**”

development. You have the business side of things in terms of insurance companies wanting to create incentives and disincentives for building in certain places. We have institutions that manage forests asking, do you thin them or not, do you let fires burn or not, do you do controlled burns or not?

“These things are not integrated in a comprehensive way. It’s a complicated issue that can be devastating to people.”

“You can think of lots of questions involving human behavior at the urban-wildland interface,” says Plantinga, one of the newest members of the Bren School faculty. “There are incentives for home construction and preventative measures to prevent loss, but the incentives are often not appropriate.

For instance, if you know that the fire department will come and put out a fire, that’s an incentive to build homes in areas where you’re going to have fires. And there are not enough incentives that encourage people to take preventive measures in those areas. If I reduce the fuel on my property, it benefits all those around me. We need to think about what kind of policies could be developed to align

incentives with social objectives.”

“The debate is not so much about the scientific means of managing fire, but about whether, how, when, and where you should use those methods,” says Anderson. “It’s on the management side that the controversy comes up.

“Also, there are other areas where we think we’re going to get fires where we didn’t historically,” she continues. “Should we be proactive in providing resources to those areas? And what do we do if we get a year with a lot of big fires happening simultaneously throughout the West and we’re running out of fire-fighting resources? How much do you allocate?”

Post-fire management is another area rife with questions. “What do you do after a fire?” Tague asks. “Do you replant? Do you reseed? There are places where the science is still poor, but that partly comes back to a policy perspective. If we need more science and research on that, then let’s make it happen, but where is the impetus for that research coming from? Our group will work to identify and understand the disconnects between the science and what actually happens in terms of post-fire management. Often we have the knowledge, but social systems preclude us from using it.”

Sometimes, too, she explains, “The science has not been synthesized. There may be 15 studies, all showing something different, so even if policy makers want to do what the science says, they can’t. They have to make decisions quickly and don’t have time to sort through the various findings.”

As for the core Bren faculty group, they’ll be reaching out to involve many more experts in this, the first big, collaborative SERI effort.

“Fire is an area just calling out for forward-looking synthetic research that brings together thinking across some of these sub-pieces of the problem,” says Gaines. “With the Bren School’s diverse faculty, we have enough expertise to do some interesting things in-house, but we can’t cover all the levels of expertise you need to be thinking about a question like this. For that, we need to take a larger, collaborative approach.”