The Role of Fire in China’s Reserve Management

While it is now generally accepted in the U.S. that fire is necessary in many ecosystems, China practices a strict policy of fire suppression. However, there is an increasing interest in the role of fire in wildland areas in China as the country moves forward with a new conservation agenda for the future. The Chinese government asked The Nature Conservancy for help in identifying conservation areas across the country for what is now known as China’s “Conservation Blueprint”. Endorsed by all levels of the Chinese government, the Blueprint recognizes the vital role the environment plays in China’s future economic growth and overall stability. With the development of the Blueprint, and in anticipation of the 2008 Olympic Games, China is emphasizing the importance of natural resource management -- including the controversial role of fire in a newly developed system of nature reserves.

In the fall of 2007, Meg Krawchuk, a post-doctoral researcher with the Center, traveled to Beijing, China with collaborators from The Nature Conservancy (TNC). The goal of the trip was to better understand the fire regimes in the Songshan National Nature Reserve in the Beijing Province, where land managers are just beginning to think about fire as a tool for ecosystem management. Chinese officials with the State Forestry Administration requested assistance from TNC in establishing a conservation plan for the reserve, and later, to assess whether fire should be considered as one component of the plan.

The opportunity for Meg to participate in this project is the result of our collaborative working relationship with The Nature Conservancy. The Global Fire Assessment (GFA) – led by partners from The Nature Conservancy, World Conservation Union, World Wildlife Fund, and the Center – is a large-scale effort to map global fire regimes using expert opinion. Largely complete, the GFA gives a qualitative overview of global fire regimes, and includes some gaps, particularly in China, where little is understood about past or current fire regimes (characterized by fire frequency, intensity, seasonality, pattern, and type).

At the same time, Center researchers have been working on a complementary quantitative approach, applying niche models – which are commonly used to examine the relationship between species and their habitats – to quantify where fire “lives”. Although still in the early stages, this approach already promises new insights into understanding “pyrogeography”, or where and why fires occur. Using the niche modeling approach, Meg has already contributed a better understanding of what China’s fire regimes might have been like in the past.

Although not directly comparable, the eastern U.S. and eastern China have similar environments and have many species in common. Therefore, using data from the U.S., Meg was able to build models that describe the relationship between climate and fire regime types. Then, she applied the statistical relationships from the U.S. to China’s climate data to infer the potential distribution of these fire regimes in China. The result was a map that describes the probability of a variety of fire regimes in China.

Although there are key differences in history and culture that also contribute to fire regimes in the U.S. and China, this spatial analysis of fire regimes will help land managers in China to discuss and better understand where fire might be a beneficial conservation tool.

Meg’s trip coincided with a workshop on ecological classification methods, so she was able to begin the process of validating her models by discussing the results with Chinese researchers familiar with the wide variety of ecosystem types that exist across China. Some of these researchers had also spent substantial time in the U.S., so were familiar with the geography and vegetation across China and the U.S. The group generally agreed that the model held up well in eastern China, but because of the differences between the western U.S. and western China (e.g., there is no equivalent of the Tibetan Plateau in the U.S.), the model would need more refinement to be applicable there.

Meg has also recently contributed to a report with TNC researchers that will be translated and communicated with Chinese researchers and practitioners. The report contains perspectives on the ecology of the Songshan reserve generated as a result of the site visit, which included discussions with local inhabitants, conservation staff, and Chinese researchers. The report suggests how fire might have contributed to Songshan’s current landscape, and how it might be incorporated into a reserve management plan.

The relationship between The Nature Conservancy and Chinese conservation practitioners, including many Chinese citizens who work for TNC, will facilitate the on-the-ground application of Meg’s research to conservation management practices in a way that would be difficult for her to accomplish alone. Including fire in the early stages of planning nature reserves should help China to avoid some of the conflicts that have arisen in the U.S., where fire had to be reintroduced to wildland areas after a long management history focused on fire suppression. -- Faith Kearns

The modeled fire regimes were based on Landfire (www.landfire.gov) reference conditions. The maps above illustrate the distribution of a fire regime characterized by a 0-35 year return interval surface fire, occurring in grasslands and the understory of forested stands. Songshan National Nature Reserve is located in north eastern China, where this fire regime is predicted to occur.
The Association for Fire Ecology (AFE) began with a small group of university, agency, and management interests in California. As it became clear over time that a larger group could benefit from becoming members, AFE expanded its scope, becoming the international society that it is today.

Center co-director Scott Stephens serves on the AFE board, and many of our researchers are active members. Over the past several years there has been increasing interest in starting a California Section of AFE (CAFÉ), and in cooperation with Neil Sugihara of the U.S. Forest Service and several others, we have put together by-laws and are now an officially recognized section, along with the Student and Tropical Sections.

One of the first major CAFE events will be a conference -- Pacific Coast Fire Conference: Changing Fire Regimes, Goals, and Ecosystems -- which will be held December 1-4, 2008 in San Diego. The meeting will focus on issues such as land management, climate change, wildlife, and public education, with a particular focus on the Pacific coast in the U.S. and adjacent lands in Mexico and Canada.

A call for paper and poster abstracts is expected to be released soon - please check the AFE website at www.fireecology.net for updates.

The Berkeley Institute of the Environment (bie.berkeley.edu), a campus-wide institute dedicated to enhancing the wide variety of environmental programs at Berkeley, sponsored a series of roundtables beginning in 2007. Center researchers, in collaboration with a broad group of researchers from across campus and beyond, proposed a roundtable focused on how communities respond to natural disasters.

The premise of the roundtable was the idea that many communities have planned only for the worst-case scenario disasters — a devastating flood, fire, or earthquake — and neglected to plan for smaller but more frequent disasters. The group was particularly interested in questions such as: How the perception of disasters differ depending on the disaster type? How does that perception influence preferences for dealing with different types of disasters? Is effective action required by individuals or a collective? Does current policy overemphasize certain types of disasters or approaches (e.g., codes, level of government involvement)?

The group met every other week for the Spring 2007 semester and hired a graduate student researcher over the summer to begin researching specific outcomes of the roundtable that might lead to the development of a larger project.

Roundtable members:
- Eric Biber, Boalt School of Law
- Elizabeth Boyer, Environmental Science, Policy, and Management
- Faith Kearns, Center for Fire Research and Outreach
- Matt Kondolf, Landscape Architecture and Geography
- Surabi Menon, Lawrence Berkeley National Lab
- Max Moritz, Environmental Science, Policy, and Management and Center for Fire Research and Outreach
- Wayne Sousa, Integrative Biology
- Scott Stephens, Environmental Science, Policy, and Management and Center for Fire Research and Outreach

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About the Center

The Center for Fire Research and Outreach was established in late 2005 by the College of Natural Resources at the University of California, Berkeley. The Center is co-directed by Max Moritz and Scott Stephens, both are faculty in the Department of Environmental Science, Policy, and Management. The primary mission of the Center for Fire Research and Outreach is to develop and disseminate science-based solutions to wildfire-related challenges.

Drawing on the expertise of Center faculty and researchers, our goals are to:

* Facilitate collaboration on innovative solutions to wildfire challenges;
* Support education and training efforts focused on interdisciplinary approaches to wildfire research and management; and
* Cooperate with stakeholders to fill their need for information and resources before, during, and after wildfires.

Re-establishment of an Experimental Burn Facility

A group of Berkeley faculty and researchers, including faculty from the Department of Integrative Biology, the Department of Environmental Science, Policy, and Management, and the College of Engineering — received funding from the UC Berkeley Biology Faculty Research Fund (with matching funds from the College of Natural Resources) to re-establish an experimental burn facility at the Richmond Field Station.

We anticipate developing the fire lab in stages -- we received enough funding to do some renovations to a building that had been used for similar work by the now-defunct Forest Products Lab. Current plans include installing an emissions control system that will allow for the burning of plant materials and some composite materials such as those commonly used for decking.

Natural Disasters and Resilient Communities

A Roundtable sponsored by the Berkeley Institute of the Environment

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For More Information

For more information about the Center co-directors, affiliated faculty and researchers, staff, collaborators, resources, and projects, please visit us on the web at:

http://firecenter.berkeley.edu

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