

STEVE PYNE'S REPLIES TO QUERIES

On Oct. 28, 2020, Stephen Pyne discussed "The Pyrocene: How Humanity Created a Fire Age" in a webinar. He took some questions after his presentation. Below are his responses to those he didn't have time to field.

Jeff, University of Maryland

Following the 1988 fires in Yellowstone, the media was heavily criticized for “fanning the flames” and contributing to a public relations disaster for the National Park Service. With wildfires an important current issue, do you think media coverage of wildfires today is different? Do they better understand fire management policies? Are they better at effectively communicating these issues to the public? What are some of the shortcomings?

REPLY: The serious media has gotten better. The fires keep coming, and in the case of California, they have returned as serial conflagrations for four years now, and this year they have gone on forever. That allows the media to move beyond prefabricated templates. They look for new angles. They find new voices. I think the general public has the basic ideas. They just want to know how implementation will affect them and their community.

Scott Einberger: Thank you for this presentation. Dr. Pyne noted that our issue now is not fire policy but fire implementation. Can he elaborate?

REPLY: A comprehensive change of policy requires space—geographic space, legal space, political space, bureaucratic space. The policy reform was a revolution from the top, completed in 1978, and never made it to the field at the scale required. The 1980 elections and attempts to roll back environmental legislation stalled the fire revolution—a lost decade. The project renewed after the 1994 season (and a change in administrations), but by then the environmental window was fast closing. Moreover, prescribed fire (anthropogenic or natural) was the expected middle ground for restoration. It never scaled up in the West; in fact, we've fallen further behind every year, and that holds for the landscape-sized restoration projects like 4FRI and others. Managed wildfire seems the preferred technique.

Jennie Bahramian: Would you thin planting trees (same species of trees) in areas that lost the forest canopy; would it make a difference?

REPLY: As with most things, it depends. Certainly, it makes sense in plantations. In wildlands, some forests experience crown fire as a normal regime; for others, some canopy openings may bring benefits. The decision would have to be made on a site by site basis. And it would vary according to whether replanting accompanied salvage logging, grazing, etc. or other interventions that might stimulate soil erosion, and of course it would depend on weather—in the midst of a millennial drought, it would not likely help. With climate change it's hard to know what conditions a new forest would encounter.

I would think there were sites where planting would make sense, but I would hope control plots were also part of the project, so we could compare and learn.

Martin Schmid: Good evening, this is Martin Schmid from the Centre for Environmental History in the *never ever burning, well managed forest city* of Vienna, Austria ;-). ... Really inspiring, thx a lot, Stephen! I would emphasize the “discovery” of the global carbon cycle in your narrative. This fundamentally also changed how we conceive of, how we perceive, and manage forests today. Forests have become either sites of carbon sequestration or when burning sites of massive carbon emissions. This has recently become another ecological reason to be concerned of fires. Agree?

REPLY: You make several good points. Until recent decades we had no real science of landscape fire. Even today, while publications about fire are increasing exponentially, every discipline is refracting fire through its own conceptual prisms. Although fire integrates its surroundings, fire science does not.

There is also a confusion over “fire.” Fire used as an enabler for forest conversion (e.g., Amazonia, Indonesia) contributes to a net carbon loss. Fire in wildlands and natural areas does not, unless its larger circumstances change (due to climate or invasive grasses, for example). Perhaps paradoxically fire is conservative: it renews what already exists. So, there are different kinds of fires that influence the carbon cycle differently. There are also examples of traditional surface burning that can enhance the overall carbon storage of a forest, in part by making wild, high-severity fires less likely. Good fire can enhance ecological integrity, and carbon storage. Bad fires don't.

Jared Haney: Do you think that fire management can ultimately mitigate our relationship with fire? Management seems to have prevented fire in the short term, but in the long term it seems that we have just placed band-aids over the holes in a sinking ship. Should we not just allow natural fire to take place and avoid building in fire-prone landscapes?

REPLY: Good sentiments, but it seems very difficult to prevent Americans from building in risky environments (not to mention decades of bad building that needs retrofitting), and natural fire is not by itself the best means to restore appropriate fire regimes. We can, however, harden communities and prevent structural losses—these are fragments of cities and need to be treated like urban fire risks. (It's worth noting that the same issues afflict most developed countries where formerly rural landscapes are being recolonized by urbanites.) And there are good reasons to work with natural fire.

We have 50 years of experience with natural fire management. In some places it has worked splendidly; in many others, the results are mixed. I think the best compromise is a strategy of box-and-burn or managed wildfire. I'm less enamored of the passive version—monitor, then responding when conditions (“prescriptions”) turn sour. There are few examples of being able to intervene successfully when fires escalate into blowups, and leaving fires to linger on landscapes encourages long-lasting smoke. Drawing a box and then prudently burning it out—not as an emergency backfire but as a prescribed fire done under urgent circumstances—keeps fire crews actively engaged with the fire, makes escapes less likely, and puts constraints on

smoke. During the suppression-only era, it was common to designate pre-attack zones. We could convert these into boxes for burning under the right conditions.

Chris Colvin: How does the history of the debate about fire management intersect with debates about "wilderness preservation" and does that point toward contemporary debates and solutions to fires' impacts on human communities in the future?

REPLY: During the era of the fire revolution, I think wilderness sentiment added reasons to restore fire. It made fire natural, not just a human artifact. The Wilderness Act created places where traditional fire suppression was prohibited and forced fire agencies to consider how to keep or reintroduce good fire. Today, I think wilderness areas provide a control plot by which to measure our various interventions against what would happen if we stood aside and let nature sort out the future. It's likely that we will see some smaller wilderness areas (legal wilderness can be as small as 5,000 acres) transformed by our evolving fire era, probably in ways that will make them very different from what we thought we were preserving. Mostly, I think we are likely to be surprised by what happens.

Solomon Dobrowski: Dr. Pyne, thanks for a fantastic presentation. You mentioned that we haven't had a failure of policy in the US, but instead a failure of implementation of sensible fire practices. How do we break through this log jam and enable these practices?

REPLY: You pose the critical question. There are lots of things, beginning with the realization that we do not have a fire problem; we have many fire problems, each with its own treatments. We need to unbundle the "fire" conundrum into manageable parts.

The first requirement is to reduce the threats to communities; we do this by treating them as we would cities. We can also focus prevention programs here, since nearly all fires that threaten communities are started by people, directly or indirectly. That powerlines start so many of the worst fires is absurd—this has technical solutions in ways that fire in wilderness does not. Note that fire intersects so many areas of human life that we can use fire threats as a catalyst to undertake a lot of reforms that we have needed to do anyway like overhaul our creaking power grid and contain urban sprawl.

Fire in wildlands needs practices adapted to the particulars of each site—these will almost certainly be suites or cocktails of treatments. It could also benefit from policy (and liability law) that give a bias to fire restoration. Ideally, I could envision an Endangered Process Act that makes restoring an appropriate fire regime mandatory (okay, I envision that in my dreams). We can also empower local groups to assist with burning and burn on private lands—Prescribed Fire Councils are a wonderful mechanism. We can reduce the absurd reliance on fuels as the metric of fire management. Fire does lots of ecological work, not just reduce and rearrange fuels. Getting the ecology right will get the fuels right as one of many byproducts. Fire will do a lot of our work if we let it.

I'm impressed with a younger generation that is not so burdened by all the culture wars over fire. We can let them step up and innovate—get out of their way, as we need to get out of fire's way.

Brenner Williams: Is there any change in policy you think would be key to helping the next generation restore balance to the role fire is playing in our society and ecosystems? What should we have in mind as we attempt to mitigate the risk posed by climate change and the correlating increase in fire?

REPLY: See my response above.

Chris Colvin: What can we learn from history about how to address challenges where the costs occur today and potential benefits would accrue in the future?

REPLY: Let me broaden this query a bit and ask what we can learn from history. We can learn a lot, but mostly, I think, the lessons involve character. The past is full of people who had to live in a contingent world about which we have incomplete knowledge. The lessons are less about what specific actions they took than how they defined the issues before them, how they behaved with grace under pressure, how they balanced prudence against risk, how they separated the charlatans and faddists from empirical evidence, how they learned and adapted as they went along.

Arthur Canterbury: How do you feel about the restrictions on RX burning in areas where threatened and endangered species are found? We have great interest in the Northeast to conduct more landscape-level burning, but pushback due to the potential impacts on T&E species. What message would you give to those who want to impose more restrictive RX burn windows?

REPLY: The impact of T&E species varies by region. In the Southeast, nearly every T&E bird adds impetus for prescribed fire—the ESA provides legal leverage to maintain habitat and the habitats are fire-informed. In the West, nearly every T&E bird seems to argue against an expansive program of fire restoration (e.g., spotted owls, sage grouse). I think the critical need is to separate genuine T&E considerations from those who want to use the ESA to argue against burning—they simply don't want burning and the appeal to endangered species is another argument they make. It's another case of unbundling.

Jameson Karns: What do you feel have been the most compelling pieces of fire management policy and/or legislation of the last twenty years? Additionally, is it your sense that the recent debates over federal funding have rekindled legislative forest fire efforts?

REPLY: Tough questions. The National Fire Plan of 2000 was an important marker, but, while it wasn't too little, it was too late. It needed to have happened in 1980. Still, much as the Yellowstone fires of 1988 alerted the public and media to fire as something other than a disaster story, so the NFP put fire in the political arena as something other than a one-off response. It argued for a more systemic program. Unfortunately, it also made fuels the primary metric, which

looks like silviculture by stealth and leads to such absurdities as making National Park fire officers do fuels assessments for backcountry burns and fire for biological benefits. And, of course, it mocks fire efforts in grasslands—and further accents the act’s foundations in forestry. Not least, it shows how crummy the metrics are for fire. We wouldn’t reduce the national economy to GDP, population, and the Dow Jones average, but we accept the equivalent for nature’s economy of fire.

The most significant breakthrough is the 2009 reinterpretation of the federal common wildfire policy that has freed space for managing wildfires. Like Dorothy and her ruby slippers, the power was there all along but not really used.

It’s hard to predict what political responses might emerge—certainly not until the results of our national election become known. The major policy reformations seem to come in roughly 30 years intervals: 1905, US Forest Service (Use Book); 1935, USFS (10 am policy); 1968, National Park Service (fire restoration); 1995, Interagency (common federal fire policy); and 2025??—maybe.

Jesse Wimberley: In consideration that you suggest Climate History is a subset of Fire History, is there an effort to change how we talk about climate history and climate to a culture focusing on Fire Change instead? With schools, media, agencies, etc.?

REPLY: Part of my interest in promoting the notion of a Pyrocene is to force the climate change debate out of its entrenched positions. Fire history invites us to go at the changes sideways. It also puts fire at the narrative axis instead of the margins. The human manipulation of combustion is the core. We got big heads and small guts because we learned to cook food; we went to the top of the food chain because we learned to cook landscapes; and we have become a geologic force because we have begun to cook the planet.

Darcey Collins: With the issue of prescribed burning still being so touchy today, and with all of the legal issues that accompany the use of fire silviculturally, do you think it will be possible to successfully implement prescribed fire on a widespread basis both for reduction of fuels and for better management of species that evolved with and/or are dependent upon fire? Or is the battle against public opinion going to be one that’s too difficult to fight?

REPLY: I’m going to defer to my comments above. I think the public understands. They want confirmation that we can do what we say. Which also means we be honest. There will be escapes. Prescribed fire is not a vaccine that will halt combustion contagion (it more resembles annual flu shots). Conditions are changing and we are not clairvoyant; we can’t predict exactly what will happen—science is not secular revelation—but we can adapt.

Lawrence Ford: Larry Ford, Rangeland Mng Consultant, Felton, CA: We recently experienced a ~100k acre wildfire that destroyed 925 homes. For the first 10 days, only the local fire departments were available to fight the fire. But the fire quickly overtook them, and they had to triage, abandoning mountain homes to attempt protection of town centers. Luckily no wind-driven fire storm emerged. Such triage was the first in my memory. Seems like we need a change

in policy and culture to reduce fuels across the whole landscape, including peri-urban areas where prescribed fire is inappropriate. Forest thinning, more grazing, building hardening, whole landscape strategy for fire breaks the size of ranches and parks?

REPLY: See replies above. We need better structure protection, but trying to abolish fires in the surrounding countryside and wildlands will not provide it. That approach fails under extreme conditions, which is exactly when we need it. The CalFire model—an urban fire service over the countryside—can't work. What mix of fire and fuel treatments is appropriate will vary according to local conditions.

Jennie Bahramian: Does planting trees make a difference in fire mitigation on the West Coast or would make it worse?

REPLY: Again, it depends. Planting eucalypts didn't make the Coast Range less fire-prone.

Lynn Barnickol: How does mechanical fuel reduction projects, such as timber harvesting using scientific silvicultural practices, fit into considerations for protecting communities?

REPLY: I'm writing this on a wooden desk in a wood-framed house and will print the result on paper. I accept the value of a wood products industry. But I reject the notion that logging is a solution to wildfire. They do different things. Logging takes the big stuff and leaves the little; fire burns the little and leaves the big. What survives after a crown fire is exactly the trunks that logging would have removed. Until 40 years ago the major conflagrations of American history trailed logging and landclearing. Besides, logging removes physical biomass; fire transforms it into more ecologically useful forms.

I can imagine some prescribed logging in select areas around communities as a suitable treatment. And I find thinning in select environments (like southwest montane forests) an appropriate strategy, especially when combined with burning. I regard thinning as a kind of woody weeding, not traditional logging.

Cari Furiness: What do you say to those that claim that Indigenous Peoples did not manage the landscape with fire to the extent claimed by historians?

REPLY: Since I am one of those historians, I don't know what to say further. I've found comparable fire practices around the globe. My default position is that people burned unless someone can show they didn't. The traditional approach reverses that: it demands that proponents demonstrate to their critics' satisfaction that indigenous peoples did burn. I suspect part of the issue is that, once again, we have people who don't like fire and want to find reasons to support that dislike. No doubt they would reverse that judgment, and say that people like me who favor fire are eager to find reasons to justify their own stance. Certainly, we can argue about the character of indigenous burning and about what it means for the present. But not, I think, about its use as widely as possible.

Clark Seely: Would you speak briefly about the interplay between “managing wildlands” vis-a-vis forest management activities like harvesting (even- or uneven-age methods) and fuel treatment/management activities and these actions as mimicking the role of fire on the landscape?

REPLY: See my response above to logging.

David DuMond: There is an evolutionary history of fire. There is a paleontological history of fire. What have we yet to learn?

REPLY: We don’t yet appreciate the deeply biological nature of fire. The living world created the oxygen and the fuel. The chemistry of fire is a biochemistry—the same reaction that metabolizes carbohydrates in our cells. In some respects, fire resembles a virus. It is not itself alive, but it is a creation of the living world and depends on that world to propagate. By defining fire as a chemical reaction shaped by its physical surroundings, we are left with physical responses that are appropriate for understanding fire that is blowin’ and goin’, but that has not proved it can manage fire in living landscapes. If we thought of megafires as the result of broken biotas—of bad interactions between humans and nature—we might conceive of them and treat them as emergent diseases. It’s not just that epidemics spread like wildfire, but that wildfires spread like epidemics. We could imagine other management strategies other than scraping firelines and dumping retardants.

Lane Johnson: Any hypotheses on why ethnographers, cultural anthropologists, archaeologists historically focused so little on cultural fire use, provided that it was such an important part of Indigenous economies and culture?

REPLY: Or for that matter, why foresters, biologists, agronomists, historians, et al ad infinitum ignored fire. The line I use is that all the other ancient elements (air, water, earth) have disciplines devoted to their study, even whole departments. The only fire department is the one that sends emergency vehicles when an alarm sounds. Fire disappeared as a scholarly and scientific study in the late 18th century—curiously, about the same time we began replacing working fires with industrial combustion. Students learn a subject as it is taught. Scholarship is conservative. It’s very hard to insert new themes. How many beginning biology texts, for example, include fire as a fundamental feature of terrestrial life? Not taught, not studied.

A decade ago I attended a workshop on fire, Earth, and humans at the National Center for Ecological Analysis and Synthesis, then located in Santa Barbara. This was the first time that fire had figured for NCEAS. Yet we could walk to the roof and observe large burn scars across the Santa Ynez Mountains, some of which had penetrated into town. How could ecologists live within sight of burns and experience fires around their community and not include it in formal scholarship? Because it wasn’t taught to them, and there were few if any opportunities for someone trained in the subject to teach it at a university.

William Parsons: My experience of using prescribed fire in North Carolina is that we reduced exposure to ticks and chiggers. Military posts in the East use a lot of fire to help.

REPLY: This was what traditional burners claimed and what the fire science of the day dismissed as superstitious nonsense. At one point the Forest Service even hired a professional psychologist to explain why locals made such claims in defiance of formal learning.

Kevin Potter: We have millions of acres of overstocked forest prone to massive fire as the result of a century-plus of fire suppression and mismanagement. There is a wider recognition now for the importance of controlled burns and reducing stand density, but the area needing treatment is more than we can reasonably handle. How do we proceed from here?

REPLY: See responses above. The lands will burn. They can be fires of choice or fires of chance.