

**Project Title:** A Fire History of America, 1960-2013

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## Abstract

With support from the U.S. Forest Service, Department of the Interior, and Joint Fire Science Program, I have written a fire history of America from 1960 to 2013. The project will result in two books. *Between Two Fires: A Fire History of Contemporary America* relates the basic narrative. *To the Last Smoke* assembles anthologies of essays, organized around important fire regions, to highlight particular places, personalities, and practices; at present, five regional reconnaissances are written, with three more planned. *Between Two Fires* thus serves as the play-by-play record, and *To the Last Smoke* as the color commentary. The University of Arizona Press will publish *Between Two Fires* in October, 2015. It will publish up to eight regional surveys shortly thereafter; five are written and currently in press.

## Background and purpose

The past 50 years have witnessed remarkable changes in American fire policy, institutions, sciences, and practices. Yet the standard history, *Fire in America*, ends in the 1970s. It misses the momentous events that make America's great cultural revolution on fire. But more is at stake than missing years. The revolution changed the storyline. It deserves its own narrative.

The output takes the form of two books. *Between Two Fires* furnishes the basic narrative - the play-by-play, if you will. *To the Last Smoke* assembles an anthology of essays on particular places, people, and events - the complementary color commentary. The latter concept, however, quickly broke down and proliferated into regional surveys. Wildland fire management, while national, is also profoundly regional.

A draft manuscript for *Between Two Fires* was completed in August, 2013 and sent out to DoI and the USFS for comments. Almost none came back. The Forest Service wished to publish the text through the Government Printing Office, but the project crashed during early editing. (I was not allowed, for example, to offer any judgments such as "in 1960 the Forest Service was a benign hegemon"). After a lengthy review, typical of university presses, the University of Arizona Press agreed to publish the book. The USFS and DoI will each purchase 500 hardcover copies at 50% discount. The book is scheduled for publication in October, 2015.

The UofA Press also agreed to publish up to eight of the regional surveys. Each has a limit of 60,000 words. They will be released after *Between Two Fires*. Five are written and in press: *Florida's Fire Mosaic*; *California's Fire Complex*; *Where the Mountains Roar: the Northern Rockies*; *Middle Ground: the Great Plains*; and *Southwest Suite*. Money remains from the Forest Service contribution to the project to continue the research, as my university calendar permits. The final three volumes will be: *Between the Mountains: the Intermountain Region*; *Slopovers: the Oak Woodlands, Pacific Northwest, and Lake States*; and *Dark Days: the Northeast*. A ninth volume, *Here and There*, was developed from essays that did not fall under the rubric of a single region. I plan to self-publish it in inexpensive ebook format with a print-on-demand option.

I sent pdfs of the draft manuscripts for *Between Two Fires* and the first five regions of *To the Last Smoke* to JFSP in fall, 2014. In addition, I have presented the material at regional and national fire conferences.

## Study description and location

Primary sources consisted of published and unpublished documents, supplemented by interviews and site visits to scenes of significance. An MS Biology student, Heidi Neeley, helped track down the published literature and print out hard copies. It early became obvious that large gaps exist in the historical record, beginning in the 1980s. The National Archive holdings end in the 1960s. Some regional archives continue for another decade. Many institutions (such as the National Interagency Fire Center and BLM) have almost no institutional records relevant to fire. In general, fire records, like fire statistics, are pretty pathetic. Still, enough exists to construct a plausible narrative.

Much of the research involved a regrounding in actual practice as conducted at the country's prominent fire regions. Three major hearths exist: Florida, California, and Northern Rockies, with a significant secondary hearth around the Flint Hills and the Great Plains, generally. The Southwest provided a place that holds bits of many themes and practices. To explore other regions would extend the project beyond the scope of its original calendar.

## Key findings

The requirements for narrative - this has been known since Aristotle's *Poetics* - is to set appropriate beginning and ending points and to devise a thematic arc to join them. So, unlike the case with science, which assumes there is one true law or principle to discover, many narratives are possible depending on the author's purpose and choices. And unlike science again, narrative is avowedly teleological. The end determines the beginning (and vice versa).

The narrative arc for American wildland fire is a simple one. In 1960 the U.S. Forest Service was a hegemon. It had – by far – the bulk of fire resources, from crews and engines to research facilities. What it did not directly control, it shaped through various cooperative programs that bonded it with the states. It determined policy. It had the heft of academic forestry to bolster its claim for moral authority, as the adjudicator of American public lands. In that year Herbert Kaufman, in a classic case study in public administration, identified it as a model agency, not least because its workforce and its ambitions had melded. For American fire the Forest Service was the indispensable institution.

Then the wheels came off. A civil society emerged to challenge a suppression-only policy and the sense that fire was a government monopoly (Tall Timbers staged its first fire conference in 1962, the same year the Nature Conservancy conducted its first burn). An environmental movement challenged the authority of forestry as a source of values, the validity of multiple use as a land management principle, and the legitimacy of agencies to self-regulate their practices. By 1976 every federal land agency had its organic act rechartered or issued for the first time. The Wilderness Act inaugurated an era in which special-interest lands would replace generic, multiple-use lands, with the added quirk that Congress did not create a Wilderness Service to manage the new category of lands but left their administration to existing agencies, which meant those agencies had to reconcile a new (and often absolutist) style of land management with their traditional practices. The Civil Rights Act and new Immigration laws heralded a mass overturning of the workforce. In sum these changes added up to a fire revolution.

The revolt in the provinces became a revolution from above. The National Park Service broke ranks on the 10 am policy in 1968, then consolidated its experiences into a national manual for fire planning, NPS-19, in 1978. The Forest Service loosened the 10 am policy in 1967, allowed for natural fires in 1972, converted Fire Control into Fire Management in 1973, and reformed its policy, financing, and institutional setting in 1978. Meanwhile, interagency institutions evolved to replace the singular role of the USFS. BIFC opened in 1969, total mobility as a doctrine was proposed in 1973, the NWCG was chartered in 1976. At the time, progress seemed painfully slow; in retrospect, reforms advanced steadily and briskly. It had all happened amidst bipartisan enthusiasm and political turmoil that saw both the president and vice president of the United States resign from scandals, a lost war, and an economy mired in stagflation. By 1978, however, the American fire community accepted a policy of fire by prescription and completed a reformation that critics 20 years earlier would have declared impossible.

Then progress stalled. The weather turned wet. The Reagan administration pushed back against environmental reforms, politics became partisan, and civilian agencies suffered relative to the military. Hostility toward the Wilderness Act only deflected environmentalists' energies toward the Endangered Species Act, a far less controllable process. Fire research nearly imploded. The workforce declined in numbers, became subject to affirmative-action imposed quotas, and, when the administration accelerated commodity production on the national forests, even split into schisms. Both American land and American society went from a melting pot to a mosaic of special interests and peoples. In the mid-1980s the idea of a wildland-urban interface was floated. The public domain would increasingly polarize between the wild and the urban, with working middle landscapes abraded away.

A flood tide had carried the fire revolution forward. The ensuing ebb tide left it stranded. Ideas failed to become practices. Some agencies weathered the period well; the National Park Service and FWS became, in effect, gated communities. The primary stresses fell on the Forest Service. It could no longer bond the American fire community together; increasingly, it could not even hold itself together. No surrogate evolved to replace it. Then the climate turned dry, and in 1988 the public learned about the fire revolution through fires in Yellowstone. For the first time the GAO was directed to inquire about fire policy. Another power (to audit its own operations) once held by the fire community was now ceded to outside agencies. The GAO joined EPA, and later, OSHA.

The aftermath of the 1988 season yielded to a period of stabilization and regrouping. The advent of the Clinton Administration, particularly the enthusiasms of Interior Secretary Babbitt, led to a revival of the revolution. The Forest Service tried to reorganize around the doctrine of ecosystem management. The consent decree stabilized upheaval in the workforce. Norman Maclean's posthumously published *Young Men and Fire* further engaged the public. Unhealthy forests became the flip-side of exurban sprawl. The catalyst for Revolution 2.0, however, was the 1994 fire season, most notably the South Canyon tragedy. The sense grew within the fire community that suppression was broken. OSHA cited the agencies for safety violations. A decade of celebrity fires – nearly all coinciding with election years – kept fire before Congress and the public. In 1998 a quiet revolution helped consolidate the new efforts (among them, JFSP). Secretary Babbitt announced that the country was experiencing a “national fire crisis.” The 2000 fire season seemed to validate that pronouncement. Large fires rambled across the Northern Rockies, while a botched prescribed burn at Bandelier National Monument burned into Los Alamos and became the largest recorded fire to date in New Mexico. The surge culminated in the National Fire Plan.

And as it did with their wars, the Bush Administration and Congress wanted firefighths without the bother of paying for them. What followed was an era of megafires, metafire analysis, and megabucks. More and more, big fires accounted for most of the damages and costs (they were the 1% of nature's fire economy). So many groups issued so many reports that it seemed wildland fire had become the domain of MBAs more than engine captains. And as it did with wars, the Bush Administration and Congress wanted firefighths without the bothser of paying for them. Transfer payments claimed over 40% of the Forest Service budget; what big fires were doing on the landscape, they were doing to agencies. More institutions crowded onto the stage. The WUI intensified to the point of becoming a counterrevolution. Modest efforts to upgrade failed to keep pace with the worsening scene. It would take another change of administrations to rekindle reform. If climate change was helping drive firescapes, a change in the climate of opinion was needed to counter it. The 2007 season set new records; the western fire scene seemed to migrate into the southeast. Another crest of reforms arrived in 2008-2009 with new guidelines for appropriate management response, with the FLAME Act, and with the start of the National Cohesive Strategy project. Fire protection demanded integration beyond interagency scales to embrace intergovernmental (and even non-governmental) ones. Ominously, the fire scene continued to push eastward; the 2011 fires in Texas, climaxing serial conflagrations over several years, put into national prominence a place that had seemed outside the national narrative. The overall workforce both expanded to include state and local fire departments and shrank in terms of dedicated public servants; the evolution of fire's community resembled that of America's military, moving from broad based militia to an all-volunteer force increasingly supplemented by private-sector services (a fire industrial complex). The 2013 season became a rolling thunder of media attention, with hundreds of houses incinerated outside Colorado Springs, the Granite Mountain Hotshots burned over, and the Rim fire rambling across Yosemite. The Forest Service was being fingered as the epitome of dysfunctional democratic government.

To summarize, cast the story into three acts. Act I (1962-1979) witnessed a revolution in fire thinking, policy, and institutional arrangements. Act II (1980-1992) saw a counterrevolution that failed to reverse the reforms or to replace them, but left the American fire community adrift and the Forest Service mortally wounded. In Act III (1993-2013) the project began again, but has failed to match threat with response. Probably the next advance will require a change in generations.

Or, to widen the aperture: the upshot is a fire history of America that divides roughly into 50-year rhythms. In the language of landscape ecology, the U.S. spent 50 years committed to resistance - stopping the threat of fire at its source. It then spent 50 years trying to restore fire, with mixed results. Now it seems to be entering an era of resilience, an admission that remediation measures come too late and on too small a scale to affect the outcome except in particular places. Fire managers will have to accept what is coming at them and try to cope as best they can with safety and cost as primary indices.

## **Management implications**

The Forest Service requested a briefing paper from the project, which follows.

- 1) The appropriate role for the U.S. Forest Service

It is hard to recapture now how thoroughly 50 years ago the U.S. Forest Service dominated and organized the American fire scene. For most of the 20th century the USFS was the indispensable agency of wildland fire. It remains the largest single player. Its history remains a cameo for the country's overall.

Steadily, however, it has surrendered that centrality to interagency (and now intergovernmental) institutions. But not completely, and not internally. It continues in ways to serve as the lead and integrative agency even as it has lost the charter to do so. It has a self-assumed responsibility without the real power to act. National tensions that should be diffused through consortia it absorbs. Yet so long as the agency is dysfunctional, so is the system.

It is not just that the Forest Service is confused about, or has lost, its mission. It's that its role in the national system for fire management is uncertain. The sooner the agency can achieve clarity, the better for all. Probably this will mean ceding certain historic roles it has enjoyed as a leader to become a first among equals.

The obvious technical solution is to evolve the National Cohesive Strategy into a body with political influence, which means giving it control over some monies and decisions about allocating those funds. Given the country's political malaise, such a move seems delusional. The U.S. fire establishment, like the Euro zone, must decide to truly integrate, break up, or pay for serial bailouts. The U.S. seems unable to make such a decision or even to decide that a decision is required.

## 2) Placing Fire and Aviation Management

This process might begin within the Forest Service itself. Moving FAM into State & Private Forestry demonstrated the peculiar role of the USFS within the country's institutional infrastructure for fire. The agency has still failed, however, to write fire plans for most of the national forests. It might make more sense to attend to its own affairs first and let the various interagency organs worry about integration. I suggest moving FAM back to the National Forest System, where its first responsibilities reside.

## 3) Prescribed fire

Fire by prescription was the ruling concept of the fire revolution. In effect, prescribed burning was conceived as a unifying practice that would redirect fire control into fire management and one that could bond all regions. The southeast was making prescribed fire its informing practice. Western wildlands could absorb both the burning of logging slash and free-burning fires in wilderness under one amorphous concept. Fire by prescription was a doctrine that allowed for - was predicated upon - the continued control over fire. It just came by different means.

The doctrine has succeeded in local places but failed nationally. Prescribed fire is a niche practice in the northeast, an expensive undertaking in the west and mostly effective in grasslands, and, though an informing practice in the southeast, still done far less than needed. Even Florida burns half of what fire officials believe is necessary. The use of prescribed natural fires has repeatedly stumbled in the field, not least because it only takes a few spectacular breakdowns to raise the political and fiscal costs beyond social tolerance. Where it works, prescribed fire will persist. Elsewhere, it is yielding to other methods or to wildfire. It has become one technique, not a defining one.

Success requires more than checklists and determination. It requires a landscape that can absorb slopovers. It requires a culture of acceptance, both within the agencies and between them and their sustaining society. It cannot be done as simple set-pieces, each subject to reviews. It requires large landscapes, coordinated planning, and flexibility over seasons, not specified dates. With better understanding of what works - and humans have been doing it more or less successfully for several hundred thousand years - the practice could certainly expand in many landscapes. But in the West it is being replaced by the nominal management of wildland fire.

#### 4) Fire management as mashup

Firefighter safety, costs, liabilities, worsening firescapes, the daunting complexities of prescribed fire, interpretations of appropriate management (or strategic) response - all are pushing fire management in many western wildlands toward a tolerance for larger wildfires. What is emerging might be characterized as a management mashup.

Under conditions that favor big fires, fire officers are selecting different strategies for different parts of the burns, a combination of point protection and big-box burnouts from defensible perimeters. Those burnouts and tolerated wildfire burning are becoming, for the West, a replacement for prescribed fire. Call it a fusion model, or a hybrid model, or just a mashup.

The process will likely spread. If so, then it would be well to find ways to do it better. Burning out has become, for some fires, among the most severely damaged parts of the fire - we should be able to apply basic fire behavior principles to get better burns with less destruction. The resulting landscapes are typically dappled with unburned and burned patches, the latter of varying character. Those post-burn environments are ideal for reconstructing new firescapes. They are places in which prescribed fire could be applied at relatively low costs and risks. In effect we can build new fire regimes out of the landscapes burned by wildfire.

The proper techniques are matters that research can identify. The critical concern may lie in assumptions about our relationship to fire. For the past century the belief has prevailed that we can control wildland fire, either by suppressing it or by substituting tame fire for wild fire, or by otherwise "controlling" wildland burning. This was never really possible. But now conditions have deteriorated such that it no longer makes sense to assert that control in the usual sense is even possible. We can live with fire, not determine it. We can manage it. We can't control it. The assumption that we must control fire has become an impediment.

#### 4) Moving toward resilience

Another way to say this is to describe contemporary development as a move toward resilience. For 50 years the country tried a philosophy of resistance. We sought to exclude a threat or when it appeared to suppress it. Then we adopted a philosophy of restoration. We would reinstate fire to something like its presettlement (or natural) state, or we would imagine what "desired future condition" we wanted, and then move to create something like it. Either approach - a golden age in the past or a golden age to come - assumed that science would determine the ideal condition and then management would apply that knowledge to achieve it. This notion, too, seems to have exhausted its usefulness.

Too much has changed, and too much is beyond our control. We can't stop climate change, the mass coming and going of species, or sprawl. We can't, even in principle, choose our conditions: they are simply happening. We can't get ahead of the problem except in select places. Instead we appear to be negotiating our relationship with fire such that we can protect our critical assets and otherwise let fire roam and build new landscapes out of what follows. Science does not determine and management apply. Like fire officers, researchers, too, must adapt to what is, not what might have been or might be.

#### 5) The I-zone and its discontents

So much has been said about the I-zone (or WUI, or Interface, or Intermix) that there is little to add. The technical problems are understood. What is missing is a suitable analogy and narrative. The time might be ripe to turn the existing explanation inside out.

Specifically, it might be helpful to shift from the wildland side of the fence to the urban side. These are pieces of cities, albeit with peculiar landscaping. They should be defined as exurban enclaves, subject to the same methods that have largely expunged fire from urban America. There are certainly plenty of things the wildland community can do to improve protection. But the problem is fundamentally an urban one. It should be defined as such.

In brief, the story is not just about wildlands and their latest challenge. It is part of a long narrative of urban fires, as the city sprawls and splashes across formerly rural scenes.

What both sides of the interface share is stress imposed by outside forces, of which climate change and global economics are primary. This matters because it can change the narrative from a western one, in which idiotic westerners are building houses where the fires are, to one in which the fire scene is moving to where the houses are. The houses are overwhelming in the East. This redefines a regional subnarrative into a national one.

#### 6) The all-hazard threat

The deeper challenge from the I-zone is that it threatens to remake wildland fire agencies into an all-hazard emergency response model. This is a global project, and it has everywhere failed to handle wildland fire. The urban fire model can improve protection and social services to communities. It has not demonstrated that it can manage fire on the landscape.

In the U.S. the two polar exemplars are Texas and California. Texas relies on volunteer fire departments, and struggles to cope with the necessary institutions to scale up for widespread and extended operations such as it experienced in 2011. California mutated its Department of Forestry into CalFire, an urban fire services model projected into the countryside. It's an expensive program - too expensive for the state - whose costs are hidden by emergency accounts and extensive use of inmate crews (which replaced the CCC).

Clearly, there are selective places where some accommodation is in order. But they should not become national goals. Where the two approaches meet, the urban wins. The best example is Southern California after Firescope. Because of the California's master fire plan, Southern California fire agencies became the model for all of the state. Apart from select settings, it would be good to halt this project at the state's borders.



## 7) It's politics, not just policies

Reconciling the many players in the American fire community is a political undertaking, not just a matter of mutual policies. The gamut of interested parties is breathtaking, from federal to state and local institutions to a boisterous civil society. Not only is some mechanism necessary to allow all members to participate, but the mechanism must be seen by all as legitimate. The National Cohesive Strategy is, as I see it, ultimately premised on this observation. If it succeeds, or if some successor is to work, it must function as a kind of fire constitution for the country.

A striking feature of the American scene is its regional composition. Each region has its characteristic fires, preferred strategies, distinctive cultures, and legacies. These do not seem to transfer across regions. *Landscape*, in its etymological origins, refers to lands sculpted by people. The regions differ not simply in their physical environments but in the way cultures act on them. The three regions identified by the national cohesive strategy make a map of Civil War America.

It's very unlikely that the science-driven products that the CS insists upon will survive. This is fundamentally a political project. I find almost no historical evidence for Congress tolerating a true loss of control. Science will not decide and Congress enact. The more probable outcome is that Congress will intervene, as it did with attempts to rationalize health care.

As a political project, a useful comparison may be to the euro crisis. The euro member states have three options. They can fully integrate. They can break up, wholly or selectively. (What does Finland have to do with Greece? Or the BLM with Texas VFDs?) Or they can continue to lavish bailouts without end. In fact, a bit of all seems to be happening, and that is likely to be what occurs with American fire. There will some integration where the pain is not high. There will be some breakups, particularly for agencies that have independent sources of funding or simple heft (becoming, as it were, gated communities). And bailouts will continue, enough to irritate those paying the costs but not enough to fix the system.

## 8) Workforce: doing the job

The story of the Forest Service's workforce is, again, the story of the country's demographics in cameo. One interpretive prism is the growth of diversity as the agency's workforce moved from dominance by white men to a composition by race, ethnicity, and gender that better reflected the nation's. It was a rough ride. Another prism, for fire particularly, is the changing character of the American military.

Fifty years ago the country had a draft and the USFS a fire militia. Today, the nation has an all-volunteer force progressively isolated from the general population. The Forest Service has a fire force steadily insulated from the rest of its operations. Although costs for both forces remain huge, its members are quasi-autonomous. Fire personnel are as likely to identify with fire counterparts in other agencies than with the ologists in their own. Even as an ideal the old militia has dissolved.

Other trends align nicely, for example the move toward privatizing. The use of contractors as vendors and security forces (mercenaries) mirrors similar developments in fire management. As with interest in all-hazard emergency service, the movement matters because it splits fire management away from land management. Fire operations becomes a separate, stand-alone service, not an integral part of land planning.

## 9) The West's emerging fire triangle

Today, three strategies compete for dealing with fire in western wildlands. One is regressive, a resort to full suppression, perhaps as an "emergency" for a season. One is proactive, and seeks to get ahead of the fire crisis by pretreating land and hardening communities. The Collaborative Forest Lands Restoration Program and Firewise are examples. The third is reactive in that it accepts that the time has passed to get ahead of the problem and we must respond to what is coming at us.

The liability with the first is that it can succeed only as a temporary fix. It can put down an ecological riot: it cannot govern the landscape. The difficulty with the second is scale. Projects are much smaller and slower than the fast-morphing fire scene. The Four Forests Restoration Initiative may, ideally, treat 500,000 acres over 10 years. The Wallow fire burned more than that in two weeks. The costs - political, social, fiscal - are large. The reactive model that emphasizes point protection and big-box burnouts is a faith-based ecology and requires that agencies admit they are no longer in control. Still, it appears destined to be the default strategy in coming years.

All three are in play, like a game of rock-scissor-paper.

These are, as the saying goes, interesting times.

## Relationship to other findings and on-going work

Wildland fire has caught the fancy of the public, the media, and, if in perverse ways, politicians. At least three books are being written on the Yarnell Hill fire alone. Fire has attracted interest for its role in biodiversity and extinction, climate change, and public safety. There are, however, any comparable works to the suite written under this project. *Between Two Fires* will almost certainly become the history of record. *To the Last Smoke* offers a unique cross-section of how America's pyrogeography looked between 2011 and 2016.

## Future work needed

Some funding which the Forest Service contributed to the project remains. I intend to use it to continue my regional reconnaissances. The University of Arizona Press has agreed to publish up to three more.

## Deliverables

### *Books*

The project promised two complementary books. Both are in publication.

*Between Two Fires: A Fire History of Contemporary America* will be published by the University of Arizona Press in October, 2015. The U.S. Forest Service and Department of the Interior have negotiated to receive 500 copies each at a 50% discount (\$25/book). I have argued for simultaneous publication of a paperback edition that can reach a larger

audience; the press has not yet decided whether to accept that recommendation. If they choose only to go with hardcover, a paperback edition will follow in 2016.

*To the Last Smoke* fissured into a suite of regional studies, each about 60,000 words long. Five such studies are in the hands of the press, with rapid publication expected after the release of *Between Two Fires*.

I project another three regional studies as my university calendar permits over the next two to three years.

The UofA Press was not interested in a ninth volume, *Here and There*, a collection of thematic essays, mostly drawn from my American research but including several essays from elsewhere in the world. I believe these pieces should be available to the fire community and am arranging to have them self-published as an inexpensive e-book with print-on-demand options for those who would like a hard copy.

*Articles and chapters (beyond those promised in the proposal)*

"Green Fire Meets Red Fire," pp. 123-132, in Ben A. Minteer and Stephen J. Pyne, eds., *After Preservation* (University of Chicago Press, 2015)

"Built to Burn," in Richard Malloy et al, eds., *Design with the Desert. Conservation and Sustainable Development* (CRC Press, 2013), pp. 213-222.

"Afterword: Fire on the Fringe," 390-396, in Greg Bankoff, Uwe Lubken, and Jordan Sand, eds. *Flammable Cities: Urban Conflagration and the Making of the Modern World* (University of Wisconsin Press, 2012)

"The Cash-Value of Environmental History," pp. 45-47, in Kimberly Coulter and Christof Mauch, eds., *The Future of Environmental History*, Rachel Center Perspectives, Rachel Carson Center, Ludwig-Maximilians-Universität München (March, 2011); <http://www.carsoncenter.unimuenchen.de/download/publications/issue6.pdf>

"The Cash Value of Fire History: An Apologia," pp. 1-4, in *Proceedings, 3<sup>rd</sup> Fire Behavior and Fuels Conference*, International Association of Wildland Fire (October, 2010).

"Box and burn: the new reality of western fire," *Slate* (4 July 2014): [http://www.slate.com/articles/technology/future\\_tense/2014/07/box\\_and\\_burn\\_the\\_future\\_of\\_u\\_s\\_wildfire\\_policy.html](http://www.slate.com/articles/technology/future_tense/2014/07/box_and_burn_the_future_of_u_s_wildfire_policy.html)

"Beyond the Jeremiad," *Wildfire* (Nov/Dec 2013), p. 34.

"Three fires," *Washington Post* (14 September 2012): [http://www.washingtonpost.com/opinions/from-yosemite-to-colorado-our-approach-to-wildfires-is-all-wrong/2013/09/13/b0aadda6-1968-11e3-8685-5021e0c41964\\_story.html?wpisrc=emailtoafriend](http://www.washingtonpost.com/opinions/from-yosemite-to-colorado-our-approach-to-wildfires-is-all-wrong/2013/09/13/b0aadda6-1968-11e3-8685-5021e0c41964_story.html?wpisrc=emailtoafriend)

"After the fire," *Arizona Republic*, Perspectives (7 July 2013)

"Why We Are Not in a War with Fire," *Project Syndicate* (4 July 2013):

<http://www.project-syndicate.org/contributor/stephen-j--pyne>

"Wallow fire," *Arizona Republic*, Perspectives (12 June 2011), B10-11

"WUI Woes," written contribution to Jackson Hole workshop on wildland/urban interface, hosted by Headwaters Economics (January, 2014)

Participant and contributor: David Brian Johnson, "The Future of Wildfires. A Futurecasting Report" (Intel, 2014)

"Between Two Fires: Understanding America's Wildland Fires Since 1960," Pinchot Institute (transcript of public talk; posted at: <http://www.pinchot.org/pubs/500>)

"Trying fires," submitted on request to FireSafe Montana

"Moved by fire: history's Promethean moment," *The Appendix 2.4* (October, 2014), pp. 46-50; <http://heappendix.net/issues/2014/10/moved-by-fire-historys-promethean-moment>

"Squaring the triangle at San Carlos," *Wildland Fire Lessons Learned Center* (1 Aug 2014): <http://www.wildfirelessons.net/viewdocument/?DocumentKey=4ac708d6-fd70-4aff-a1f9-6ba991ad5ecc>

"Firepower," *Interdisciplinary Studies in Literature and Environment 016* (2014), pp. 109-114; doi: 10.1093/isle/isu016

"Burning Like a Mountain," *Aeon Magazine* (January 2014); <http://aeon.co/magazine/nature-and-cosmos/how-the-american-west-became-a-fire-tinderbox/>

"The Big Blowup," *Global Environment 11* (2013), Special Issue on Environment and Memory, ed. Frank Oekötter, pp. 200-201

"Green Fire Meets Red Fire: Environmental History and the No-Analogue Anthropocene," *The Pinchot Letter 17* (3) (Spring 2014), pp. 1-4,7

"A Refusal to Mourn the Death, by Fire, of a Crew in Yarnell," *Pacific Standard* (Nov 12, 2013)[<http://dev.psmag.com/environment/refusal-mourn-death-fire-crew-yarnell-69717/>]

#### *Presentations (beyond required deliverables)*

"Smokechased," Southwest Fire Consortium, Santa Fe, NM (2012)

"Figuring the Future," Association for Fire Ecology, Portland, OR (2013)

"Words on Fire from a Scholar on Fire," Oregon State University (2013);  
[https://media.oregonstate.edu/media//0\\_uo5e6hbq](https://media.oregonstate.edu/media//0_uo5e6hbq)

"Fire History," M-520, National Advanced Fire and Resource Management (2011, 2012, 2013, 2014)

"These Conflagrated Prairies," Society for Rangeland Management; Oklahoma City, OK (2013)

"Between Two Fires," University of Nevada-Reno (2013)

"Consuming Fire," Backyards and Beyond, NFPA; Salt Lake City (2013)

"Between Two Fires," Pinchot Institute for Conservation; Washington, DC (2014)

"Between Two Fires," Oak Woodlands Consortium; Tennessee (2014)

"Recent fire history of America," Southwest Fire Consortium; Santa Fe, NM (2014)

"Between Two Fires," IAWF-AFE conference; Missoula, MT (2014)

*Other publications, indirectly related to the project (and beyond required deliverables)*

The research also contributed to portions of *Fire on Earth: An Introduction* (Wiley Blackwell, 2013), *Fire: Nature and Culture* (Reaktion Books, 2012), and a TED Talk (2015).