



Strategic Foresight: Applications for COVID-19 and Wildland Fire Management

Long Term Outlook Illustration. Photo: AdobeStock.

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Strategic foresight, also known as Futures, is an applied field that uses a suite of methods to explore possible, plausible, and preferable future states in order to support today's decision making and management. Strategic foresight is widely used by (among others):

- All U.S. military branches and intelligence agencies,
- Many companies from the Fortune 500 as well as smaller businesses, and
- The United Nations and International Monetary Fund.

Because the work tends to be proprietary or classified, the results are rarely made public, making strategic foresight less well known than its widespread use would suggest. The Forest Service's Northern Research Station's Strategic Foresight research team (see the sidebar) has been building a strategic foresight program to address issues in forestry and natural-area management and to broaden the understanding of these methods within the public sector.

In March 2020, when the COVID-19 pandemic was declared to be a national emergency with the fire year heating up and the field season imminent, our team was asked to quickly develop scenarios to help plan for and manage the impending compound disaster. We did so by providing a set of scenarios that

fire teams used as this unprecedented fire year unfolded (as described in other articles in this issue).

This article:

- Describes the scenario development process we used for COVID and wildland fire management and how it could be applied in other contexts; and
- Discusses additional ways that strategic foresight could benefit wildland fire management.

APPLYING SCENARIOS

Although many different methods are used in strategic foresight, scenarios are probably the best known, with the Millennium Ecosystem Assessment being one well-known environmental application (Carpenter and others 2005). Scenario planning is a way of grappling with fundamental uncertainty and helping decision makers by exploring a range of plausible paths that an uncertain future could take (Alcamo 2008). The Intergovernmental Panel on Climate Change defines a scenario as "a coherent, internally consistent, and plausible description of a possible future state of the world" (IPCC 2008). Scenario planning can help identify robust options and actions that would be appropriate and effective under a wide range of potential future conditions. It can also support creative thinking about novel situations.

Want to learn more about the Forest Service's strategic foresight research?

- Our [unit page](#) outlines the basics
- Ten Principles for Thinking About the Future:
 - » [Short version](#) (online summary)
 - » [Full writeup](#) (about 20 pages)
- [Federal Foresight Community of Interest](#)
- [Drivers of Change in U.S. Forests and Forestry](#) (general technical report)
- [The Forest Futures Horizon Scanning Project](#) (general technical report)

Strategic foresight is typically used to identify and explore possible futures. Ten, 20, or even 50 years hence, the methods might also be usefully applied to immediate concerns. For example, Machlis and McNutt (2010) worked with a team to develop scenarios to

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with a number of professional futurists, several of whom had participated in a previous strategic foresight project on wildland fire (Olson and others 2015). We divided the scenarios among the three of us, then shared our drafts with each other and refined them together. Scenarios are typically named in a way that sums up their main points or their ethos and impact; we decided on the scenario names together.

Results: Scenario Sketches

We generated four scenarios (fig. 3), one for each quadrant in the 2x2 matrix:

1. High-COVID-19 impacts and low fire year severity,
2. High-COVID-19 impacts and high fire year severity,
3. Low-COVID-19 impacts and low fire year severity, and
4. Low-COVID-19 impacts and high fire year severity.

We kept the scenarios brief to meet the needs of high-level policymakers and because rapid turnaround was required.

For clarity, the scenario sketches below have been lightly edited from the original report. Each includes the scenario name, key drivers, a short narrative, and potential long-term implications. The scenarios were written as the pandemic was just beginning in the United States, and little was known about how COVID was transmitted. As typical for scenarios, each narrative is written from the perspective of the future, as if the scenario had actually occurred.

SCENARIO 1: Necessary Redirection (high COVID-19 impacts, low fire year severity)

Key drivers:

- Mild fire year (less severe than recent average year).
- Severe COVID impacts across society nationally and globally.
- Massive economic recession and Government response.
- Forests perceived as safer than cities.

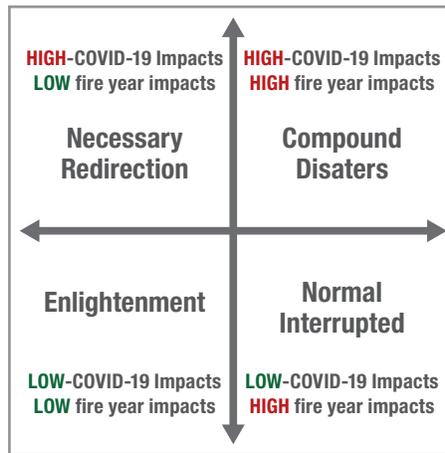


Figure 3—The four scenarios by name, each reflecting a quadrant in the 2x2 matrix.

Scenario narrative: Drastic precautions were necessary to reduce disease transmission rates among firefighters and support crews. Mandatory testing was enforced before firefighters were deployed; additional hygienic measures were required, such as laundering of soiled clothes and hand-washing stations. Large fire camps were eliminated, and difficult choices were made as to where and how to deploy small teams. Thankfully, the mild fire year allowed smaller crews to work fairly effectively in response to wildfires, primarily focusing on rescuing people rather than containing fires. However, the crews had less ability to conduct fuel management activities such as prescribed burns.

With fire less of a concern, response to the pandemic took precedence in terms of funds, resources, and workforce. Funds previously allocated to wildland fire management were diverted to combat COVID-19; in many cases, firefighters were asked to support law enforcement and pandemic relief efforts. Widespread implementation of social distancing policy increased visitation of public lands because cities were seen as dangerous. Panic and despair also drove people to take up residence on public lands, legally or not. Unsanitary makeshift communities became viral hotspots, and some rural communities refused entry to outsiders, including firefighters and support crews.

Potential long-term implications:

- Fewer prescribed burns could result in larger fuel loads and more large wildfires in the future.
- Hygiene improvements in fire camps could become permanent.
- Fire management budgets could be cut because diverted resources caused little increase in damage from wildfires.
- Massive long-term recession could displace many from homes onto public lands, heightening the risk of future wildfires and increasing the difficulty of rescue.

SCENARIO 2: Compound Disasters (high COVID-19 impacts, high fire year severity)

Key drivers:

- Fire year more severe than recent average year.
- Severe impacts of COVID-19 across society nationally and globally.
- Economy in severe recession, bordering on a depression in terms of unemployment.
- Support services severely curtailed (including commercial flights, supply chains, and contractors).

Scenario narrative: Dealing with two simultaneous and interacting disasters was an unprecedented challenge. A pandemic during a severe fire year created cascading effects that stretched every aspect of wildland fire management to the breaking point or beyond. From hiring and training to transportation and support, all essential aspects of wildfire response were impaired. Traditional local partners were often unavailable because they were already struggling to respond to the pandemic, and fire crews from other regions and countries were unable to help. Many wildfires burned with little or no response from firefighters.

Some counties without confirmed COVID-19 cases blocked entry of crews for fear that they could be carrying the virus. In other places, people refused

to leave their homes for fear of the virus, even in the face of approaching wildfire. Loss of lives and property was significant. Staff morale hit an all-time low and staff burnout an all-time high, affecting job performance and employee safety and well-being.

Potential long-term implications:

- Fully embrace the shift to a new fire management paradigm: from the “war on fire” paradigm, with the goal of extinguishing all blazes, to a “fire resilience” or “learning to live with fire” paradigm.
- Trust in Government and in experts who failed to curb both the pandemic and wildfires could rapidly decline.
- Hiring firefighters and support crews could become much more difficult in the future due to the devastating and terrifying fire year.

SCENARIO 3: Enlightenment (low COVID-19 impacts, low fire year severity)

Key drivers:

- Fire season less severe than recent average year.
- COVID-19 response moderately successful in flattening the curve in the United States.
- Economy in short-term recession.
- Support services curtailed (such as commercial flights, supply chains, and contractor services).

Scenario narrative: Mobilizing fire crews was difficult, but the relatively low size and number of wildfires softened the impacts. Because COVID-19 containment was relatively successful, the greater use of “spike camps” (temporary secondary camps for individual fire crews, accessible from base camp) improved hygiene, and other tactical options were also largely sufficient to manage COVID-19.

Wildfires were carefully studied and monitored to decide where to best deploy resources, with more fires allowed to burn in areas where risk

to life and property was low. Use of wildfires offset the reduction in number of prescribed burns to reduce fuel loads; prescribed fires were curtailed early in the year for safety reasons, although concerns about future fuel loads rose.

Forest Service employees were able to deliver important fire and illness prevention messages to campers and other forest visitors. Due to the relatively low severity of the fire year, some fire funds were redirected to pandemic response.

Potential long-term implications:

- Public confidence in Government and science could rise in response to the effective management of the pandemic and fire year.
- Future epidemics might not be taken seriously if the Government is seen as overreacting to relatively low COVID impacts.
- Funds that were redirected from agencies responsible for wildland fire management due to low fire year severity could be lost permanently.
- Any additional national or global disruptions (such as war or extreme weather) could rapidly change this scenario.

SCENARIO 4: Normal Interrupted (low COVID-19 impacts, high fire year severity)

Key drivers:

- Fire season more severe than recent average.
- COVID-19 response moderately successful in flattening the curve in the United States.
- COVID-19 resources (including funds and equipment) redirected to wildfire response.
- Economy in recession.
- Support services curtailed (such as commercial flights and supply chains).

Scenario narrative: Public health efforts to slow the spread of COVID-19 proved moderately successful, slowing the rate and severity of infections. Nonetheless,

the realities of fighting fires—with firefighters sharing close quarters in camps and vehicles and with many shared high-touch points (like truck door handles)—meant that firefighters continued to be at increased risk of COVID-19 even as complacency set in regarding the risk. Smoke exposure increased the risks for fire crews and residents alike. Because of disruptions in support services, decisions about which fires to fight—and how—were based almost exclusively on threats to life rather than property. More fires were left to burn.

Potential long-term implications:

- If the agencies responsible for wildland fire management announce a decreased firefighting capacity due to COVID-19—and if a severe fire year brings significant losses to people and communities—then the agencies could lose credibility.
- The necessity of fighting fewer wildfires could result in stakeholders assuming that the agencies responsible for wildland fire management can fight fewer fires in the future.
- Changes required to manage COVID-19 could result in long-term safety and hygiene improvements for fire crews.
- Public health lessons learned from the pandemic response could offer insights into improving wildland fire management.

Scenarios like these are typically developed to guide decision making in situations that might be possible for 10 to 20 years or more. By exploring widely varying plausible futures, decision makers are able to think about preferable futures and take actions leading to them (and preventing undesirable futures). In the case of the imminent compound disaster of a pandemic in a severe fire year, scenarios were useful in tracking the situation as it unfolded and in guiding actions while preparing for what might come next. (The use of the scenarios is described by McCarthy and Calkin in this issue.)

STRATEGIC FORESIGHT AND FIRE: APPLICATIONS BEYOND COVID-19

David Bengston and others led an expert panel study in applying strategic foresight to wildland fire management (Olson and others 2015; Olson and Bengston 2015). The study highlighted the “level of uncertainty about external developments and future conditions that will set the context for wildland fire management,” noting that the level of uncertainty is “significantly greater than is recognized in current planning” (Olson and others 2015). Exploring possible impacts of different critical uncertainties from outside an area of focus is a hallmark of strategic foresight, and greater application of its methods could strengthen wildland fire management.

One example of a critical uncertainty from outside the realm of wildland fire management was the threat of a pandemic. Public health experts had long been warning of a global pandemic, and the outbreak of Ebola in western Africa in 2013 motivated some to plan for a global pandemic (Osterholm and Olshaker 2017; Khan and Patrick 2016). We were able to apply strategic foresight methods to the imminent issue of fighting wildfire during a pandemic.

But how might strategic foresight be used in wildland fire management to be more prepared for a future disruption? Let’s take a look.

We discussed rapid scenario development, noting that scenarios are one of the best known methods in the strategic foresight toolkit. Other strategic foresight methods include the futures wheel, backcasting, gaming, and visioning (Bengston 2019). Foundational to strategic foresight is horizon scanning, a process of gathering and analyzing “weak signals” of change from many fields (Hines and others 2019). An example of a weak signal of change from long ago is Henry Ford’s tinkering with a horseless carriage; in time, the car completely transformed access to public lands and what people wanted from them (Sutton 2002), even though many initially scoffed at Ford

and his experiments. Weak signals often apply to the other methods of strategic foresight as well, including the development of scenarios. The use of horizon scanning can find “wild cards” (low-probability, high-impact events; Bengston, in press) and other signals of potential change and can point to very different futures than today’s business as usual would suggest. Consideration of a broad array of possible futures—in the plural—distinguishes strategic foresight from other future-looking methods, such as forecasting, which tends to focus on a single future outcome (fig. 4).

We developed a horizon scanning program and have been gathering “horizon scan hits” with forestry implications since 2016 (Hines and others 2019). Scan hits are signals of change, often weak signals. Our dataset has nearly 3,000 horizon scan hits to date, each tagged for pertinent topic areas and also for three horizons. Horizon 1 (H1) comprises scan hits for changes that are emerging now or are imminent. H1 scan hits reflect the current trajectory of the domain (in this case, forestry and wildfire) and can already be affecting the domain. Horizon 3 (H3) scan hits are further in the future, even decades away, and are the most uncertain. H3 scan hits are new and can even sound laughable and strange, like Ford’s horseless carriage. H3 scan hits are the disruptors: if they come to pass, they could transform the domain. Horizon 2 (H2) scan hits are in between in terms of both time and level of uncertainty, reflecting a transition (rather than transformation) in the domain (Hines and others 2019). As Hines and others (2019) put it, H1 is “now” (or near), H2 is “next,” and H3 is “new.”

To illustrate how scan hits from outside a specific topic of interest can be important, let’s

look at three scan hits related to forest products, one for each horizon:

1. **H1:** Mass timber products, including cross-laminated timber (CLT) and nail-laminated timber (NLT), are increasingly used in construction worldwide (Domanska 2020). At least one company is making class A fireproof CLT by infusing the wood with surfactants (Pollock 2018), thereby creating an even more fire-resistant form of CLT. Increased attention to lowering construction’s carbon footprint could build demand for CLT, NLT, and similar wood products, potentially increasing demand for wood.
2. **H2:** Transparent wood that can replace glass and other materials in certain applications has been developed but not yet deployed commercially. Home construction, cell phones, and other products could all someday be made essentially from wood (Androff 2021). This and related advances could also increase demand for wood.
3. **H3:** Lab-grown wood is in the earliest stages of development (Bengston 2021). Scientists are prototyping methods to grow wood in the lab without ever harvesting a tree, not unlike the production of lab-grown meat. If lab-grown wood follows a similar development path as lab-

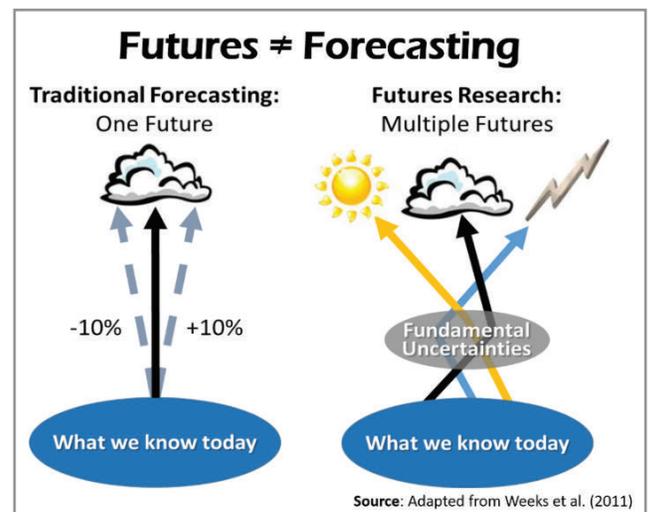


Figure 4—Strategic foresight (or Futures) considers a wide array of possible future states, whereas forecasting typically focuses on one future state. (Adapted from Weeks and others 2011.)

grown meat, then we could see lab-grown wood products going to market in 10 to 20 years. Unlike the H1 and H2 scan hits, this one could point to a significant decline in demand for wood from forests.

These three scan hits suggest forces that could initially increase and then rapidly decrease the demand for wood, with potential dramatic changes for the timber industry. The demand for wood has implications for wildland fire management: Is there a market for wood thinned to reduce fuels? Will a drop in demand increase fuel density, thereby escalating the severity of wildfires?

Of course, these are just three scan hits out of thousands; before any attempt could be made to guide decision making, a fuller analysis would be needed, including scan hits from many other domains, from climate change to demographic shifts and more. But these three examples show the range from now (H1) to new (H3) and how emerging issues and developments from outside the domain of wildland fire management can have meaning for fire managers.

Scan hits can be the data for other strategic foresight methods, including scenarios to guide planning (Hines and others 2019); futures wheel exercises to explore the possible positive, negative, and transformational implications of any given change (Bengston 2019); and backcasting analysis, which traces from a desired (or undesired) future state back to the present (Bengston and others 2020). Wildland fire managers and policymakers could use the futures wheel, for example, to explore the possible effects of any given change (such as a sudden decline in demand for wood) to help frame preferable futures in order to guide decisions today. Playing serious games, such as our *IMPACT: Forestry Edition*, can help people break out of cognitive ruts while providing a look at possible future states. Together, these and other strategic foresight methods can help managers and policymakers think outside business-as-usual trajectories to consider mid-range to long-range futures that

could be quite different from the world we live in today and to plan accordingly.

PREPARING FOR THE FUTURE

In 2020, the need to simultaneously combat actual wildfire and the wildfire-like spread of the coronavirus was an unprecedented challenge for the agencies responsible for wildland fire management. Rapid development of scenarios helped frame possible trajectories for the 2020 fire year. In the longer term, the application of strategic foresight methods—including scenarios, futures wheel exercises, and focused horizon scanning—could expand thinking on what could change in wildland fire management, enabling managers and policymakers to better prepare for whatever future we find ourselves in.

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