

2. AN INNOVATIVE METHOD FOR IDENTIFYING FRUITFUL SCANNING SOURCES FOR FOREST FUTURES

Bo Roe and Andy Hines

Abstract.—The Forest Futures Horizon Scanning project depends on volunteer scanners, who often have no experience with scanning. Therefore, it was important to find ways to help volunteers become productive scanners quickly and effectively. This paper describes a method that was developed for identifying a list of useful and relevant scanning sources for the forest futures domain. The table of scanning sources produced by this research is a valuable first step to help new scanners begin to identify signals of change related to forest futures.

INTRODUCTION

The goal of horizon scanning is to identify early indicators of change that could affect organizations and other systems. Horizon scanning is an initial step toward developing strategic perspectives and actions to help organizations maximize benefits and minimize negative consequences by anticipating possible future changes. Scanning involves finding, collecting, and analyzing signals of change that may indicate shifts within a domain or topic area. The USDA Forest Service (hereafter, Forest Service), Northern Research Station's Strategic Foresight Group, in cooperation with the University of Houston Foresight program, has designed and is in the early stages of implementing an ongoing Forest Futures Horizon Scanning system as an input into a larger program of foresight research. The overall goal is to develop environmental foresight, defined as a combination of insight into future social and environmental challenges and opportunities, and the ability to apply that insight to prepare wisely for a sustainable future (Bengston et al. 2012, Hines et al. 2018).

This paper focuses on the specific challenge of identifying productive scanning sources related to the future of forests, forestry, and the Forest Service. The forest futures domain or topic area poses unique challenges, because forestry is a diverse field and it is closely connected with many other domains and fields, such as sustainable agriculture and climate change. The early experience with the Forest Futures Horizon Scanning system suggested that fruitful scanning sources relevant to the forest futures domain were difficult to identify for many scanners. Thus, a side project was launched to identify a list of relevant and fruitful scanning sources for the forest futures domain. This paper describes the method that was developed for identifying those sources and discusses opportunities for improving it in future iterations.

METHODS

The Forest Futures Horizon Scanning system includes a domain map: a simple visual depiction of the main categories and subcategories that are important for the domain. The domain map (Fig. 1) provides a set of convenient search parameters for scanners. The primary domain-related search categories are ecosystems, climate, industry, stewardship, and institutions, and the traditional STEEP (social, technological, economic, environmental, and political) categories (Morrison 1992). Attached to each category are subcategories that further refine the search. The master domain map for the project included at least two subcategories for each category and occasionally more. Individual scanners were initially assigned one of the primary categories and conducted Internet searches specific to that area to identify signals of change within each category.

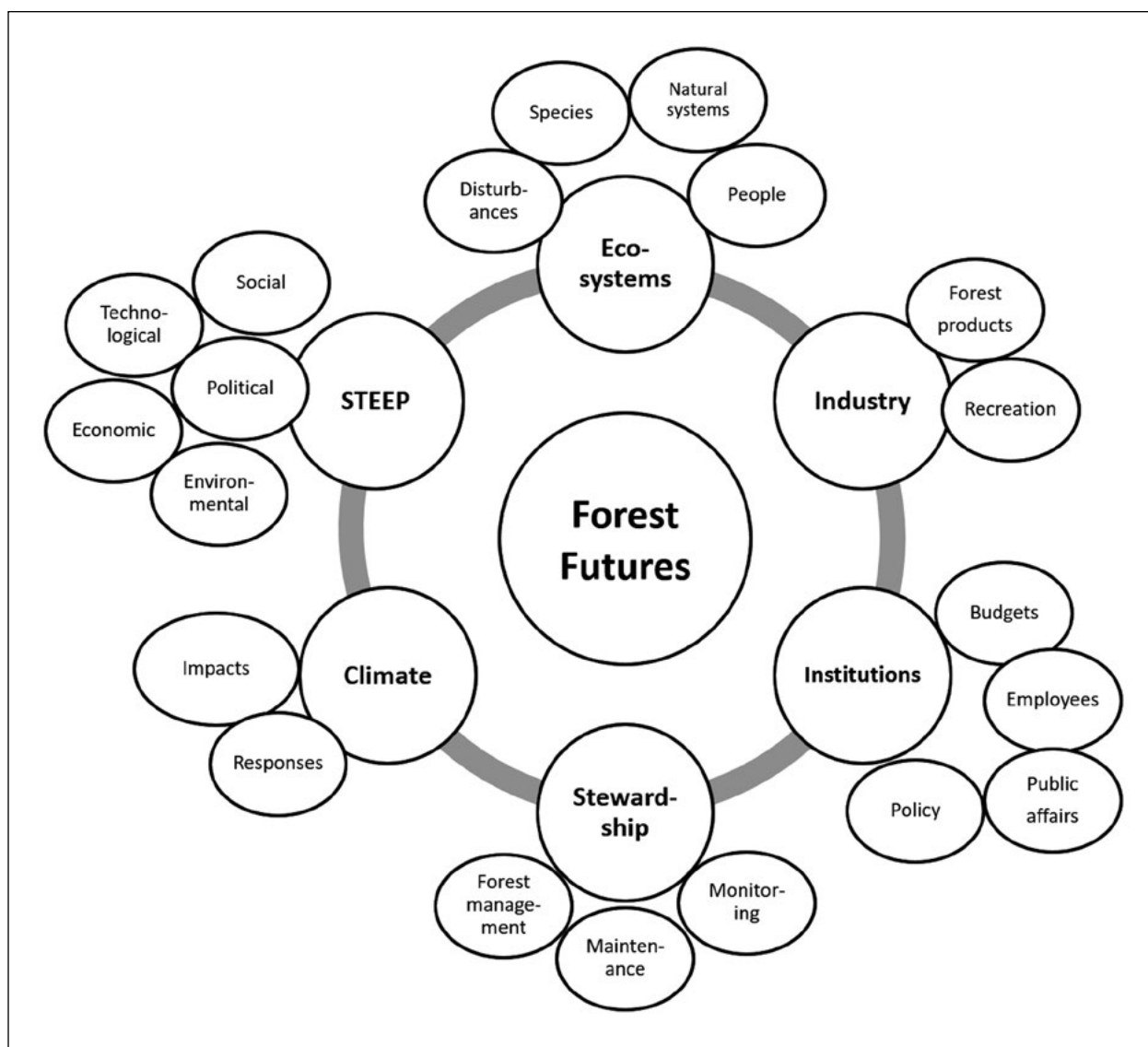


Figure 1.—Forest futures horizon scanning domain map.

The scanners typically drew upon a list of future-oriented keywords such as “of the future” and “long term” (see adjacent box). They were asked to scan across a range of sources including blogs, periodicals, news outlets, specialized industry Web sites, scientific and technical journals, and research reports. An individual signal of change is referred to as a “scanning hit.” The individual scanning hits are cataloged in a database with hyperlinks back to the original sources.

Futures-related Search Terms

of the future, of tomorrow, implications, emerging, long term, trend, by the year, vision, scenario, wild card, sea change, the next * years, 2025, 2030, crossroads, dilemma, disruption

The scanning team has so far identified and collected more than 1,000 scanning hits in a private group on [Diigo.com](https://diigo.com), a publicly available Internet bookmarking tool that provides an online tagging, annotating, and sharing service for Web-based content (pages or portable document format [PDF] files) that can be easily shared across a group of users and exported into multiple formats for further analysis. The scanning hits were all from publicly available Internet sources. Each hit is tagged by using a common nomenclature drawn primarily from the domain map, along with a keyword or two that are specific to the hit (Fig. 2). As part of the tagging process, the scanner indicates which time horizon she thinks that a scan hit represents. For this project, Horizon 1 is the present to 2025; Horizon 2 is 2025 to 2035; and Horizon 3 is 2035 and beyond (Curry and Hodgson 2008). See paper 1 in this volume for more detail on the three time horizons. The scanner also comments on potential implications for forest futures.

Steps in Creating the List of Sources

The Diigo scanning library was exported to Microsoft® Excel to facilitate the analysis. The following steps were taken to parse potential scanning sources to identify the most fruitful ones:

1. Isolate. The URL for each scanning hit was parsed to extract the root domain (e.g., “www.usda.gov”), and duplicates were removed to generate a list of unique and nonrepeating root domain sources. The number of scanning hits that the team had collected for each root domain was noted as one initial indication of potential for future relevance.

2. Investigate. Each of the target root domains was then investigated to determine the relevance of the source to the forestry domain, the likelihood of producing additional scanning hits, and the degree to which the scanning hits were unique or intriguing. A subjective scanning hit opportunity rating was created, using a 5-point Likert-type scale (where 1 was “low potential opportunity” and 5 was “high potential opportunity”). The composite subjective scale reflected the following six criteria:

- Which time horizon does the source cover (Horizon 1, 2, or 3)?
- How many total hits from this root domain source were captured by the scanning group?
- How many scanners captured hits from this root domain source?
- What is the likelihood that this root domain source will produce additional hits in the future?
- How relevant is this source to the domain map categories?
- How unique are the hits from this root domain source?

The root domain sources were also categorized to indicate the type of information that the site was most likely to provide. The following categories emerged: forestry, futures, science, technology, environment, government, culture, mass media, general news, political, and design. To simplify the analysis, these 11 initial categories were clustered into 3: forestry, futures, and general scanning hits.

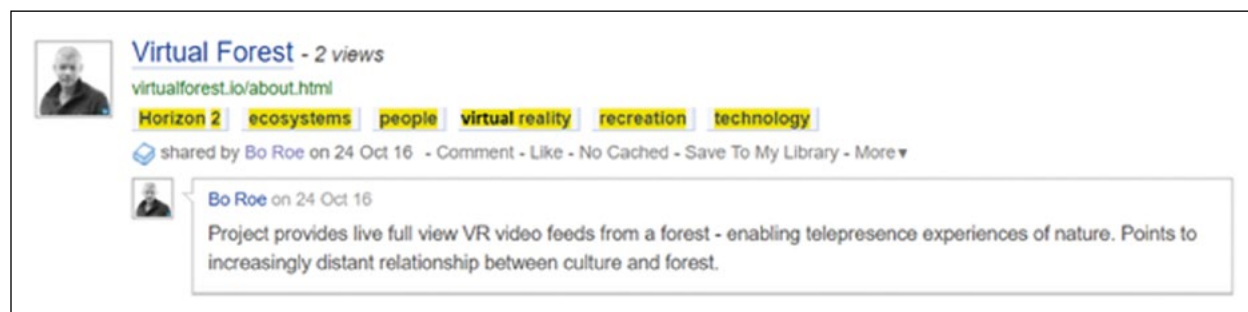


Figure 2.—A scanning hit with descriptive tags highlighted.

3. Abstract. To provide additional general information about each of the Web sources, a high-level overview of the purpose of the organization or entity associated with each site was captured from its “about” page or from Wikipedia where available. A scanning hit title and brief description from each root domain source were then captured as an example. These three points (root domain source overview, example scanning hit title, and example scanning hit description) form an abstract that indicates what each of these sources is likely to provide (Table 1).

4. Sort. The 5-point rating in Table 1 is based on a subjective judgment of how well each root domain source (not scanning hit) rates relative to the six criteria listed in the Investigate step (step 2). Sources with a scanning hit opportunity rating of 1 or 2 were eliminated as unhelpful. These scores did not reflect the content of the collected hits, but rather the potential of the root domain sources for future production of relevant and valuable scanning hits. Sources that rated from 3 to 5 were sorted into the first three of the following categories:

Table 1.—Sample abstracts of scanning sources

Scanning source title	Hyperlink	About (from site's “about” page or Wikipedia)	Category	Rating (1-5)	Scanning hit title	Scanning hit description
The Futures Centre	http://thefuturescentre.org/	Run by Forum for the Future, an independent, international nonprofit organization with a 20-year track record in driving sustainable development. Purpose is to accelerate the big shift to a sustainable future by transforming whole systems.	Futures	5	A bacterial ecosystem quickly restores unproductive soils	Forest management could be increasingly about soil management: harvesting, inoculating, and encouraging microbiomes to favor specific biomass species for unique forestry roles over much longer horizons.
Kurzweil	http://kurzweilai.net/	Launched in 2000, a network that explores the radical growth of pervasive technologies—both biological and machine—which are radically changing our world. Based on forecasts and insights originally articulated by futurist and inventor Ray Kurzweil.	Futures	5	Chemicals that encourage plants to defend themselves replace pesticides	Naturally occurring plant defenses could (if harnessed and activated by managers) replace existing pesticide applications to deter timber pests.

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Table 1 (continued).—Sample abstracts of scanning sources

Scanning source title	Hyperlink	About (from site's "about" page or Wikipedia)	Category	Rating (1-5)	Scanning hit title	Scanning hit description
Futurity	http://futurity.org/	Features the latest discoveries by scientists at top research universities globally. The nonprofit site, which launched in 2009, is supported solely by its university partners in an effort to share research news directly with the public.	Futures	5	How to make asphalt soak up more greenhouse gases	A new form of porous asphalt can sequester 154 percent of its weight in carbon dioxide.
Resilience	http://resilience.org/	Supports building community resilience in a world of multiple emerging challenges, such as climate change and biodiversity loss, and the social and economic issues which are linked to these. Publishes news, research, and analysis in five areas (energy, economy, environment, food and water, and society).	General	4	Will Trumpism, Brexit, and geopolitical exceptionalism sink the planet?	"Indeed, the future pace of climate change will be determined as much by geopolitical factors as by technological developments in the energy sector."
GreenBiz	http://greenbiz.com/	Provides intelligent, focused content on business, technology, and sustainability for people from every industry and discipline. Since 1991, GreenBiz has chronicled and been a catalyst for thought leadership in aligning environmental responsibility with profitable business practices.	General	3	What if nature had the rights of a person (or a business)?	Granting personhood to forests (even specific forests) opens up new complexities for industry...weak signal, but very interesting.

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Table 1 (continued).—Sample abstracts of scanning sources

Scanning source title	Hyperlink	About (from site's "about" page or Wikipedia)	Category	Rating (1-5)	Scanning hit title	Scanning hit description
Forest Trends	http://www.forest-trends.org	Works to conserve forests and other ecosystems through the creation and wide adoption of a broad range of environmental finance, markets, and other payment and incentive mechanisms.	Forestry	5	Carbon marketplaces create a mechanism for forest carbon finance	Marketplace payments for carbon sequestration in forests continue to rise—future potential for "carbon farming" as a legitimate revenue stream...or carbon penalty for harvesting timber.

- **Priority 1: Forestry-related sources**—directly related to the domain in addition to having a high degree of future-oriented content (Horizons 2 and 3). These sources are high priority for identifying future scanning hits.
- **Priority 2: Futures-related sources**—considered a subset of more general sources, these sources have already done some of the hard work of creating future-oriented compilations. They provide context for Horizons 2 and 3, which support categories from the domain map.
- **Priority 3: General sources (high ratings)**—not directly related to forestry, but provide a perspective on the future context. These sources have high potential for future scanning hits.
- **Priority 4: General sources (low ratings)**—provided less interesting, more mainstream, or less domain-relevant information. While still worth reviewing for future scanning hits, these sources are less likely to produce significant, unique, or numerous hits, and are likely to remain focused on Horizon 1.

The sources were then documented in a table that was shared with scanners, with visual weight to the four priority categories just described.

5. Custom search engine—an optional fifth step. The purpose of the side project described in this paper was to create a prioritized list of sources to share with the scanning team. Roe (first author), however, thought it might be useful to take the work a step further and feed the output directly into a search engine. Therefore, the root domains identified as priorities 1, 2, or 3 were loaded into a Google Custom Search Engine (CSE) and prompted with the keywords “forest,” “forestry,” and “tree.” Though not the intended purpose for Google’s CSE application programming interface, this approach produced consistently relevant results (Fig. 3). Scanners can be provided a link to the resulting Web interface. They then have access to an additional scanning tool and new resources to leverage the existing scanning sources by searching for various keywords from the domain map.

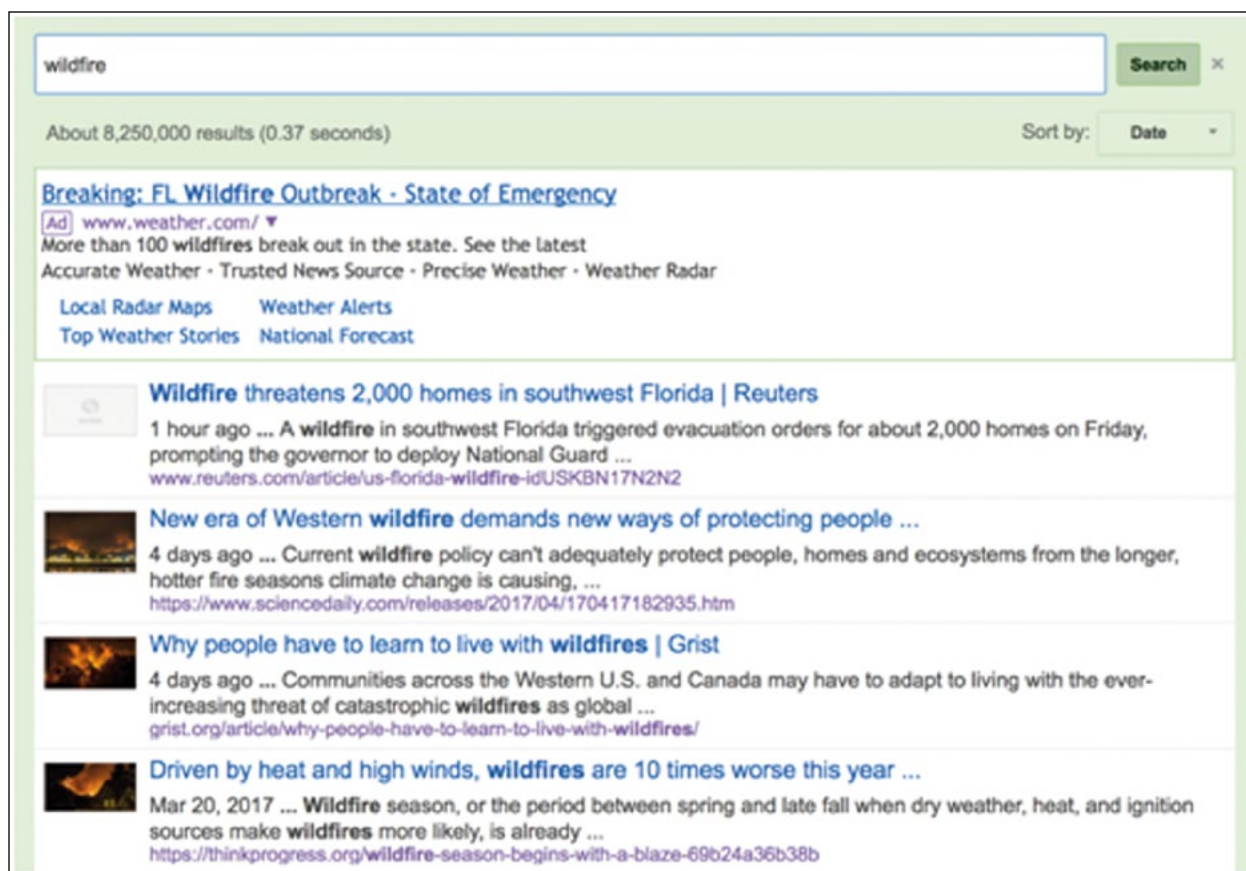


Figure 3.—Sample output from the Google Custom Search Engine.

DISCUSSION

The approach described here makes the most sense for organizations with a continuous scanning system. The setup time is worthwhile for ongoing scanning, whereas it may not be worth the effort for a short-duration scanning project.

Anticipated Uses

This research was part of a larger project to establish a horizon scanning system. A goal of the core team is to recruit a network of volunteer scanners. The volunteers have their “day jobs” and would be scanning primarily for goodwill, so the team is looking for ways to make the onboarding process as simple and effective as possible. The table of scanning sources produced by this research—along with other tools described in the preceding paper—is a good first step to help new scanners quickly begin to identify potential signals of change related to forest futures.

Areas for Improvement and Further Research

This research project was informed by the early scanning work; in other words, the sources were the result of the initial rounds of exploration for the Forest Futures Horizon Scanning project. As a result of the use of these initial sources, future explorations would bring in whatever natural biases existed in the first phases of scanning. Therefore, it would be desirable for some scanners to scan outside the CSE and perhaps others would be specifically dedicated to finding new sources. It may make sense to revisit the sources in the CSE periodically and to include new sources identified as useful and relevant. They could pass through the same evaluation criteria; thus, the list would be a living document. It may also prove useful to limit the size of the list, so a “pruning” or elimination of the least productive sources could be done periodically as well.

A more rigorous rating system is likely to be worth the energy to create when practitioners are replicating this source prioritization method. Individual ratings for uniqueness, domain relevance, and the other criteria could be used to create a more consistent composite score. In this case, the root domain was isolated to generate distinct sources. In future replications of this method, this constraint might be relaxed, because some unique sources may originate from within the same root domain—as independent subdomain-level URLs or sources. This complicates the automation of the prioritization somewhat, but the effort may produce relevant information.

Though the Google CSE provides a very simple interface for cursory scanning, the results using only this tool would not be fully comprehensive. The tool is highly sensitive to the keywords and URLs loaded when constructed, and requires an administrator to make changes over time. However, the CSE does point to a future trajectory of simple custom scanning tools for projects that could bring inexperienced volunteer or client scanning teams into productive scanning quickly. While not a replacement for an active, informed, and skilled scanning process, the Google CSE output could be a beneficial introduction to the collection and processing of weak signals for new scanners. As these custom engines are based entirely on existing search parameters, the results will inherently be narrowed to previously identified areas. Though far from complete, it is a useful tool for getting new scanners up to speed.

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