



A System for Scanning and Monitoring the Future of Forests

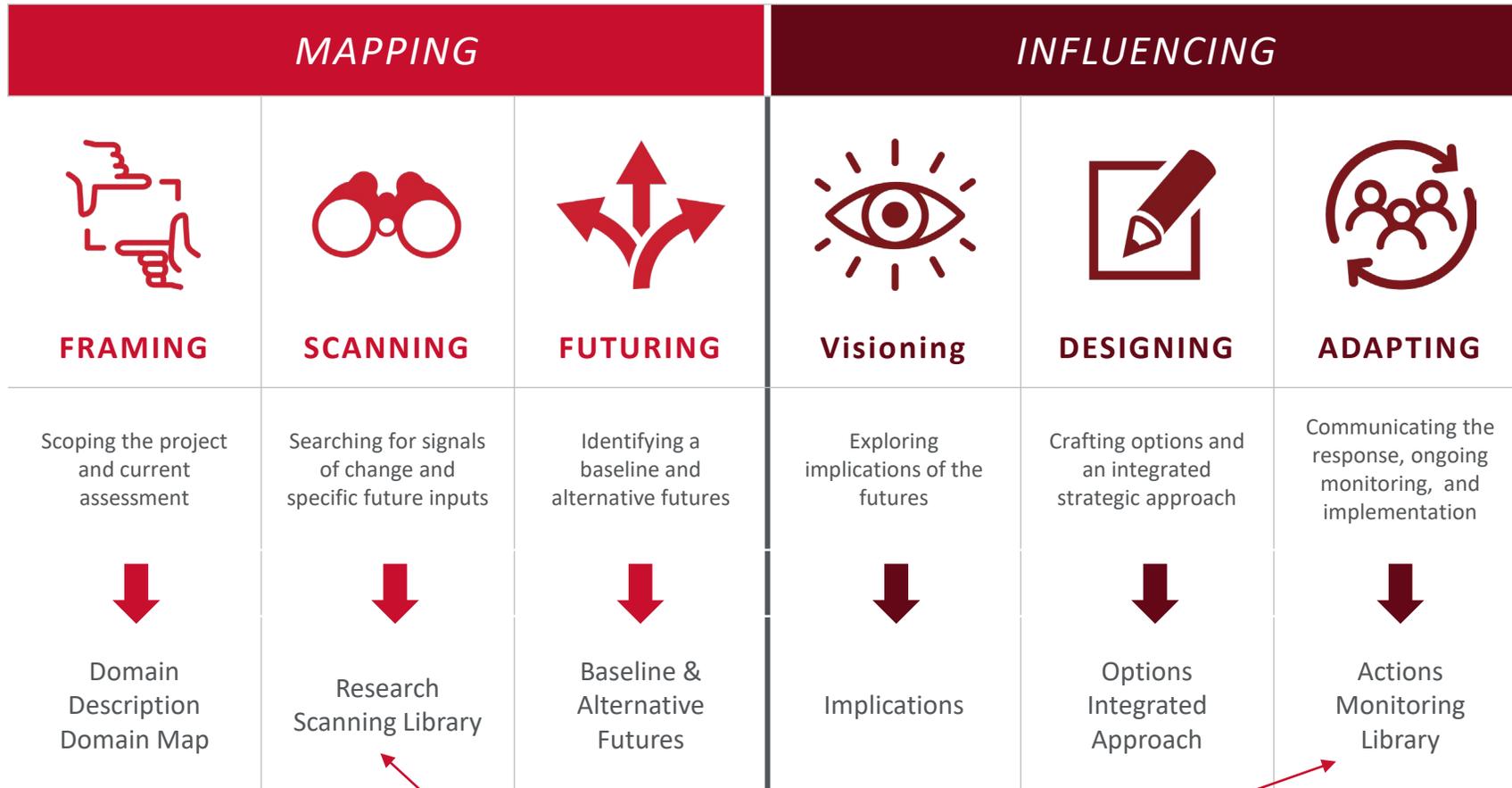
ANDY HINES

CERM 2022 CONFERENCE

OCTOBER 26, 2022

HOUSTON **FORESIGHT**
Preparing Professional Futurists

Mapping & Influencing the Future in Six Steps



Source: A. Hines

We are focusing here

Scanning

What Is Horizon Scanning?

An early warning system finding & interpreting **early indications of change** in order to identify potential opportunities & threats (aka emerging issues)



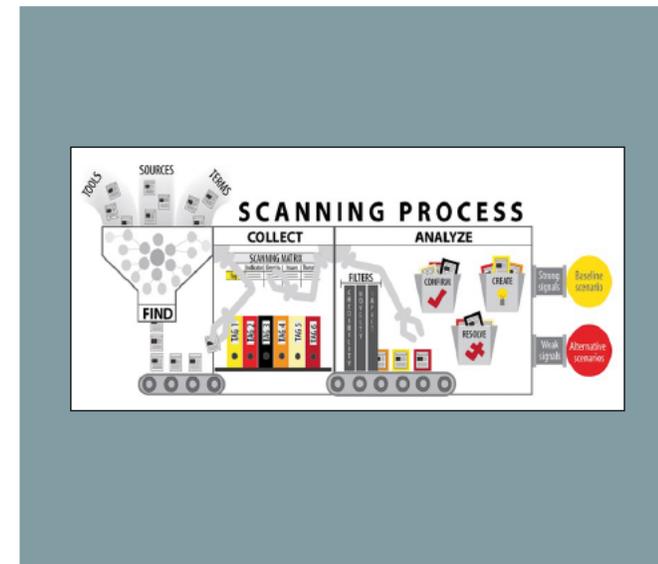
Forest Futures Horizon Scanning Project

- Univ. of Houston
- Team of scanners
- Searchable database of “scanning hits”
- Identify emerging issues
- Explore implications

<https://www.nrs.fs.fed.us/pubs/57939>



The Forest Futures Horizon Scanning Project

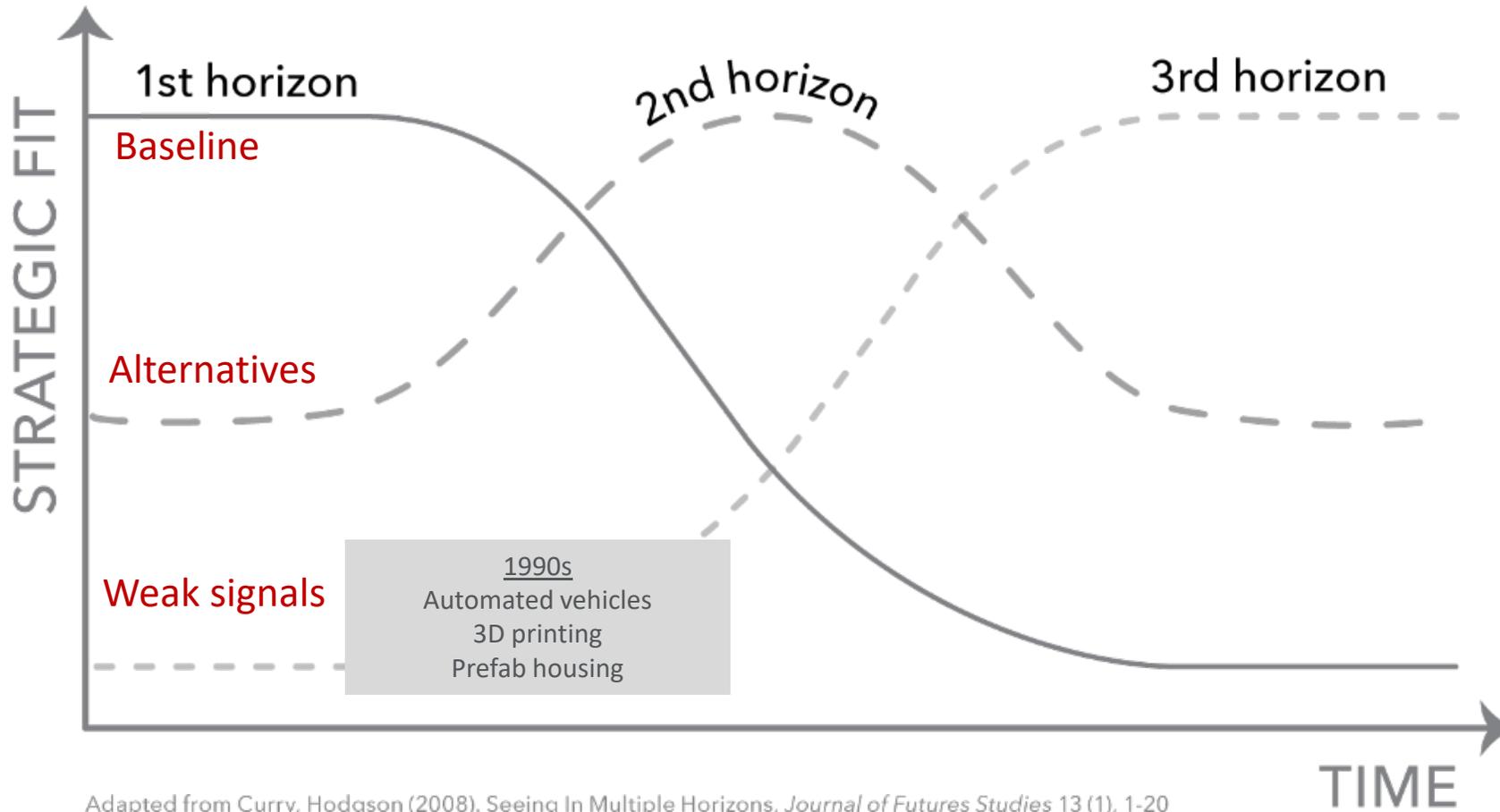


Northern
Research Station

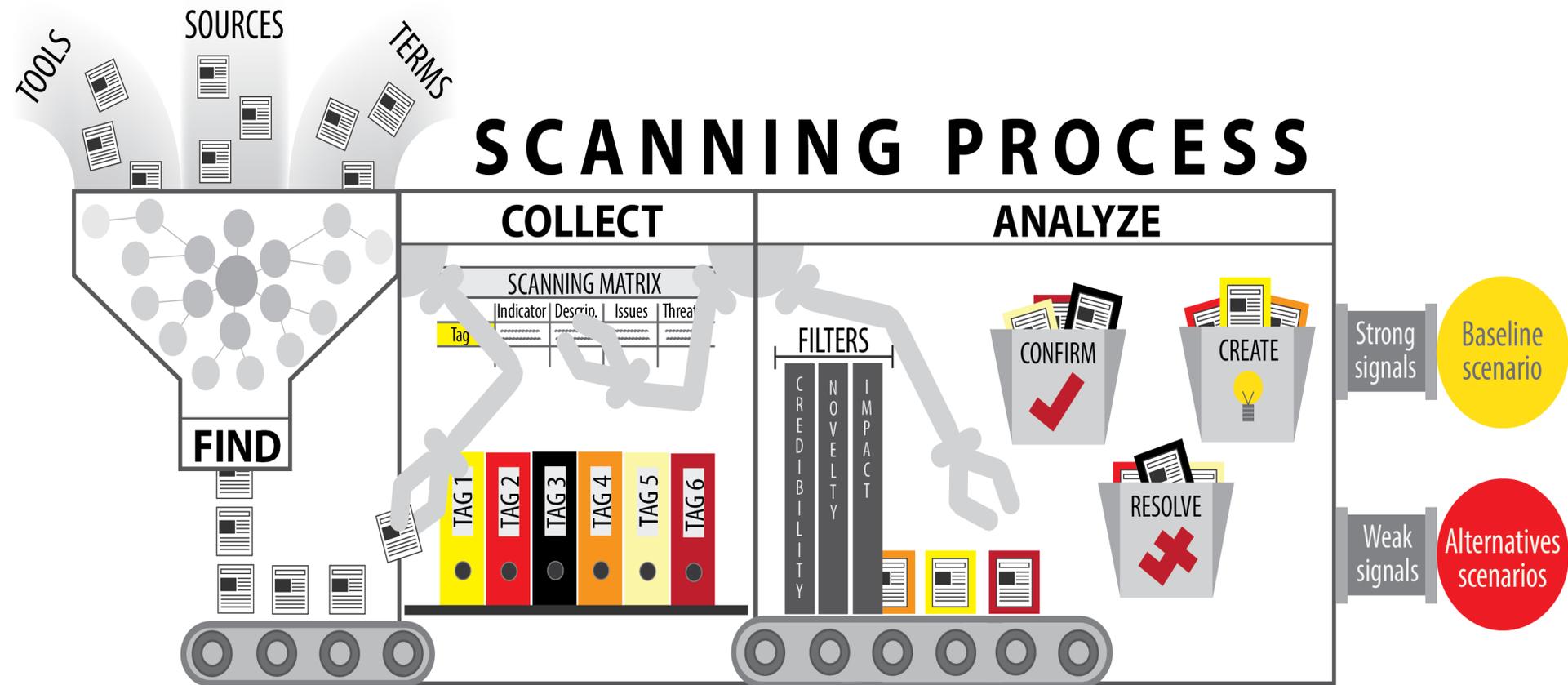
General Technical
Report NRS-P-187

March 2019

Three Horizons

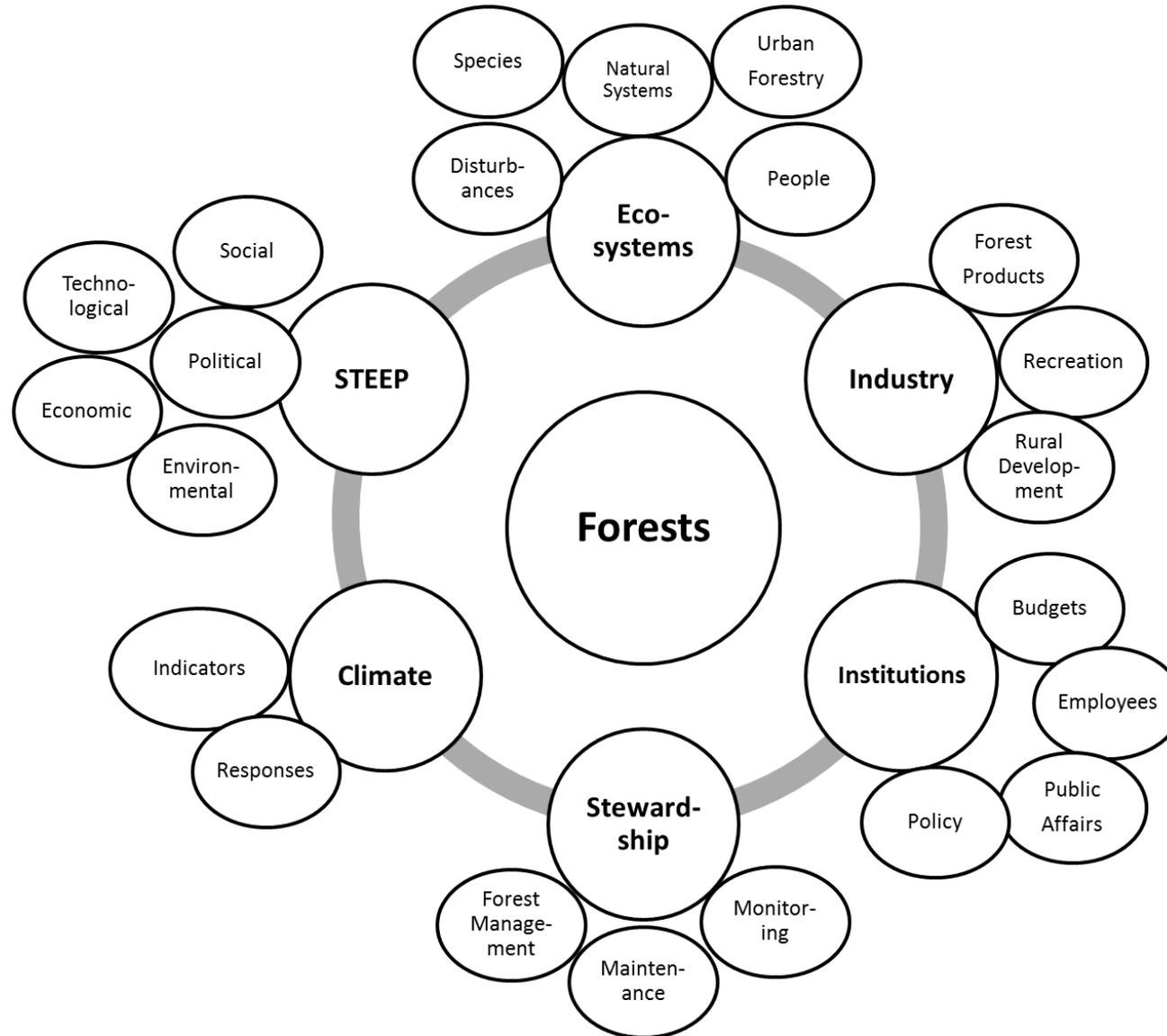


Scanning Approach



Source: Houston Foresight - Andy Hines and Maria Romero

Start with a Domain Map



Terms

Terms: “Bubble Category” +

“of the future” “of tomorrow” “implications”
“emerging” “long term” “trend” “by the year”
“vision” “scenario” “wildcard” “sea change” “the
next * years” “2020” “2030” “crossroads”
“dilemma” “disruption”

Types of Sources by Horizon

H3: IDEA Creation <i>Talking about a new way of doing things</i>	H2: Elite Awareness <i>Talking about significant shift to the existing way of doing things</i>	H1: Mainstream Awareness <i>Tweaking the existing way of doing things</i>
<p>Specialty Media: niche publications with specialized idea focus, e.g., FUTUREdition</p> <p>[Deep] Scientific Journal: very technical subject matters and small audience, e.g., Advanced Functional Materials</p>	<p>Scientific media publications appealing to general elites, e.g., Scientific American</p> <p>Industry/Trade Association/Think Tanks: groups, typically supportive of a particular domain, ASME (Amer. Society of Mechanical Engineers)</p> <p>Govt/NGO: research by agencies and supporting organizations, e.g. World Economic Forum</p>	<p>Mainstream media appeals to mass audience, CNN</p>
<ul style="list-style-type: none"> • Monographs • Specialized periodicals • Art • Fiction • Fringe Media • Underground Blogs • Speeches • Technical journals • Social movements • Social media fringe (Reddit) 	<ul style="list-style-type: none"> • Trade journals • Research reports • Newsletters • Popular tech journals • Newsletters • Intellectual magazines • Books • Surveys • Government reports 	<ul style="list-style-type: none"> • News • Periodicals • News, radio, TV, Intern • Textbooks • Company pubs • Doctoral dissertations

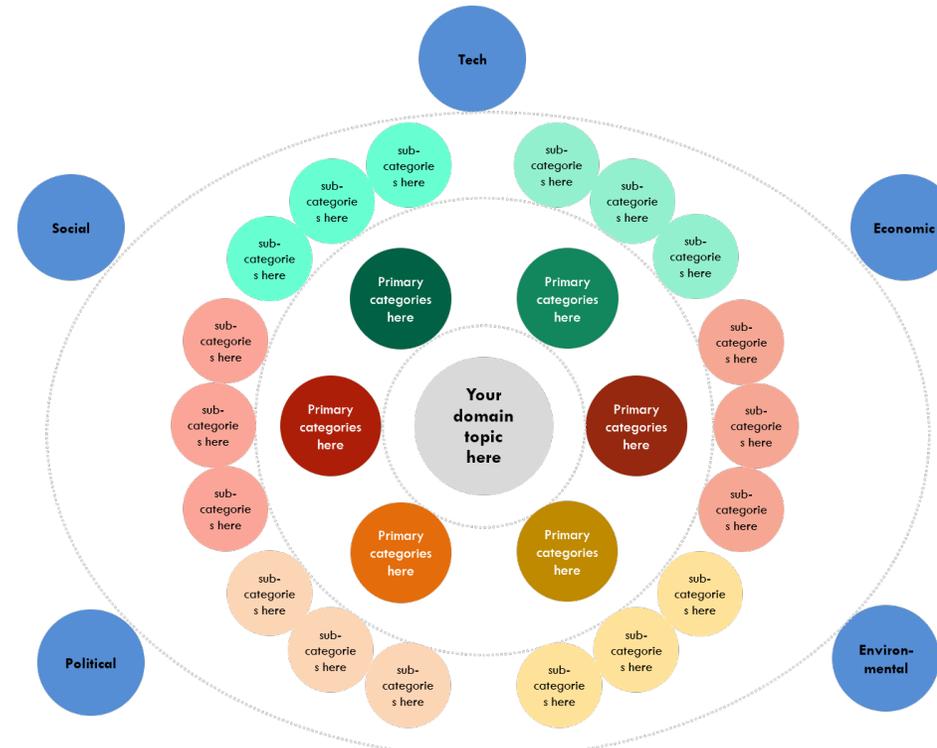
Example Sources and Typing

Table 4. Source from Most Recent 20 Diigo Hits.

Source	Horizon	Type of source
1. Yoga journal	H2	Newsletter
2. Housing theory and society	H3	Technical journal
3. UNEP science & data	H2	Government report
4. Plastic-free world.com	H2	Specialty pub (conference) from Special interest group
5. Oregon convention ctr	H2	Specialty pub (conference) from state government
6. Inside construction	H2	Trade journal
7. The architects newspaper	H2	Trade newsletter
8. ACS (Appl. Polym. Mater)	H3	Technical journal
9. Down to earth	H2	Blog (aggregator)
10. Yahoo finance	H1	News
11. Science alert	H2	Popular tech journal
12. Forbes	H1	Blog news
13. Euronews	H1	News (aggregator)
14. National geographic	H2	Popular tech journal
15. Floor Nature	H1	Company site
16. NJ MMA News	H1	News
17. Meetup.com	H3	Social movement
18. Tech Xplore	H2	Blog (technical)
19. Nature connection guide	H2	Technical non-profit site
20. Gizmodo	H3	Blog (future-oriented)

The STEEP “Cheat”

In a typical three-month project there is not time to scan all of STEEP, so draw on our ongoing STEEP inventory (and filling in gaps needed).



Job Hopping Generations	As a result of many Boomers staying in the workforce past typical retirement age, Millennials and Gen X are resorting to job hopping to find promotions and higher pay. Some companies are losing promising employees due to lack of promotions and higher pay.	link
Moral capitalism	Maximizing shareholder value is going out of fashion; instead, companies increasingly consider all stakeholders - employees, their communities, and the environment to name a few - when making decisions. And consumers are paying attention to which companies do this.	link
Peer-to-peer (P2P) models	It is increasingly practical to “disintermediate” the middle layer so that consumers can directly transact with one another; one projection is global P2P lending will hit \$44B by 2024 up from \$18B in 2018 .	link
Reputation systems	Reputation systems are becoming increasingly important for commerce, with credit rating systems underpinning the lending system, and buyer rating services supporting the evolution of e-commerce .	link

<https://www.andyhinesight.com/foresight-2/the-steep-cheat-build-your-trend-inventory/>

Specific Sources

<p>STEEP</p> <p><u>Social (inc. Demo)</u></p>	<p>Population Reference Bureau, UN Population Information Network, US Census; Boing Boing, Arts & Literature Daily, Variety, brainpickings.org</p>
<p><u>Technology</u></p>	<p>TechCrunch, Digg, Technorati, Wired, Slashdot, Science and Technology Daily, Fresh Patents, Kurzweil AI.net, Singularity Hub</p>
<p><u>Economic</u></p>	<p>Real World Economics Review, OECD Statistics Portal, Innovation Daily, The Economist, IMF World Economic Yearbook, UN Statistics Division, FastCoLabs, Venture Beat</p>
<p><u>Environmental</u></p>	<p>The Watchers, Treehugger.com, Greenbiz , Resilience, Natl Resource Defense Council, WorldWatch, Green Car Reports, Business Green, Security & Sustainability Guide</p>
<p><u>Political</u></p>	<p>CIA World Fact book, US Government News, Third Wave, Change.org, Project Censored, DrudgeReport, Zero Hedge, Jacobin, Stratfor</p>
<p><u>General (inc. weak signals)</u></p>	<p>FutureSeek, Next Big Future, Reddit, Shaping Tomorrow, Trendwatching.com, FutureEdition, Futurity, World Future Society, FutureAgenda, Future Timeline.net, Next Big Future, QuantumRun, Flipboard, Tumblr, Instapaper, Snopes, Google Zeitgeist, Futures Centre, WEF Strategic Intelligence</p>

Tagging on the Three Horizons



Forest Service



Antarctica's Collapse Could Begin Even Sooner Than Anticipated -- Scientific American

- 1 views

www.scientificamerican.com/...n-even-sooner-than-anticipated

H1 climate accelerating climate change Antarctica Thwaites Ice Shelf

shared by [dave bengston](#) on 18 Oct 22 - Comment - Like - No Cached - Save To My Library - More



[dave bengston](#) on 18 Oct 22

"Two expeditions to the Thwaites Ice Shelf have revealed that it could splinter apart in less than a decade, hastening sea-level rise worldwide... For the past 20 years, as the planet has warmed, scientists using satellites and aerial surveys have been watching the Thwaites Ice Shelf deteriorate. The decline has caused widespread alarm because experts have long viewed the Thwaites Glacier as the most vulnerable part of the larger West Antarctic Ice Sheet. The ice shelf acts as a dam, slowing its parent glacier's flow into the ocean. If the shelf were to fall apart, the glacier's slide into the sea would greatly accelerate. The Thwaites Glacier itself holds enough ice to raise the global sea level by 65 centimeters (about two feet). The loss of the Thwaites Glacier would in turn destabilize much of the rest of the West Antarctic Ice Sheet, with enough ice to raise sea levels by 3.2 meters-more than 10 feet."

Top 10 Tags

[View All](#)

H1	2143
H2	1683
climate	975
Recreation	858
ecosystems	619
technology	592
industry	461
stewardship	395
H3	330
social	280

Note: some double-counting here
3,405 total hits

Other Scan Hits from Diigo Library



In a Cross-State Aquifer Spat, a View of a **Water**-Stressed Future -

undark.org/...memphis-aquifer-supreme-court

H2 **water** ecosystems housing industry

 shared by [lmwestphal](#) on 15 Sep 20 - Comment - Like - No Cached - Save To My Library - More ▾

...According to mapping by the U.S. Geological Survey (USGS), neighboring Arkansas and Mississippi pump 170 million gallons per day and 97 million gallons per day, respectively. Whiskey distillers, pharmaceutical companies, and national bottled **water** companies are among the many businesses that rely on the source on either side of state lines. ... Across the aquifer system's eight states, hydrogeologists have identified 20 "cones of depression," points of significant drawdown of the ground**water** surface that appear in hydrogeological simulations ... One of these cones has declined about 100 feet below pre-industrial levels under Memphis, just barely edging into Arkansas and Mississippi. ... In a case currently before the U.S. Supreme Court - with a final ruling that could come next term - the state of Mississippi claims that Memphis has "forcibly siphoned," or effectively stolen, its **water**, which Mississippi frames as its "sovereign territory." That's a new way of thinking about **water**. For almost two centuries, with few



The fight to stop Nestlé from taking America's **water** to sell in plastic bottles

www.theguardian.com/...-sell-water-in-plastic-bottles

H1 **water** conflict climate

 shared by [dave bengston](#) on 29 Oct 19 - Comment - Like - No Cached - Save To My Library - More ▾

Water quantity and quality is intimately related to forests, especially the national forests in the US. Conflict over **Water** from the NFs will likely increase with climate change: "Last year Nestlé siphoned 45m gallons of pristine spring **Water** from the creek and bottled it under the Arrowhead **Water** label. Though it's on federal land, the Swiss bottled **Water** giant paid the US Forest Service and state practically nothing, and it profited handsomely: Nestlé **Waters'** 2018 worldwide sales exceeded \$7.8bn. Conservationists say some creek beds in the area are now bone dry and once-gushing springs have been reduced to mere trickles. The Forest Service recently determined Nestlé's activities left Strawberry Creek "impaired" while "the current **Water** extraction is drying up surface **Water** resources""

Note on Scanning: Vertical Farms



2008



Today

With this new facility, we'll be able to reach nearly 100 million Americans, within a single day of distribution versus the week it can take from the west coast,"



[The World's Biggest Vertical Farm Yet Will Fertilize Crops With Fish Poop](#) - 0 views

singularityhub.com/...fertilize-crops-with-fish-poop

H2 technology agriculture vertical farm

shared by [Andy Hines](#) 2 minutes ago - Comment - Like - No Cached - Save To My Library - More



[Andy Hines](#) 2 minutes ago - Edit - Delete

Four and a half years ago I visited a vertical farming research facility in the Netherlands to learn the basics about growing food indoors without sun or soil. Since then, new vertical farms have sprung up from Asia to Europe and the US, with the technology's uber-local and eco-friendly aspects taking on increased significance as urgency grows around the climate crisis. A new facility announced this week will be the largest vertical farm yet, and will sprout local greens for the most populous market in the US: New York City.

Criteria for a Good Scanning Hit

+ Credibility

- Is the source reputable? expert, popular, or fringe?
- Do they have a hidden agenda (selling you something?)

+ Novelty

- Is the hit new? Or has it been widely reported?
- Is it new to the client/audience?

+ Likelihood

- What are the chances that the hit will amount to something?
- Will it change the future?

+ Impact

- If it does, how big a change will that be?
- How important is that change to the client or the domain?
- Will it change the framework document?

Forest Futures

A Guide for Scanners

All the materials necessary to begin operating as a “scanner” including:

- + Brief intro to Forest Service (for externals, e.g., UH students)
- + Brief intro to horizon scanning
- + Stakeholders
- + A “how to” guide for Diigo
- + Forestry domain map & “tagging”
- + Pointers and tips
- + Let’s get started!

Some Emerging Issues

1. Technology: Genetic Engineering: Bio-luminescent Trees



- **Living streetlights:
Not a new idea**
- **Ongoing R&D**
- **Lights: Large part of
a city's energy bill,
CO2**

SOURCE: <https://www.nextnature.net/2014/04/glow-in-the-dark-trees/>

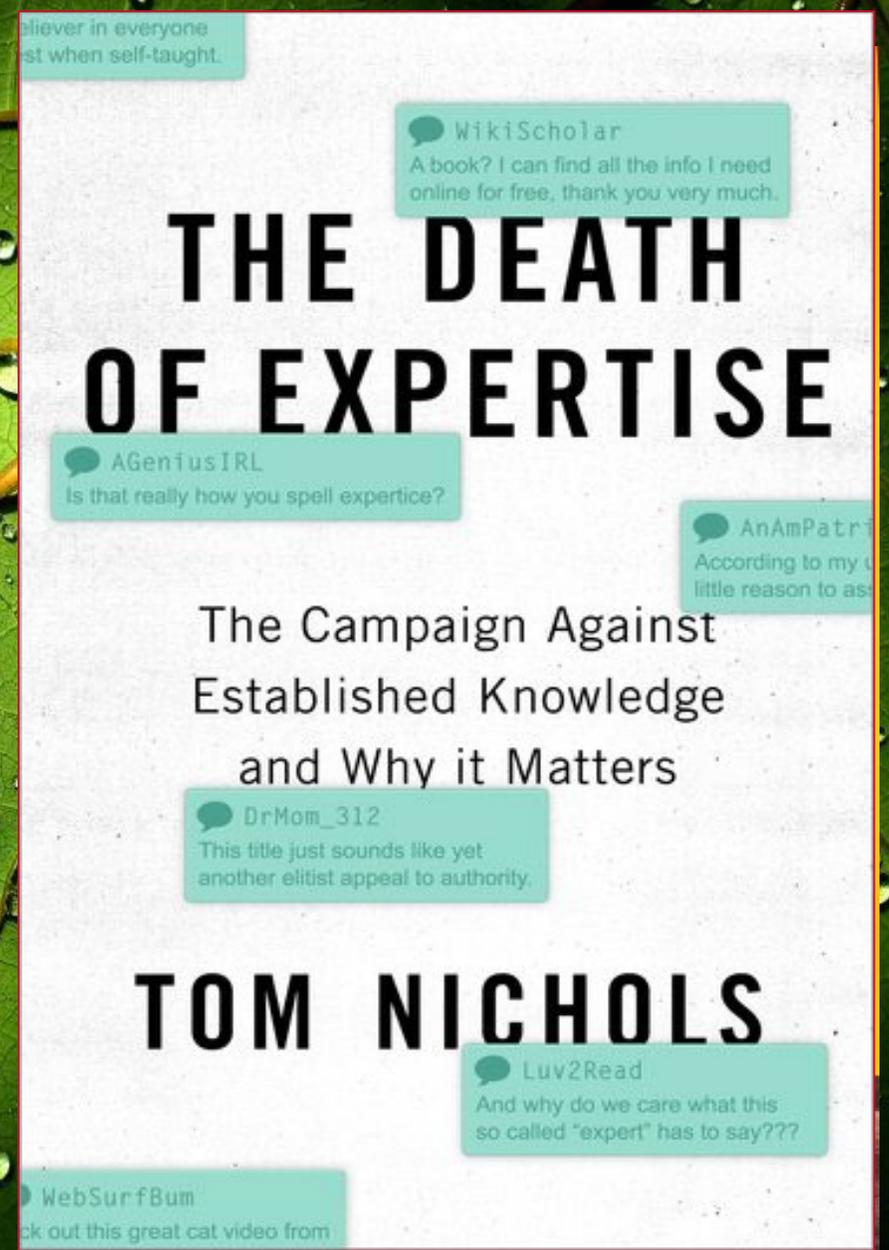
2. Architecture: Vertical Forests / Treescrapers



Bosco Verticale Towers (350 feet, 250 feet), built in 2014 in Milan, Italy

3. Social: Growing Distrust of Science, Experts

- Climate Change
- Evolution
- Moon Landing
- Vaccinations



4. Technology: Exoskeletons for Human Performance Augmentation

AEGIS

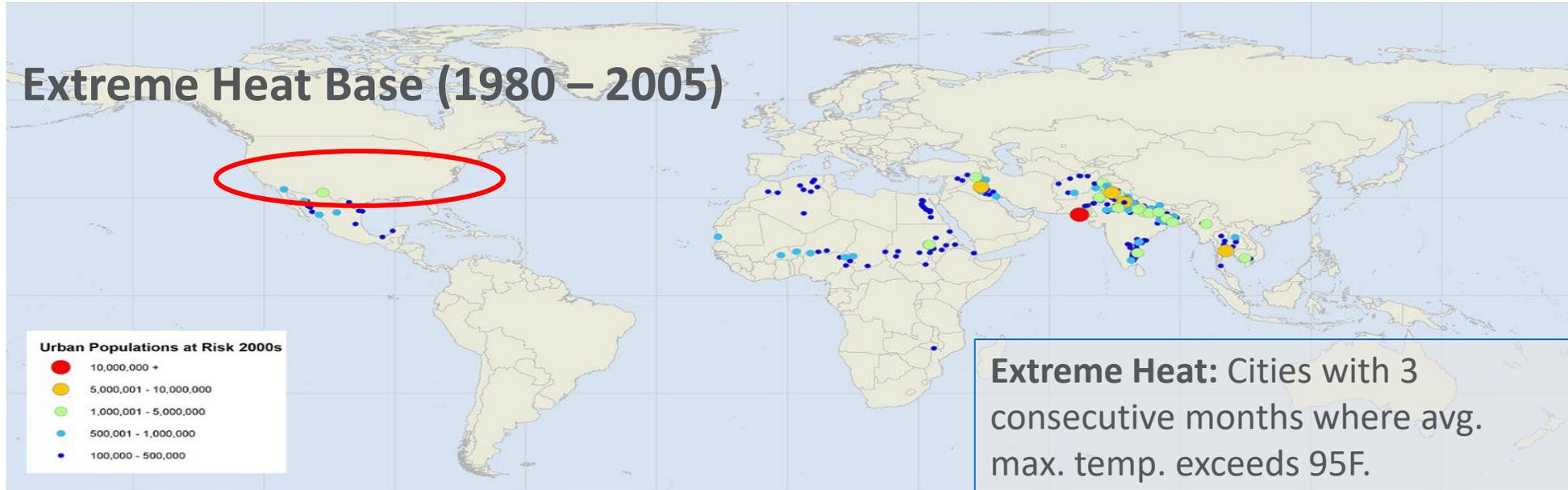
Exoskeleton for Logging Worker

Metal frameworks fitted with motorized muscles to multiply wearer's strength.

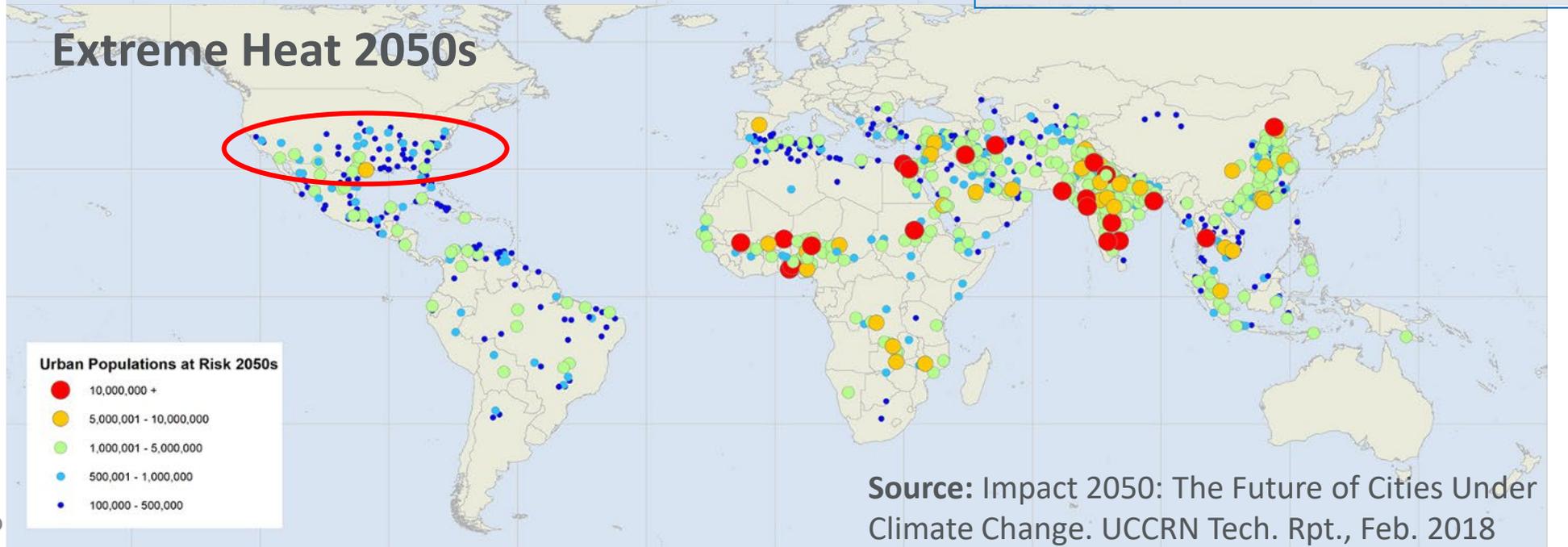
Source: <https://www.woodworkingnetwork.com/community/project-gallery/exoskeleton-super-suit-protects-loggers-falling-trees>

5. Climate: Extreme Weather: Heatwaves

Extreme Heat Base (1980 – 2005)



Extreme Heat 2050s



6. Health & Wellness: Arborists as Mental Health Providers

Doctors prescribing nature visits for anxiety & depression

The screenshot shows a web browser window with the URL <https://www.isa-arbor.com>. The page features a large banner image of a young girl with braids sitting in a forest. The banner text reads: "Showing the world the benefits of trees" and "We promote the professional practice of arboriculture to foster a greater awareness of the benefits of trees." Below the banner is a "READ MORE" button. The website header includes the ISA logo, a "MENU" button, a search bar, and a "MyISA" user profile. The browser's address bar and tabs are visible at the top.

Ecosystem Services

Health Benefits

Economic Value

Mental Health

What do You Think?

Tables: Which one do you think is likely to have the biggest impact on forestry in the next 10 years?

1. Technology: Genetic Engineering: Bio-luminescent Trees _____
2. Architecture: Vertical Forests / Treescrapers _____
3. Social: Growing Distrust of Science, Experts _____
4. Technology: Exoskeletons for Human Performance Augmentation _____
5. Climate: Extreme Weather: Heatwaves _____
6. Health & Wellness: Arborists as Mental Health Providers _____

Monitoring

Monitoring: Don't Guess, Track!

- + Identify indicators for the appearance of each scenario.
- + Track progress toward the indicators via observations

Paris
Luxury Brands Come Around to Selling Online
A number of elite, luxury retailers have opened their products online, often because of their brand and services-based business models with modern, but as they move on being more thoughtful.

Mumbai
In India, Thin Is In
In a country where full-figured women were traditionally regarded as objects of beauty, thin is becoming increasingly popular.

Stockholm
Selling to the Poor
Cellular companies are finding quick and constant in emerging markets.

New York
Laptop with a Humanitarian Mission Widens its OLC (One Laptop Per Child) is getting ready to launch around the world, more than intended, its raising awareness.

London
Non-Stick Gum to Hit the Street:
A revolutionary new gum that do pavement and is biodegradable by regulators who battle the issue that results in tainted streets and

New York
ATMs Become a Tool for Money-Laundering
A new scheme called "microstructuring" allows criminals to make small deposits and withdrawals via ATMs which avoids raising the suspicion of the banks or the authorities.

Global
Dell Launches Global Competition to Design World's Greenest Computer
In an effort to bring awareness to more environmentally sound computer design, Dell has initiated a global competition.

Mumbai
Western Retailers Discover the Importance of Local Culture in India's Markets
Many western retailers are finding that neatly organized stores and products are not the way Indians are accustomed to shopping. Many prefer smaller, cramped stores with haggling customers.

Ireland
Ireland Sees Its Culture with Increasing Immigrants
Like many other countries Ireland is seeing an influx of immigrants, which is impacting the culture and also introducing challenges.

Shell Energy Scenarios to 2050
SIGNALS & SIGNPOSTS

Quantities / events that signal a key uncertainty is being resolved in one way or another or that one or other scenario is more or less likely to occur

Indicator Examples



Scenario

Indicator

Outcome

The New Sputnik

NY Times

September 27, 2009

OP-ED COLUMNIST

By [THOMAS L. FRIEDMAN](#)

Most people would assume that 20 years from now when historians look back at 2008-09, they will conclude that the most important thing to happen in this period was the Great Recession. I’d hold off on that. If we can continue stumbling out of this economic crisis, I believe future historians may well conclude that the most important thing to happen in the last 18 months was that Red China decided to become Green China.

Yes, China’s leaders have decided to go green — out of necessity because too many of their people can’t breathe, can’t swim, can’t fish, can’t farm and can’t drink thanks to pollution from its coal- and oil-based manufacturing growth engine. And, therefore, unless China powers its development with cleaner energy systems, and more knowledge-intensive businesses without smokestacks, China will die of its own development.

Maybe!

Why China’s electric-car industry is leaving Detroit, Japan, and Germany in the dust

China was no good at cars. Then EVs came along...5 of top 10 EV companies are Chinese.

[Jordyn Dahl](#)
MIT Technology Review,
12/17/18

We are here!

“Good” Indicators

Type		Indicator	Source
Quantitative with known accessible data source		40% of US population identifies as postmodern	World Values Survey data
Quantitative without known source		Increase in cultural creatives/the creative class	? (extrapolate from work of Ray/Florida)
Qualitative with reliable evidence		Shift in values to new priorities such as sustainability and wellness	Scanning hits on these topics
Qualitative with murky evidence		Shifting values	General scanning

Example: Monitoring System for US Forest Service

01

Clearly define
and bound the
emerging issue

02

Identify
indicators as
search terms

03

Search for
monitoring hits

04

Keep non-
indicator hits

05

Collect and tag
the hits

1. Clearly Define & Bound the Issue

(Genetics) Increasing influence of genetics in the forest

- + **Issue:** *Should we, or how might we, integrate augmented or artificial design/approaches, such as synthetic biology, with the natural forest?*
- + **Description:** *As gene editing knowledge and expertise grows, new species will be created and established species will be modified by synthetic biologic processes. In addition, engineered applications, such as artificial photosynthesis, may be integrated with the natural forest environment in the future. New regulations and resource management plans will need to be developed to balance competing priorities driving new technologies with preserving natural ecosystems.*

The six emerging issues identified by the Horizon Scanning system were:

Genetics in the Forest: Should we, or how might we, integrate genetics and augmented or artificial design/approaches, such as synthetic biology, with the natural forest?

Climate Migrants: As climate change forces people to uproot and move, what will be the impact on rural economies and forests?

Forests and Human Health: Will forest therapy be seen as legitimate?

Climate-induced Social Tipping Points: What tipping points might flip climate social movements and attitudes?

Coming Age of Wood: How might high-tech advances in wood products bring about a new “age of wood”?

Vertical Forests: Are vertical forests a gimmick or signaling a way to integrate the forest more deeply into urban and daily life? “Vertical forests” are buildings with trees and other greenery integrated into their design.

2. Identify Indicators as Search Terms

Emerging Issue	Indicators
Genetics	Augmentation "Synthetic biology" "Artificial photosynthesis" Regulation GMOs
Migrants	"Rural economies" Nomads "Land management" "Climate refugees" "Settlement patterns" "Distressed communities" "Natural disasters" "Extreme weather events"
Health	"Forest therapy" "Forest bathing" "Insurance" "Alternative medicine"
STP (Social tipping points)	"Social movements" "Political movements" "Climate protests" "Off-grid living"
Wood (Coming age of wood)	"Wood skyscrapers" "Cross-laminated" "Wood alternatives"
Vertical (Vertical Forest)	"Urban heat islands" "Stefano Boeri" "CO2 reduction" "Mental health" OPEX

3. Search for Monitoring Hits

And 4. Keep non-Indicator

	<u>H3: Idea creation</u>	<u>H2: Elite Awareness</u>	<u>H1: Mainstream Awareness</u>
Initial “big” list of potential source	Specialty Media (Niche publication/blog) Scientific Journal Monographs Specialized periodicals Art Fiction Fringe Media Underground Blogs Speeches Technical journals Social movements Social media fringe (Reddit)	Scientific media (publication or blog) Industry/Trade Association Govt/NGO Trade journals Research reports Newsletters “Dopesheets” Popular tech journals Newsletters Intellectual magazines Books Surveys Government reports	Mainstream media News Periodicals News, radio, TV, Internet Textbooks Doctoral dissertations
Categories we used for tagging in Diigo	Specialty media Scientific journal	Scientific media Industry/Assn pub Govt/NGO pub	Mainstream media

Diigo Monitoring Library

Top 10 Tags	View All
H1	59
H2	39
Specialty Media	39
Wood	32
mainstream media	27
Health	20
scientific journal	17
Migrants	17
wood alternatives	15
Vertical	15



[For a Healing Hike, Try Forest Bathing | Minnesota Monthly](#) - 1 views

www.minnesotamonthly.com/...ealing-hike-try-forest-bathing

[H1](#) [mainstream media](#) [forest bathing](#) [Minnesota](#)

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[Andy Hines](#) on 02 May 20 - [Edit](#) - [Delete](#)

Leigha Horton is one of a handful of Twin Cities forest bathing guides certified by the Association of Nature & Forest Therapy Guides & Programs. She and husband Travis Norman co-founded Silvae Spiritus, which leads immersive, meditative, two- to three-hour strolls around the Twin Cities metro area

5. Collect and Tag the Hits

The Tagging Dictionary

Time Horizon	Source	Emerging Issue	Tags (see #2 indicator search terms)	Article specific	Date of publication
H1, H2, or H3	Specialty media Scientific journal Scientific media Industry/Assn pub Govt/NGO pub Mainstream media	Genetics Migrants Health STP (social tipping points) Wood Vertical			Add as comment, format: 16-MAR-2020

Track Movement Over Time

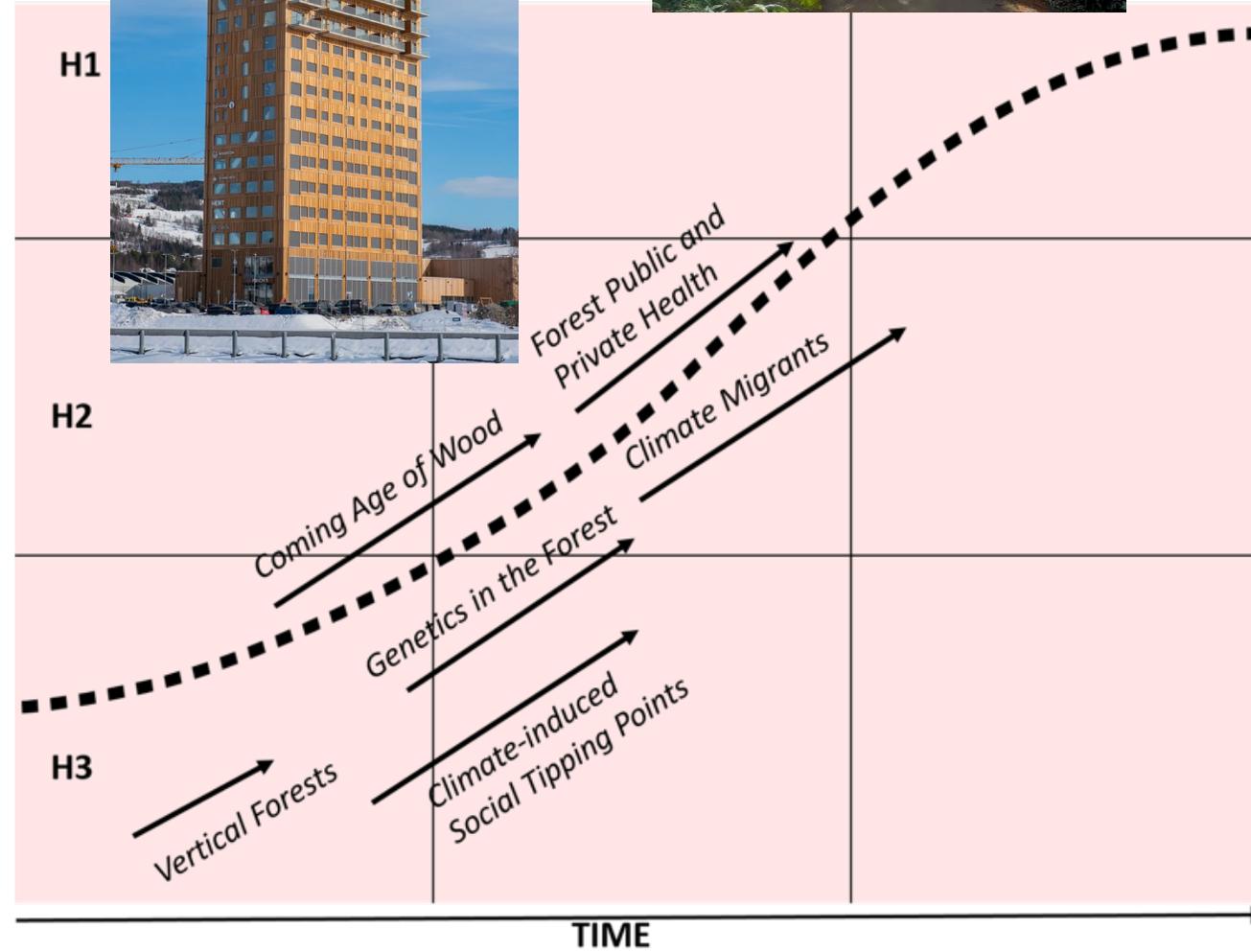
Coming Age of Wood
(Wood skyscrapers)



Forest Public and Private Health
(Forest Bathing)



Vertical forests



Communicating

- + Diigo scanning library
- + Blog posts
- + Newsletter
- + Articles
- + GTR: Global Technical Report
- + Presentations
- + Input into other strategic foresight projects, e.g. future of outdoor recreations

Forest Futures
A Monthly Horizon Scanning Summary

U.S. Strategic Foresight Group
HOUSTON
Foresight Institute

SCAN HITS
HORIZON 1 (0-5 YRS) | HORIZON 2 (10-20 YRS) | HORIZON 3 (20+ YRS)

GENERAL
driving forces:
social
technological
economic
environmental
political

What if Citizens had the rights of a person for a business?
New Zealand's (Te Tiriti o Waitangi Act) granted a formal legal status of a person. Shared to an indigenous group, the forest is believed to be one of their living ancestors. Granting personhood to forests opens up new opportunities for the forest industry.

Urban Risk: The Global Concerns in Mind
Between 2015 and 2050, three-quarters of global urban consumption growth will be driven by nine megacities, with half of this being driven by rising individuals and elderly in developed economies, China's working-age population and North America's working-age population.

Spectrum: The Case for a New Economic Paradigm
A different kind of economic structure is needed for an ecologically constrained world — "degrowth", an equitable downscaling of production and consumption that will reduce societal throughput of energy and raw materials, moving towards degrowth as an economic structure could mean reduced consumption of timber products.

In Sum

1. Making time to scan and monitor the future helps de-mystify it
2. The future moves at different paces, some change is faster, most is slower, and some things barely change at all
3. If you do horizon scanning, you will not be surprised by the future!
4. Actively preparing for the future can help make you a more valued strategic partner.

Contact Info

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With special thanks to Dave Bengston, US Forest Service,
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