Response to
the Draft REPORT ON
THE REVIEW OF AERIAL APPLICATION OF HERBICIDES
FOR FOREST MANAGEMENT

by Mitch Lansky
January, 2022

"All my means are sane, my motive and my object mad."
Captain Ahab

Thinking about forests has changed over the last few decades. We are living in an age that has more awareness of threats to biodiversity and the earth's climate, and also the roles of forests to help reduce such threats. We are also more aware of the cumulative body burden of various chemical pollutants, including pesticides.

One would hardly know about such changes in consciousness, however, by reading the Draft Report on Aerial Spraying of Forests in Maine.

The Draft Report uses some pretty strong language to let us know that herbicide use is benign, if not necessary. For example: "In most instances, productive forest management cannot be managed economically without herbicides (pg. 51)." Since most management in Maine does not use herbicides, we can infer that most management is not productive. In the thousands of years that humans have lived in Maine, productive management, based on this line of thinking, was not even possible before the development of herbicides.

No Problems

What about the impact of herbicides on human health and wildlife? "The authors find nothing that would contradict the opinions of the US EPA and others as expressed on the herbicide labels that aerial application of herbicides can be used safely in this situation without causing undue risk to humans or the environment..."

There are a lot of studies on the impact of herbicides, including glyphosate based herbicides (GBH), on human health and wildlife. Some studies make a case that there *are* problems. To be able to say that "nothing" contradicts the opinion that the herbicides are safe requires an opinion that studies that show no problems are valid, and studies that show harm are not valid. Such thinking is considered "circular reasoning."

In some cases, the Draft Report cited studies that show there are problems. The response of the authors is to say that the problems are temporary (because habitat, food, and wildlife will bounce back, after a few years) and limited (because there is so little herbicide spraying as a percentage of all forested acres). By diluting time and space, it is easier to ignore what happens now, here.

Another response is that maintaining a "mosaic" of habitats ensures that the landscape will support all the species. The authors claim that the Forest Practices Act, which sets a 250 acre maximum limit, ensures that the landscape will be in such a mosaic. The authors forgot that some of the biggest herbicide sprayers are in the Outcome Based Forestry program that exempts participants from the Forest Practices Act limits on clearcut size and buffer requirements.

Thirty years ago I wrote a response to the "mosaic diversity" theory:
"Putting degraded and simplified fragments together into a mosaic does not magically compensate for the deficiencies of the constituent parts. A mosaic of relatively young stands does not create habitat for species associated with old growth. A mosaic of stands favorable to common species does not create a larger haven for rare species. A mosaic of fragmented stands does not create habitat for species requiring a more continuous mature forest. A mosaic of unstable stands does not create a more stable forest ecosystem."

Herbicide advocates have admitted that herbicides can be toxic to plants, but they are harmless to animals. Amphibians, however, are considered to be animals, and not plants. The Draft Report (pg. 102) mentioned studies that showed that glyphosate based herbicides can cause "significant, dose dependent toxic effects" to some amphibian species at vulnerable life stages (such as larval stage). The chemicals can kill frogs.

Amphibians are not a minor part of forest ecosystems. A study at Hubbard Brook, in New Hampshire, estimated that redback salamander biomass per acre of forest was twice the biomass of birds at peak breeding and equal to the biomass of mice and shrews."[1]

One study, published in 1989, and funded, in part, by a paper company, found, no reduction in species diversity from herbicide spraying.[2] A closer read, however, shows that with forest invertebrates, 43% of the species diversity was found on the 2% of the stand that got inadvertently skipped by the spray. So the logic here is that herbicides protect species diversity if one counts species in areas that don't get sprayed. If this logic is extended further, however, the best protection of species diversity is to skip the stand altogether.

I won't get into the literature on the impact of GBHs on human beings except to mention there are studies that indicate that Glyphosate Based Herbicides are possible carcinogens (non-Hodgkins Lymphomas) and there are billions of dollars in court settlements going to spray victims. If nothing can change the opinion of the authors that the chemicals are safe to human health when used as directed, the implication is that all the studies that show harm must be invalid and all the settlements to spray victims are invalid as well.

Precaution

If one can concede that in a complex world, some interactions of these novel anthropogenic chemicals with human health or the environment might not be benign, this would, logically, favor a strategy of "precaution." The more chemicals used in our environment, the bigger the burden of chemicals in our bodies, and the more possible interactions of chemicals, drugs, or diseases. A precautionary approach would be to reduce exposures to chemicals that may possibly have problems, rather than increase exposures to them.

In the Draft Report, however, "precaution" refers to spraying more carefully rather than spraying fewer acres.

---

1 Hunter et al, *Maine Amphibians and Reptiles,"*University of Maine Press, 1999, pg. 66

2 See Beyond the Beauty Strip (BTBS), pg. 261 for references. Santillo was prime author of studies cited.

Such a policy (of spraying less) was endorsed more than 30 years ago by a Maine Commission to study herbicides, which concluded that it should be state policy to “encourage through education and other appropriate means, the reduction of, and alternatives to, pesticide use.”[3]

A similar precautionary approach was also adopted by Forest Stewardship Council, one of the entities that certifies forests to be “sustainable.”

The FSC wrote:
“Experience has repeatedly shown the difficulty of ensuring consistent proper use, and the limits of knowledge of the ecological and environmental impacts of pesticides, and the consequent unforeseen consequences of their use."[4]

"Management systems shall promote the development and adoption of environmentally friendly *non-chemical* methods of pest management and *strive to avoid the use of chemical pesticides*." (my emphases)

It is a *non-certification threshold* if "*forest management practices are selected that heighten dependency on pesticides.*"[5]

Dependency
Scientific Certification System’s (SCS certifies by FSC standards) Forest Conservation Plan Operating Manual states (pg. 36) that: "The use of chemicals as an expediency or as an indispensable facet of broadly applied silvicultural prescriptions is fundamentally incompatible with the precepts of sustainable forestry."

A major point of the Draft Report is to prove that herbicides are an indispensable facet of “productive” management. Apparently, the authors of the Draft Report are either unaware of or ignorant of SCS guidelines, because their point of herbicides being indispensable, if true, would mean that companies that use them would be barred from certification.

Surprisingly, the company in Maine that is doing the most forest herbicide spraying, the JD Irving company, has been certified by SCS, repeatedly.

If such an ironic fact—that a landowner who is responsible for the majority of forest herbicide use in Maine is somehow setting an example of reducing reliance—is ignored by a certification company, I suppose it makes sense that the Draft Report can ignore it too.

Despite growing crises in biodiversity and climate, the Draft Report accepted what, it admitted, was plantation-style management—even though choosing such management is an overwhelming factor “requiring” the spraying of herbicides.

---

3 Maine Office of Policy and Legal Analysis, *Final Report of the Commission to Study the Use of Herbicides,* State of Maine 114th Legislature, December 1, 1990, Appendix B1.

4 FSC GUIDANCE DOCUMENT FSC PESTICIDES POLICY: GUIDANCE ON IMPLEMENTATION FSC-GUI-30-001 VERSION 2-0 EN

5 Ibid

Another irony. The FSC has a policy that plantations established after 1994 are not certifiable as "natural forests." The certifier, SCS, has ignored this policy with JD Irving by calling intensively managed stands "planted forests." That means the following practices are now considered "natural": whole-tree clearcuts, site preparation (which involves extensive soil disturbance), planting boreal spruce where there was a mixedwood stand, spraying herbicides, and doing pre-commercial thinning, all on a 40-50 year rotation. The Draft Report authors, by referring to such practices as "plantation management" either forgot or did not know that such practices are not supposed to be certified as "natural" forestry.

Forest Ecologist, David Perry, in an interview three decades ago stated an ecological precautionary principle:
"One rule of thumb I favor is the more a given management approach departs from the natural forest structure, the less area it should occupy (at least until its stability is established, which could take decades or centuries)."

Whole-tree clearcuts on short rotation go way beyond any normal forest disturbance. Forest fires or windstorms, for example, do not remove all the above-ground biomass and nutrients, including tops and branches. And natural disturbances in Maine's Acadian Forest do not occur every 40 or 50 years, but, rather, may recur on a given site centuries apart. Boreal softwoods do not normally dominate sites in Maine that previously supported mixed-wood Acadian species, except for spruce coming up in abandoned pastures.

Weeds

One technique to get us in the right frame of mind to think that herbicide spraying is benign is to confuse a metaphor with reality. We are supposed to see a forest as an industrial farm and the planted trees are the "crops." Broad-leaved species growing up in clearcut forests, are, based on this metaphor, "weeds." If managers see the forest that way, they will treat the forest that way.

Weeds are plants that are in the wrong place, are worthless, and compete with crops. I have read, however, studies on vegetation management where the stands studied do not fit the "weed" assumption found in the Draft Report.[6]

What comes up after clearcuts, for example, can be pioneer species, which are adapted to quickly grow in disturbed forests to help the site recover and prevent nutrient leaching. Some of the trees might be northern hardwoods adapted to better sites or mixed woods. In either case, they are not growing in the "wrong" place. They are native plants growing where they are adapted to be.

Hardwood trees are not worthless and do have economic value, even though the studies quoted on the benefit of herbicides ignore the volume and value of hardwoods in control sites. Maine is a net importer of hardwood pulpwood. From the 1990s to 2008, landowners in northern Maine were cutting more hardwood volume than was growing.

If productivity is an issue, some of the tree species that are herbicide targets (such as poplar) can grow faster on good sites than planted spruce trees by a good margin.[7] You'd be better off leaving and managing the poplars, rather than herbiciding them.

6 BTBS pgs.257-264, and 178-204
7 BTBS,pg. 189

Rather than be competitors, pioneer species can, in some cases, be considered "nurse trees." This occurs when they partially shade an understory of tolerant softwoods, leading to higher volumes from the total of hardwoods and softwoods because there is better use of growing space.

Some studies found that spraying herbicides was quite effective at killing "brush," but there was *no growth response* to the "crop" trees. The "brush" was not suppressing the softwoods.[8]

In some cases, the crop trees that got "released" by herbicide spraying got damaged later by frosts, animal browsing, and insects.[9] In short-term studies (ten or less years) these longer-term problems might not become evident.

The "weed" metaphor does not always accurately predict what actually happens on the ground. Rather than view forests as industrial farms, it would be preferable to see them as self-regulating ecosystems.

Saving the Climate

Climate experts agree that we need to start reducing carbon emissions now, not later. Whole-tree clearcuts, however, create a carbon debt now. Taking away all the trees and exposing the soil to direct sunlight leads to less sequestration, but also increased emissions, as organic matter breaks down. The result is net carbon dioxide emissions that can go on for more than a decade.[10]

The result also is less carbon storage, because there is less tree volume. In Maine, the majority of what gets cut down is made into short-lived products, such as paper and biomass, which start releasing carbon within a few weeks, months, or years after cutting, adding to the carbon debt.

The result of shorter rotations is a younger forest landscape. More than a third of the forests in northern Maine are dominated by seedlings and saplings. For carbon storage or for biodiversity we need more older forests, not more younger forests. Herbicides, by killing off broad-leaved plants that normally would create shelter to the bare forest soil, can extend the period of net carbon emissions.

An alternative approach that *does* start increasing carbon storage and decreasing carbon emissions *now* is "proforestation," which is being advocated by William Moomaw.[11] The strategy is to put more growth on existing trees, rather than start forests from scratch every 40 years.

If one is managing for the long term, any planting should favor species that are adapted to both the current site and the climate now and in the expected future. Which raises the question: why are some landowners cutting down mixedwood forests and replacing them with boreal forests? Is the climate cooling?

Conclusion

Intensive management following clearcuts occurs on a small minority of the forest and is done by a small percentage of landowners. Clearcuts make up less than 7% of acres cut in Maine (2019 figure).

8 BTBS 184-189
9 BTBS 187-188
10 https://masswoods.org/sites/masswoods.org/files/Forest-Carbon-web_2.pdf
11 https://e360.yale.edu/features/why-keeping-mature-forests-intact-is-key-to-the-climate-fight

Doing cuts on short rotations and converting to boreal spruce with the aid of herbicides is even less common. Such management is a choice, not a necessity.

Partial cuts make up 53% of all acres cut in Maine. If productivity is an issue, the Maine Forest Service should be promoting less highgrading and better stocking on partial cuts, many of which have sub-optimal distribution of trees based on tree size and stand type.

If landowners can afford to pay for site preparation, herbicides, and pre-commercial thinning, all of which have long paybacks, why can't they afford to leave better-stocked and better quality residual stands resulting from partial cuts?

Supporting intensive management requires that the Maine Forest Service make excuses for clearcutting whole-trees, having net carbon emissions for part of a rotation, simplifying or converting mixed forests to boreal species, creating landscapes with higher percentages of seedlings and saplings, and exposing the public to toxic chemicals. Are these desirable results that MFS employees can proudly promote?

Lowering the maximum allowable wind speed, one of the major changes from business as usual by the Draft Report, is better than nothing. The Draft Report, however, makes an argument that herbicide spraying is already low risk at currently allowable wind speeds. Indeed, based on the Draft Report we can infer that "productive management," dependent on herbicides is a good thing. Since the Report argues that herbicides are necessary and benign, the implication is that we should be *increasing* herbicide use, not decreasing it. Just do it more carefully. Might as well throw precaution (reducing reliance on spraying) to the wind.