Below are responses by Tom Groves to public comments related to herbicide use described in the draft 2022 management plans for forestlands owned by The Fund for North Bennington, Inc. Mr. Groves is a certified commercial herbicide applicator in Vermont and Massachusetts with extensive experience with herbicide applications on conserved forestland. He is field manager for woodland services at Long View Forest in Westminster, VT.

The *italicized* sections below are selections from public comments.

> *In the proposal, herbicides are discussed as an unfortunate necessity, but the only other options discussed are hand pulling, mowing and mulching. What about controlled fire, mycological interventions, tarping, planting more desired species, selective tree-felling, soil health management, or other techniques? For Garlic Mustard, for example, the newest research from Cornell suggests that the best approach is actually to leave it alone, as it self-limits and dies out. Each plant has its own techniques, of course, but a blanket of chemicals is not always the best way.*

Controlled fire could be a potential option for smaller invasive seedlings without much of a root mass. On most of the property covered by these plans, the invasive plants are long established. They would survive and resprout in a fire-management approach. In the forest, where most of the infestation is occurring, it might be hard to get a fire hot enough to actually do any long-term damage to these well-established plants. Many woodland native plants could be harmed with this approach. Control by fire would be better suited to a field or area where herbaceous invasive plants are present and the ecological community is better suited for a fire approach.

Tarping for invasive plants has generally not been successful and tends to be attempted when there is a very small invasive population selected for control. Due to the scale of The Fund's property (acres), size of the exotic plants present, and the amount of tarp material or plastic that would be needed for cover, it is not a feasible approach. In this scenario, similar to the fire-management approach, there is potential to harm more sensitive native plants.

Planting of more native plant species is always something we advocate and is something we do on a regular basis. This is one tool we use in the fight against invasive plants in conjunction with herbicide.

Selective tree-felling, also known as Timber Stand Improvement (TSI), is definitely an approach we use in land management. This technique is most often used in younger forests where the advantage can be provided to a particular tree or species to manage a future outcome. TSI does not really apply to invasive plants other than in this context and should not be started without first managing the invasive plants in the understory. If a disturbance happens, such as a light increase with selective tree cutting, it will make the invasive plant situation worse.

When some invasive plants are present, they release allelopathic chemicals into the soil that can inhibit native plant germination. Examples of this are Japanese knotweed and garlic mustard. The most effective way to deal with garlic mustard is to hand-pull it when it is young and before it flowers. It's one of the earliest plants to green up in the spring and it's easily identifiable. Garlic mustard is particularly hard to control due to the number of seeds it produces, it's ability to flower throughout the growing season despite repeated cutting and its rapid response to disturbance. I have seen in places like Greylock Glen whole understories that should be filled with ramps and bloodroot and other spring ephemerals completely choked out with garlic mustard that went unchecked for years. It definitely has not been self-limiting.

Use of herbicides in a forestry setting is not like industrial farming. Chemicals are applied during one growing season (during three to seven visits) and after the initial season's treatment we estimate that 90 percent of the invasive plants will be dead. The following season we perform an assessment to determine if a follow-up chemical treatment is needed, or if there's another approach that would make sense in light of the conditions we observe in the field. In most cases there will be a seed bank of invasive plants that flushes two to three years after the initial treatment. This is a great time to get volunteers together and get pulling – herbicide free.

> *In the proposals, the herbicide application is vague. Would it be spray, pellet, or injection? What chemicals would they use? For example, I am dealing with a major infestation of Ailanthus on my property and the best approach seems to be: application of a tiny dose of herbicide into the trunk, then felling six months later. This entirely limits the poison to the tree and root structure. A foliar spray approach to the same issue creates a scorched-earth environment where the soil and many of the microorganisms in it are killed by the herbicide, which ultimately finds its way into the water table (not to mention changing the microorganisms in the soil).*

The applications we use vary depending on the infestation density, size of plants, and species. Long View Forest uses one herbicide 98 percent of the time. It is a wetland approved glyphosate product called Rodeo. It is the preferred herbicide for sensitive areas and, in my experience, produces the best results with lowest potential harm to pesticide applicators and the public. We primarily use Rodeo because it has a 40-day half-life, binds on contact with soil and does not percolate into ground water. It is decomposed by bacteria and sunlight and affects plants through inhibiting the Shikimate pathway – an amino acid production process that humans don't utilize. Ground-water contamination and run-off concerns relate principally to the use of herbicide in industrial farming rather than in a forestry setting.

We purchase this product as a liquid. It is primarily applied as a foliar treatment during the growing season from May through November, although it can be used as a cut-stump treatment until the ground freezes. In areas where the invasive-plant population may only be 5 percent to 50 percent, we can apply the herbicide with a low-pressure/low-volume backpack sprayer and be extremely targeted with our application. In these areas where bigger plants cannot be sprayed they are cut and the stumps

dabbed which only puts herbicide on the cambium of the tree. Where the population of invasive plants is more dense (50 percent to 100 percent) a higher volume application method is needed as well as a hybrid approach of some or all of the application methods.

> *I want to know how the plan will address the aquatic invasive species in Lake Paran. I gather that the introduction of buffers may be a part of the plan?*

Long View Forest primarily deals with invasive plants in a forest setting and does not do any application of aquatic invasive species. The herbicide we use is allowed by law to be applied up to the water's edge.

> *The proposal does mention applying for "NRCS brush management practice (chemical) #314". That practice discusses the benefits of foliar sprays as one option, saying it is "cost-effective". I hope that they aren't weighing momentary cost over the long-term health of this ecosystem. The fact that they also propose to mow and mulch in a handful of areas is great, but the majority of the management plan is chemical-based.*

In the case of The Fund's property a chemical approach at least to gain a foothold is the most ecologically informed approach. Often an initial chemical treatment is the only available option to make any meaningful impact and regain a semblance of the previous habitat. There can be many factors that make a certain approach on a particular property possible. After this initial chemical work is done the areas are much more manageable and other approaches can be taken to mitigate invasive plants in the future.