

Scientific Forest Management Area Herbicide Policy

Adopted [month/year]

Overview

Herbicides in the Scientific Forest Management Area (SFMA)¹

Park donor Percival Baxter's stated goals for the SFMA portion of Baxter State Park included the continuous (sustainable) production of a supply of timber and the use of practices that are informed by the current knowledge in the science of forestry. This herbicide policy is meant to allow the SFMA to meet Percival Baxter's stated goals for the SFMA. This herbicide policy expressly authorizes the use of herbicides as a tool to facilitate the continuous production of timber and guides decision-making and practices regarding their use. This dual function of the policy ensures that herbicides are included as an option along with other silvicultural forest management tools, while minimizing their impacts on the forest ecosystem.

The regeneration of vegetation following timber harvests present challenges for forest management. In some instances, non-merchantable shade-tolerant shrubs and small trees such as hobblebush (*Viburnum lantanoides*), striped maple (*Acer pensylvanicum*), and American beech (*Fagus grandifolia*) can grow densely under forest canopies, limiting the amount of sunlight that reaches the forest floor. This can suppress the establishment of tree seedlings of desirable merchantable species. The Park strives to use silvicultural prescriptions in the SFMA to promote desirable regeneration, rather than relying on post-harvest treatment of undesirable regeneration. However, as in many other managed forests in Maine, such conditions have developed following certain types of timber harvests or other management actions and have resulted in relatively widespread failure of desirable regeneration in the SFMA. Once these challenging conditions are created, landowners may use mechanical means based on silvicultural principles to re-direct the successional trajectory of such stands towards the regeneration of desirable species (e.g., various forms of cutting of the vegetation that is interfering with the growth of desirable species, soil scarification). Based on the most current science the SFMA's staff and Advisory committee have determined that in some stands in the SFMA establishing the regeneration of desirable species with these circumstances is not feasible using these mechanical approaches (in some cases due to the scale of the need for management). The use of herbicides represents an additional tool that can be effective for mitigating such conditions.²

The application of herbicides involves risks, such as impacts to non-target species, soil, water, and the herbicide's applicators. A well-defined policy minimizes the risks of herbicides in situations when their use represents the only feasible way to effectively manage forest regeneration. This policy allows the use of herbicides, with the intention of re-establishing conditions that can once again be managed using silvicultural (and sometimes mechanical) tools alone.

¹ This policy applies only to the SFMA portion of Baxter State Park, where forest management takes place.

² Nyland, R. D., Bashant, A. L., Bohn, K. K., & Verostek, J. M. (2006). Interference to hardwood regeneration in northeastern North America: Controlling effects of American beech, striped maple, and hobblebush. *Northern Journal of Applied Forestry*, 23(2), 122–132. <https://doi.org/10.1093/njaf/23.2.122>.

Due to the risks associated with herbicides, the SFMA will always first consider and employ mechanical methods for plant control to address silvicultural problems (such as regeneration failure) and will resort to the use of herbicides only in instances where mechanical methods have been determined by the SFMA's certified foresters to be ineffective or impractical at the scale of the stand. This is often the case in larger areas because mechanical control is more labor intensive and less effective (and so may need to be repeated). The Park will comply with the policy stated in 22 M.R.S. § 1471- X by "using the minimum amount of pesticides needed to effectively control targeted pests in all areas of application." Additionally, the Park will employ best practices as outlined by the Maine Board of Pesticide Control Guidelines for the Application of Pesticides in Forest Settings in Order to Minimize the Risk of Discharges to Surface Waters.³ Furthermore, the SFMA will utilize an integrated pest management approach to reduce the overall volume and number of chemical herbicides used as well as ensure efficient and prudent use of the least hazardous effective chemicals. Chemicals used in the SFMA must have the least toxic chemical composition, the highest target efficacy, the least negative effects on non-target vegetation, wildlife, water quality, and human health of any cost-effective chemical available, as outlined by the Forest Stewardship Council's (FSC) List of Highly Hazardous Pesticides.⁴

Desirable and undesirable regeneration

Desirable regeneration refers to the seedlings and saplings that will lead to the replacement of the previous overstory, desired species composition at a site, or transition the site into a new desired forest type in cases where the aim of forest management is to force a forest type change (such as for the purpose of restoration forestry or climate change adaptation). Undesirable regeneration in the SFMA refers to competing plants species that interfere with the germination or growth of desirable regeneration. When plants such as hobblebush, diseased beech, or striped maple dominate the understory, cutting at any intensity will promote these plants and cause them to severely limit the establishment and growth of desired species.⁵

³ Maine Board of Pesticide Control. (2015, June 5). Guidelines for the Application of Pesticides in Forest Settings in Order to Minimize the Risk of Discharges to Surface Waters.

⁴ Forest Stewardship Council . (2024, February 13). FSC-POL-30-001a V1-1.

⁵ Nyland, R. D., Bashant, A. L., Bohn, K. K., & Verostek, J. M. (2006b). Interference to hardwood regeneration in northeastern North America: Ecological characteristics of American beech, striped maple, and hobblebush. *Northern Journal of Applied Forestry*, 23(1), 53–61. <https://doi.org/10.1093/njaf/23.1.53>

Process for Evaluating and Using Herbicides in the SFMA

Assessment Procedure

Treatment candidates must meet one of the following conditions:

Condition 1- Prior to establishment or final harvest: Forest stands with undesirable species (e.g., diseased beech, striped maple, hobblebush, *Rubus* species, beaked hazel, pin cherry, hay scented fern) that are creating conditions that are known to exclude establishment of desirable regeneration.

Condition 2- Post establishment or final harvest: Regenerated hardwood, mixedwood, and softwood stands where undesirable species are threatening the survival or severely hampering the development of desirable regeneration.

Condition 3- A site where exotic invasive species, as defined by the State of Maine, are present: This condition will be assessed with different protocol than conditions 1 and 2.

Stand assessment protocol to be used for controlling competing vegetation

Field Methods

Randomly establish 1/500th acre (5.3' radius) fixed radius plots using the sampling intensity described under Sample Size below.

- All plants > 0.5" and < 4.5" Diameter at Breast Height (DBH) are tallied in 1" diameter classes. Record species. Note the tallest measured plant in the plot.
- Note the presence of hay scented fern, beech, striped maple, or hobblebush if present within the plot but not tallied. Also record its relative height to other plants in the plot.

Adjustments to plot size and sampling intensity are up to the discretion of a licensed forester. Examples of justifiable adjustments include spruce/fir sites where a 1/700th acre plot would be more efficient, extremely dense stands or highly variable stands. The sampling intensity described below should be considered the minimum.

Decision Criteria

Condition 1: The purpose is to determine if the plot represents a site that will successfully regenerate upon an establishment harvest or will fail to regenerate due to competition after an establishment harvest. Each plot is judged on a pass/fail basis. If the tallest plant in a plot is of an undesirable species, the establishment of desirable regeneration is expected to fail, and the plot fails. If over 30% of the plots fail, intervention with herbicides may be considered.⁶

⁶ Nyland, R. D., Bashant, A. L., Bohn, K. K., & Verostek, J. M. (2006). Interference to hardwood regeneration in northeastern North America: Controlling effects of American beech, striped maple, and hobblebush. *Northern Journal of Applied Forestry*, 23(2), 122–132. <https://doi.org/10.1093/njaf/23.2.122>

Note: If an inventory is solely performed for an herbicide assessment, the inventory may cease when 30% of the plots have failed, as the block (or area within it with the same conditions) has failed the regeneration assessment and may be considered for herbicide treatment.

Condition 2: The purpose is to determine if established regeneration requires a release (i.e., a management intervention that will provide a plant an advantage over its competition). To ensure that the majority of the species that will respond to a harvest have had a chance to do so, the survey should be performed at least three seasons after an establishment or final harvest. A stand will warrant a release only if it is fully stocked with desirable regeneration. If over 50% of the plots are stocked with desirable regeneration, the stand should be considered fully stocked. If over 30% of the stocked plots (fully stocked with desirable regeneration) are overtopped by an undesirable species (even a single stem), an herbicide treatment may be employed. If less than 30% of the stocked plots (fully stocked with desirable regeneration) are overtopped by an undesirable species, an herbicide treatment may not be employed.

- An average of 1 hardwood or pine greater than 4.5 feet tall per plot represents a completely stocked plot (500 trees per acre [tpa]). Greater than 50% of the plots should have at least one stem of desirable hardwood or pine to be considered stocked with desirable advance regeneration.
- An average of 1.5 spruce, fir, or cedar greater than 4.5 feet tall per plot represents a completely stocked plot (750 tpa). Greater than 50% of the plots should have at least one stem of spruce, fir, or cedar to be considered stocked with desirable regeneration. 1/700th acre (4.45 feet) plots may be substituted in spruce/fir stands to improve sampling efficiency.

Sample Size: sampling intensity is calculated using “rule of thumb” in A Sampler of Inventory Topics by Kim Iles & Associates Ltd.(2003):

Stand Area	Number of Points
Less than 10 acres	10 plots
11-40 acres	1 plot per acre
41-80 acres	20+0.5(area in acres)
81-200 acres	40+0.25(area in acres)
Over 200 acres	$n = \frac{t^2 cv^2}{E^2}$

Where n= number of points for the desired precision E, with a probability level implied by the value t. The CV is the coefficient of variation of the forest in percent.

Stand assessment protocol for controlling invasive plants

A visual assessment is acceptable for state recognized invasive plants; no inventory is required. The correct identification of the plant is critical, and photographic and written records must be generated and retained.

Selecting an Herbicide Application Method

1. If there are fewer than 500 undesirable stems per acre, use individual stem treatments.
2. If there are over 500 undesirable stems per acre (under 15 feet tall), use mist blowers.
3. Aerial applications of any kind (e.g., by plane Unmanned Aerial Vehicle), as silvicultural treatments for forest regeneration or for the treatment of invasive plants, will be considered only in cases where the use of mist blowers is determined by a licensed forester to be ineffective, and will be discussed with the SFMA Advisory Committee and the BSP Authority prior to its use.

Record Keeping

The justification for any herbicide treatment—based on the assessment criteria above—must be recorded in the block narrative, along with the inventory data, and all records for the application (all of which include dates and employee names).

Treatment Process

- Assess the qualification of the stand and method of herbicides by performing the stand assessment (as described above).
- Lay out treatment areas, delineating the treatment area boundary and recording it with GPS.
- Delineate buffers:
 - Buildings or wells 300 feet
 - Lakes, ponds, streams, and wetlands 25 feet
 - No herbicides will be applied within 25 feet of a river, stream, lake, pond, or hydrologically connected wetland without a permit from the Department of Environmental Protection.
 - Ownership boundaries 100 feet
 - Riparian Management Zones (RMZ) Mapped
 - Herbicides applied within a SFMA RMZ must be formulated for use near water, and a justification for the use must be clearly documented.
- Develop prescriptions describing the appropriate type and amount of herbicide to control target species and detailing the application method.
- Herbicide application may be performed by qualified BSP staff or a contractor. If using a contractor, a contract should specify responsibilities, treatment conditions, treatment prescriptions, areas, and timelines.
- Provide an overarching plan and a summary of the block acreages and prescriptions to the applicator in advance of commencing the work.
- Review with the applicator:
 - The overarching plan
 - Individual treatment area maps

- Treatment areas in the field
- If the applicator is a contractor, SFMA staff familiar with the treatment area and chemical application must be present at the commencement of work for each block being treated.
- Records to be kept during the application are:
 - Date and time of treatment
 - Wind speed, temperature, relative humidity, and precipitation
 - Batch information: chemicals, volumes, label #
- Records to be kept in the block narrative include:
 - Map showing treatment area and any sensitive or other appropriate features.
 - Prescription page discussing the chemicals used, delivery method, target species, treatment block acreage, and sensitive features associated with the treatment area.
 - Applicator documentation
 - Name
 - License number
 - Address of applicator
 - Block number
 - Habitat
 - Date
 - Start and stop times
 - Chemical used
 - EPA Reg number
 - Concentration used
 - Carriers/additives
 - Total amount of chemical used
 - Mode of application
 - The weather during application

- Weather 24 hours before
 - Comments
- Outcome, including any divergence from the plan and reasons for the divergence.
- Assess the treatment area no sooner than 48 hours following, but within 1 week of, the application to ensure the work was completed as planned and to remove signage. Assess the treatment again the following growing season to evaluate and ensure the efficacy of the treatment.

General Guidelines

- Herbicides that are prohibited for use by the state of Maine shall not be used in the SFMA.
- Herbicides listed by the Forest Stewardship Council in 2024 as “Prohibited” shall not be used in the SFMA.
- Herbicides used in the SFMA must have a low toxicity to non-target organisms, as outlined in categories 2.1b and 7 of the FSC Highly Hazardous Pesticides list.
- Always use licensed and qualified applicators and apply the herbicides as specified by the label.
- Place signage warning people that herbicide application is occurring in the area.