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Invasive Plant and Interfering Vegetation Treatment

Environmental Assessment

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Introduction

We are proposing to treat invasive plants and interfering vegetation using manual, mechanical, and chemical treatment methods to conserve native plants, wildlife habitat, and desirable vegetation. Treatments would primarily occur on National Forest System lands, but may also occur in partnership with willing landowners on other lands within or adjacent to the Allegheny National Forest proclamation boundary. If approved, our proposal would achieve these objectives by:

- Reducing invasive plant infestations and improving our ability to reduce the spread of invasive plants across ownership boundaries.
- Reducing interfering vegetation to improve the regeneration of desirable tree species.
- Amending the 2007 Allegheny National Forest Land and Resource Management Plan (forest plan; USDA Forest Service 2007a) to provide clarification, additional direction, and allow certain treatments to occur in additional areas.

We prepared this environmental assessment to determine whether the effects of our proposed activities require further documentation in an environmental impact statement. By preparing this environmental assessment, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act and other relevant laws and regulations.

Project Location

The project area is located on the Allegheny National Forest in northwestern Pennsylvania. The activities proposed would primarily occur on National Forest System lands within the proclamation boundary. As described in this document, treatments on lands in other ownerships within and adjacent to the proclamation boundary may sometimes occur. A map of lands within the proclamation boundary is provided below as figure 1.

The proposed forest plan amendment is programmatic in nature. It would apply to all National Forest System lands on the Allegheny National Forest.

Need for Action

Need for Invasive Plant Treatment

Invasive species are among the most significant environmental and economic threats facing our nation's forest, grassland, and aquatic systems (USDA Forest Service 2013). More than 70 species of non-native invasive plants have been documented on the Allegheny National Forest, and an additional 33 species are on our early detection list to encourage a rapid response should they be discovered (see appendix A for details).

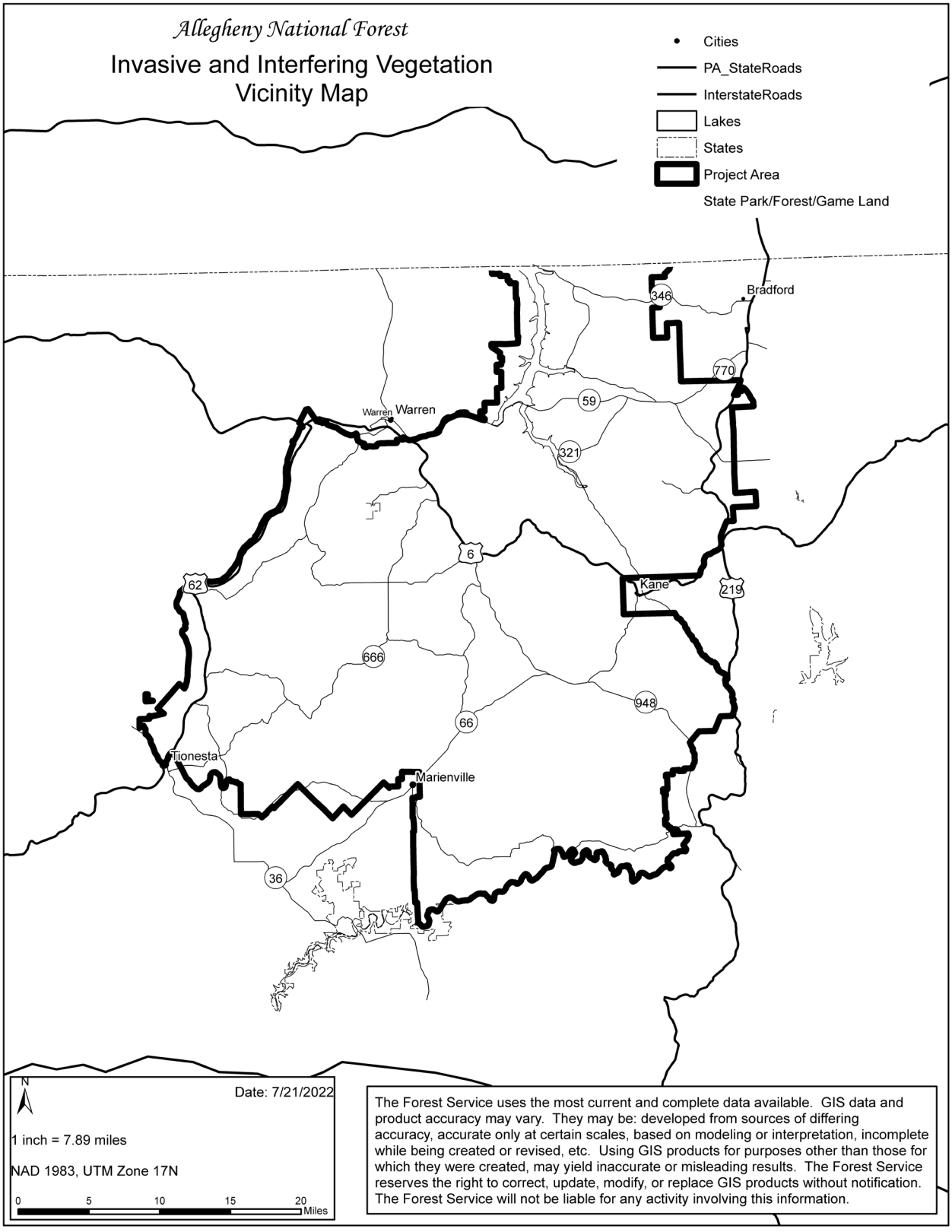

Figure 1. Allegheny National Forest proclamation boundary.

Some of the most widely distributed and most abundant non-native invasive plant species include glossy buckthorn (*Frangula alnus*), Japanese knotweed (*Fallopia japonica),* multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), honeysuckle species (*Lonicera* spp.), Japanese stiltgrass (*Microstegium vimineum*), and garlic mustard (*Alliaria petiolata*). These and other invasive plant species require concerted treatment efforts because they often have:

- A wide tolerance for sun or shade.
- High reproduction rates due to quick maturation, large quantities of highly viable seeds, and the ability to reproduce by seed and vegetatively.
- Few effective predators.
- The ability to spread aggressively over large areas.

Invasive plant species occupy growing space, use resources that could be used by more desirable native species, and often lack natural biotic controls that coevolved with them in their native range. Additional information regarding invasive plants is available online from the U.S. Forest Service,[1] Pennsylvania Department of Conservation and Natural Resources,[2] and many other sources.

Without an active treatment program, the aggressive expansion of invasive plant species would limit many land uses and values now and in the future. For example:

- Plant and animal habitat may be degraded or lost.
- Recreational opportunities and scenic integrity may be reduced or impaired.
- Sustainable production of desirable wood species may decline.
- Inaction may result in the spread of invasive plants to lands in other ownerships, impacting ecosystem services and values on those lands.
- Local economies may be affected if there is a related decline in tourism, the production of forest products, or the value of forest products sold.

To reduce the risk of continued and aggressive spread of invasive plants, there is a need to expand our current treatment program.

Treat More Areas and More Acres

Invasive plant treatments have occurred on an average of 544 acres annually over the past decade (see table 1). Most treatments are proposed as part of our larger integrated resource management projects. Because we typically propose new activities on just a few thousand acres each year, our current planning approach risks leaving infestations untreated in large areas of National Forest System lands.

Some infestations require treatment over multiple years, and newly documented infestations require a rapid response to limit their spread. Approximately 100,000 acres of the Allegheny National Forest are known to have at least one invasive plant of concern, and more are being identified each year. At this scale, an average of 544 treated acres per year is insufficient to conserve native plants and wildlife habitats over the long term.

For these reasons, there is a pressing need to treat invasive plants in more areas and on more acres overall.

1. https://www.fs.usda.gov/managing-land/invasive-species.

2. https://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx.

Table 1. Allegheny National Forest non-native invasive plant treatments, fiscal years* 2012–2021

Fiscal Year	Manual and Mechanical (acres)	Herbicide (acres)	Total (acres)
2012	100	93	193
2013	265	28	294
2014	192	227	419
2015	120	79	199
2016	172	121	293
2017	20	140	160
2018	352	143	495
2019	31	634	665
2020	125	1,675	1,800
2021	872	50	922
Average	**225**	**319**	**544**

* A fiscal year is from October 1 in the first year to September 30 the following year.

Reduce the Time Between Initial Documentation and Treatment

As noted above, most invasive plant treatments are included in project decisions for areas that are being actively managed. This approach may result in a gap of several growing seasons, or longer, between when an infestation is documented and the time when treatment begins.

This gap occurs because we typically cycle through project areas on a fairly regular interval. We only have capacity to develop new proposals for a given area roughly once every ten years, and generally lack capacity to add additional, yearly, stand-alone treatment projects on a large scale.

Invasive plants may obtain a critical foothold during this time by crowding out desirable native plants, establishing a seedbank, and spreading even further into the forest interior. Early detection, followed by a rapid response, is the best way to limit the spread of invasive plants. As a result, we need a treatment program that allows rapid treatment of infestations as they are documented in the field.

Treat Across Ownership Boundaries

Invasive plants spread across ownership boundaries and are likely to spread from National Forest System lands to adjacent ownerships and from adjacent lands to National Forest System lands. The most effective treatment program would leverage partnerships with willing landowners to treat invasive plants wherever they are located.

Federal law allows us to enter into collaborative agreements with willing landowners to conserve native plant and wildlife communities on lands in other ownerships. Unfortunately, our ability to fund or participate in on-the-ground treatment may be delayed by one or more growing seasons due to limited capacity for stand-alone projects and the time required to satisfy National Environmental Policy Act requirements. This delay may be too long for willing landowners to wait. As a result, we need a treatment program that makes it possible for us to work with willing landowners to rapidly treat infestations as they are identified.

Use the Most Effective Treatment Method with Fewer Effects to Desirable Species

Our current treatment program includes a combination of manual, mechanical, and chemical treatments.[3] Although effective for controlling many invasive plant species, other methods or herbicides may sometimes be more effective or result in fewer effects to surrounding vegetation. For example, other herbicides or methods may be more effective if they are pre-emergent, allow for selective basal bark application and extend the treatment window, are more selective to certain types of plants, or allow infestations to be effectively treated on large acreages or in areas that are difficult to access.

This is particularly important for buckthorn infestations. Glossy buckthorn (*Frangula alnus*) and common buckthorn (*Rhamnus carthartica*) often form thickets that are much denser than observed in their native range of Eurasia. These thickets impede hunters, hikers, and wildlife moving through the forest, obscure foreground and middle ground scenic views, and exclude other native shrubs, trees, and herbaceous plants from establishing or remaining on site. Glossy buckthorn, in particular, has invaded tens of thousands of acres of forest lands and is of great concern for many landowners in the region.

Due to the density and height of buckthorn, our current treatment methods may be ineffective or inefficient. Infestations are often taller than human shoulder height and the height of boom-mounted sprayers, which limits foliar application. Moreover, due to high plant density, buckthorn along the exterior of an infestation may block applied herbicides from reaching the interior. As a result, we often need to cut down plants more than five feet tall, wait for them to re-sprout, and then treat them with foliar application of a broad-spectrum herbicide (glyphosate). This is costly, time consuming, impractical on the scale needed for effective treatment, and may affect nearby desirable vegetation.

Need for Interfering Vegetation Treatment

The Allegheny National Forest is managed to sustain or improve forest health; promote a diversity of forest types, age classes, and wildlife habitats; as well as provide sustainable supplies of high-quality timber and other forest products. We achieve these goals, primarily, by implementing silvicultural treatments that are designed to achieve site-specific resource management objectives including, but not limited to:

- improving age class diversity;
- developing desired visual conditions;
- maintaining tree vigor and forest health;
- carrying out integrated pest management;
- maintaining tree species composition;
- enhancing wildlife habitat;
- responding to overstory tree mortality, blowdown, or catastrophic damage;
- accelerating the development of late structural forest stand characteristics; and
- restoring structural conditions in forested stands.

3. Manual treatments are hand-based methods including pulling, digging, and cutting. Mechanical treatments include the use of chain and brush saws, mowers, skidsteers, excavators, and specialized mulching equipment to remove woody plants. Chemical treatments include application of products containing the active ingredients of glyphosate, sulfometuron methyl, or sethoxydim.

Timber harvest and other vegetation treatments that manipulate the kind and abundance of trees growing on a site are the primary tools used to accomplish these site-specific resource management objectives.

Because stand regeneration on the Allegheny National Forest almost exclusively relies on free-to-grow natural seedling regeneration that is established from existing seed trees, it is typically necessary to control interfering vegetation like grass, fern, mountain laurel, and undesirable tree species by temporarily reducing their abundance on a site. The use of manual and chemical treatments to reduce the abundance of interfering vegetation is a common practice on National Forest System lands, and on other lands within the Allegheny Plateau. From 2017 through 2021, an average of 3,240 acres of manual site preparation activities and 2,183 acres of chemical site preparation treatments occurred on National Forest System lands each year in support of reforestation (see table 2).

Table 2. Acres of completed site preparation treatments on the Allegheny National Forest, fiscal years* 2017–2021

Fiscal Year	Manual Site Preparation (acres)	Chemical Site Preparation (acres)
2017	3,141	2,050
2018	4,149	1,854
2019	2,575	2,507
2020	3,352	2,626
2021	2,982	1,879
Total	16,199	10,916
Average	3,240	2,183

* A fiscal year is from October 1 in the first year to September 30 the following year.

Interfering vegetation treatments are part of the silvicultural prescription to manage a forest stand. To date, chemical site preparation treatments on the Allegheny National Forest have exclusively used glyphosate and sulfometuron methyl. This is largely because, at the time of forest plan revision, we did not anticipate a need to use other active ingredients. The forest plan, however, does not prohibit the use of other herbicides and we would like to consider using herbicides with other active ingredients that are more effective or more selective in certain applications.

Need to Change the Forest Plan

Reflect the Work Needed to Conserve Native Plant Communities

The forest plan estimated that we would treat approximately 610 acres annually during the second decade of forest plan implementation to address non-native invasive plant infestations (USDA Forest Service 2007a, page 22, table 3). The plan also identified an objective to "...[c]omplete 300 to 600 acres of invasive plant treatment annually" (USDA Forest Service 2007a, page 18). Although these numbers are not restrictive, and do not reflect minimum or maximum treatment acreages, neither accurately reflects the amount of work needed to move toward desired conditions.

Based on recent implementation trends (see table 1 above), we believe the estimated activity level and related objective should be increased to reflect the fact that more work is needed to conserve native plant and animal communities. This is because we are aware of more infestations, occupying a larger number of acres, than we knew of at the time of plan revision. The rate of infestation, moreover, can exceed 90 percent in some areas, and more invasive species are documented each year.

Improve Our Ability to Conserve Native Plant Communities in Riparian Areas

Riparian areas are transition zones between terrestrial and aquatic ecosystems. Although most active management activities are generally avoided in riparian areas, high rates of disturbance may still occur due to a combination of natural and human factors. Disturbances include flooding, wind events, insect infestations, disease, development of access roads and trails, developed and dispersed recreational opportunities, and mineral development (USDA Forest Service 2007b, page 3-31).

Areas where disturbances occur are especially susceptible to the growth of invasive plants, and waterways are effective pathways for transporting invasive plants to new areas. As a result, keeping riparian areas healthy and properly functioning is key to maintaining biologically diverse and highly productive environments (USDA Forest Service 2007b, page 3-29). Without treatment, invasive plant infestations may crowd out native plants and degrade wildlife habitat.

Unfortunately, our ability to treat infestations in riparian areas is currently impaired by a combination of limited treatment methods and forest plan restrictions, as described below.

- Manual and mechanical treatments are only effective for small infestations and are more difficult to use in areas where equipment and materials must be carried in due to limited vehicle access. As a result, these controls alone are insufficient to conserve native plant and animal habitats.
- Although chemical treatments within riparian areas are possible in some circumstances, the forest plan currently contains restrictions on the application of all glyphosate formulations, including those labeled for aquatic use, near water resources (USDA Forest Service 2007a, page 57).
- Backpack foliar application of glyphosate is prohibited within ten feet of standing or flowing water, dry intermittent stream courses, dry springs, and dry seeps (USDA Forest Service 2007a, page 57).
- Cut surface treatment using glyphosate is prohibited within ten feet of standing or flowing water (USDA Forest Service 2007a, page 57).

These restrictions impair our ability to conserve native plant and animal communities in riparian areas.

Standards and Guidelines for Aerial Application

While developing our proposed action, we identified aerial herbicide application, on a limited basis, as one method for responding to some of the needs discussed above. The forest plan contains very limited direction for aerial application, and it may be beneficial to create additional standards and guidelines to guide implementation. Although still proposed, and still helpful, the need for these changes has lessened since the scope and scale of our aerial treatment proposal has been reduced.

Minor Design Feature Modifications and Clarifications

Some design features in the forest plan were originally created for reforestation or broadcast application purposes but did not clearly say so in writing. These design features may be confusing and, if misinterpreted, could unintentionally limit our ability to treat invasive plants and interfering vegetation in the future.

Some design features referenced time or concentration limits that are no longer found on product labels. Updating these design features to reflect current product label instructions would help avoid confusion in the future and may increase the efficiency of treatment efforts.

The need for invasive plant and interfering vegetation treatments has substantially increased since the forest plan was last revised. As a result, some design features that may be suitable for smaller programs are quickly becoming impractical to implement as the number of treatments needed increase.

Proposed Action

Our proposed action is divided into three parts:

1. An invasive plant treatment program to help conserve native plants, animals, and their habitat.
2. A complementary program for understory interfering vegetation treatment, which is intended to supplement approved reforestation efforts.
3. A forest plan amendment.

It largely mirrors the proposed action included in the scoping document but includes several notable differences. Many of these changes are summarized in table 3.

Table 3. Changes made to the proposed action after scoping

Proposed Action	Changes Made After Scoping
Manual treatment	Added information on treatment location, season, duration of treatment activity, and frequency.
Mechanical treatment	Added information on treatment location, season, duration, and frequency.
Chemical treatment	1. Added information on example products and application rates. 2. Added information on treatment location, season, duration, and frequency. 3. Added metsulfuron methyl to the proposed action. 4. Considerably narrowed the proposed action for aerial application.
Design Features	1. Added herbicide application buffers and direction for imazapic, imazapyr, indaziflam, metsulfuron methyl, sethoxydim, and triclopyr. 2. Added design features for wildlife, fish, and sensitive plant habitat. 3. Added design features for scenery.
Forest Plan Amendment	1. Clarified standards for glyphosate to confirm that application to surface water is not proposed, but plants rooted in water may be treated. The revised proposal includes the following standards for directed foliar backpack application: a. "Glyphosate shall not be applied to surface waters, regardless of whether a formulation registered for aquatic application would be used." b. "Only aquatic labeled formulations of glyphosate shall be applied up to the edge of water, including some plants that may be rooted in water." 2. Slightly modified the following guideline for aerial application by adding the underlined text: "Areas within one-quarter mile of active bald eagle, raptor, and great blue heron nests will be excluded from aerial treatment to reduce disturbance from low-flying aircraft unless the responsible official determines that doing so would be infeasible or result in undesirable effects <u>to ecosystem integrity</u>." 3. Removed our proposal to amend the broadcast herbicide guideline listed below. As a result, this guideline would remain unchanged. a. "Broadcast herbicide treatment for reforestation purposes with glyphosate or sulfometuron methyl should not begin on the ANF until after the Fourth of July

Proposed Action	Changes Made After Scoping
	weekend. Areas having ferns and grass as the target species should be treated after the Fourth of July weekend. Areas containing striped maple and beech as the target species should be treated after August 1 for best effectiveness."

Invasive Plant and Interfering Vegetation Treatments

We are proposing to conserve native plant and animal species, and their habitats, as part of an integrated pest management approach. Our proposal is to use a variety of manual and mechanical methods, complemented by using selective and broad-spectrum herbicides, to treat invasive plant infestations. We are also proposing to improve the regeneration of desirable tree species by authorizing use of imazapyr and triclopyr for reforestation purposes.

Table 4 provides a brief summary of the treatments proposed. The actual number of acres treated annually would vary based on factors including treatment needs, funding, and staff and contractor capacity.

Table 4. Summary of proposed treatments

Treatment Purpose	Control Type	Methods	Estimated Annual Treatment Acres
Invasive Plants	Manual	Hand cutting, digging, and pulling.	10 to 50
Invasive Plants	Mechanical	Cutting, mastication, and mowing.	500 to 1,000
Invasive Plants	Chemical	Application of herbicides containing imazapic, imazapyr, indaziflam, glyphosate, metsulfuron methyl, sethoxydim, sulfometuron methyl, triclopyr, and other herbicides found to have similar or fewer associated risks.	1,500 to 2,500
Interfering Vegetation	Chemical	Application of imazapyr, triclopyr, and other herbicides found to have similar or fewer associated risks.	500 to 1,000

Invasive plant treatments would primarily occur on National Forest System lands. Treatments, however, may also be applied on lands in other ownerships within the proclamation boundary of the Allegheny National Forest, and within adjacent watersheds, in partnership with willing landowners interested in cross-boundary treatments. On National Forest System lands, special restrictions would apply to treatments located within the management areas summarized in table 5.

Table 5. Special management area restrictions

Location	Management Area	Restriction
Designated Wilderness	5.1	Mechanized treatment in wilderness areas is prohibited by a forest plan standard that restricts "motorized equipment or mechanical transport . . . except for fire suppression and in situations that threaten the health and safety of visitors . . . " (USDA Forest Service 2007a, page 118). A minimum tools analysis is required before undertaking projects in designated wilderness areas. (USDA Forest Service 2007a, page 118). Invasive plant treatments must use the most beneficial method based on objectives, effectiveness, safety, environmental protection, and cost (USDA Forest Service 2007a, page 120).
Wilderness Study	5.2	Mechanized treatment in wilderness study areas is currently prohibited by a forest plan standard that restricts "motorized equipment or mechanical transport .

Location	Management Area	Restriction
		. . except for fire suppression and in situations that threaten the health and safety of visitors . . . " (USDA Forest Service 2007a, page 125). Invasive plant treatments must use the most beneficial method based on objectives, effectiveness, safety, environmental protection, and cost (USDA Forest Service 2007a, page 125).
Remote Recreation Areas	7.2	"Changes resulting from vegetation management activities shall be kept as naturally appearing as possible. Vegetation management is generally infrequent . . . ." (USDA Forest Service 2007a, page 139).
Wild and Scenic River Corridor	8.1	"Changes resulting from vegetation management activities shall be kept as naturally appearing as possible. Vegetation management is generally infrequent . . . ." (USDA Forest Service 2007a, page 145).
National Recreation Area	8.2	"Changes resulting from vegetation management activities shall be kept as naturally appearing as possible. Vegetation management is generally infrequent . . . ." (USDA Forest Service 2007a, page 150). Treatments must be consistent with management purposes identified in the designating legislation.[1]
Scenic Area	8.3	"Changes resulting from vegetation management activities shall be kept as naturally appearing as possible. Vegetation management is generally infrequent . . . " (USDA Forest Service 2007a, page 155).
Historic Area	8.4	"Changes resulting from vegetation management activities shall be kept as naturally appearing as possible. Vegetation management is generally infrequent . . . ." (USDA Forest Service 2007a, page 159).
Research Natural Area and Adjacent Areas	8.5 and Adjacent Areas	"Treatments within 300 feet of the Tionesta Research Natural Area must be consistent with the values for which the area was designated" (USDA Forest Service 2007a, page 62). "Management processes shall approximate the vegetation and processes that govern natural recession" (USDA Forest Service 2007a, page 163).
Kane Experimental Forest	8.6	Treatments must be reviewed by the project leader of the Northern Research Station (USDA Forest Service 2007a, page 167).
North Country National Scenic Trail	Various	"Management of the North Country National Scenic Trail should be consistent with the "North Country Trail Comprehensive Plan for Management and Use" (USDI National Park Service 1982, as amended) and "North Country National Scenic Trail – A Handbook for Trail Design, Construction, and Maintenance" (USDI National Park Service 1996, as amended and/or updated)" (USDA Forest Service 2007a, page 61).

1 - The following purposes are identified: "(1) outdoor recreation including, but not limited to, hunting, fishing, hiking, backpacking, camping, nature study, and the use of motorized and nonmotorized boats on the Allegheny Reservoir; (2) the conservation of fish and wildlife populations and habitat; (3) the protection of watersheds and the maintenance of free flowing streams and the quality of ground and surface waters in accordance with applicable law; (4) the conservation of scenic cultural, and other natural values of the area; (5) allowing development of privately owned oil, gas, and mineral resources . . .; and (6) minimizing, to the extent practicable, environmental disturbances caused by resource development, consistent with the exercise of private property rights." 16 U.S.C. section 460qq(b).

Interfering vegetation treatments would occur in accordance with a stand-specific silvicultural prescription, primarily in stands where it is more effective or efficient than previously approved chemical site preparation activities. Treatments would exclusively occur on National Forest System lands in management areas where herbicide application for reforestation or restoration purposes is a suitable management activity. These management areas are listed in table 6. Implementation would be prohibited in all other management areas (USDA Forest Service 2007a, page 62). Please note the restrictions in

table 5 above for management areas 7.2, 8.1, 8.2, 8.4, 8.6, and the North Country National Scenic Trail would also apply to interfering vegetation treatments for reforestation or restoration purposes.

Table 6. Management areas where interfering vegetation treatments may occur

Location	Management Area	Treatment for Reforestation	Treatment for Restoration
Early Structural Habitat	1.0	Suitable	Suitable
Uneven-Aged Management	2.1	Suitable	Suitable
Late Structural Linkages	2.2	Suitable	Suitable
Even-Aged Management	3.0	Suitable	Suitable
Late Structural Habitat	6.1	Suitable	Suitable
Buzzard Swamp Wildlife Management Area	6.3	Not Suitable	Suitable
Developed Recreation Areas	7.1	Not Suitable	Suitable
Remote Recreation Areas	7.2	Not Suitable	Suitable
Wild and Scenic River Corridor	8.1	Not Suitable	Suitable
National Recreation Area	8.2	Not Suitable	Suitable
Historic Area	8.4	Not Suitable	Suitable
Kane Experimental Forest	8.6	Not Suitable	Suitable

Manual Controls for Invasive Plant Treatment

Manual removal is best suited for smaller plants with a shallow root system growing in loose soil. Small infestations (typically less than 100 square feet) may be treated by hand-pulling, hand digging, or hand cutting. Hand pulling and digging removes plants, including as much root material as possible, to prevent re-sprouting. Hand cutting reduces growth or seed production by reducing the amount of above-ground plant material. Tools that may be used include shovels, picks, mattocks, hand clippers, loppers, and machetes.

We anticipate treating approximately 10 to 50 acres annually using manual control methods. Manual treatments should occur before flowers are first visible; however, treatment can occur later if plants are bagged and burned or removed to keep seeds from developing. Treatment typically occurs once per year, and the time needed ranges from a few minutes to a few hours in any given area. Although re-treatment may be needed in subsequent years, the amount of infestation and time needed for treatment should steadily decline each year.

Mechanical Controls for Invasive Plant Treatment

Mechanical controls include mowing, cutting, and mastication with chainsaws, brush saws, mowers, skidsteers, excavators, specialized logging equipment, and similar equipment to remove woody plants. Mowing with a brush-hog or push mower may be useful for treating some species to lessen biomass or weaken below ground plant structures by repeated cutting. Cutting with a brush cutter is another option for treating small infestations and can help to reduce biomass and seed production. Because seeds may mature even after plants are cut, mowing and cutting are typically done prior to the start of seed development. Mastication refers to cutting and mulching woody plant material using a hydraulic attachment on a skidsteer, excavator, or tractor. These mulching machines are land clearing tools that can cut through dense stands of non-native woody plants.

We anticipate treating approximately 500 to 1,000 acres annually using mechanical control methods. Mechanical treatments typically occur before April 1 or after July 1 due to nesting restrictions and would only occur if ground conditions and weather are conducive to treatment. However, individual or small numbers of plants may occasionally be cut with chainsaws or brush saws between April and July if impacts to nesting birds are not anticipated (for example, if snow is present into late April).

Treatment typically occurs once per year, and the time needed ranges from a few minutes to a few hours or days in any given area.

Mechanical methods are typically used in conjunction with other activities, including herbicide controls and planting, because soil disturbance may create favorable conditions for invasive plants to regrow from seeds and root fragments. Herbicide application usually occurs at the same time as mechanized treatment but may sometimes occur later in the year.[4]

Chemical Controls for Invasive Plant and Interfering Vegetation Treatment

Chemical controls include the use of herbicides to control or treat invasive plants and interfering vegetation. We anticipate treating 1,500 to 2,500 acres annually to reduce invasive plant infestations, and up to 500 to 1,000 acres annually to reduce interfering vegetation through this project. The actual number of acres treated in any given year would vary based on factors including treatment needs, funding, and staff and contractor capacity.

Known invasive plant infestations would be treated, as well as those identified in the future, within and adjacent to the proclamation boundary of the Allegheny National Forest. The specific herbicide and treatment method selected would depend on several factors, including, but not limited to, target species, extent of the infestation, location and adjacent resources, accessibility, site characteristics, time of year, treatment effectiveness, and cost.

Interfering vegetation may also be treated for reforestation purposes. Our proposal for reforestation treatments, however, is more limited than invasive plant treatment in terms of geographic area, active ingredients, treatment methods, and treatment amounts. Treatments would be limited to a narrow range of National Forest System lands where imazapyr or triclopyr may be used.

Our proposed action includes the use of herbicides labeled for aquatic application. Some of these herbicides may be applied near water resources or may be used to treat invasive species rooted in water (for example, purple loosestrife). We do not, however, intend to treat aquatic species in open water.

Invasive Plant Treatment Methods

Foliar Application for Invasive Plant Treatment

Foliar herbicide application may occur using hand or broadcast application methods. Products containing glyphosate, imazapic, imazapyr, indaziflam, metsulfuron methyl, sethoxydim, sulfometuron methyl, or triclopyr may be used.

- Hand treatment targets very small infestations and is very selective. Herbicide is applied by wiping, wicking, hand sprayers, or backpack sprayers.

4. For example, we may cut glossy buckthorn, and then re-enter later in the same year for foliar treatment when the root-to-shoot ratio is great enough to translocate enough herbicide for effective treatment.

- Tank sprayers mounted to utility terrain vehicle may also be considered a form of hand treatment. This method has a broader reach when compared to other hand treatments. It is often used along roadsides and can reach vegetation within 10 to 20 feet of the road edge.
- Broadcast treatment uses a high-volume air blast system, mounted to a skidder, to spray vegetation up to 15 feet tall. Depending on vegetation density, the air blast system can reach 30 to 40 feet on either side. This method is typically used in forested stands that are 20 to 40 acres in size, although some treatment areas may be larger.

Hand application typically occurs between mid-May and the end of September for most species, but some species may be sprayed earlier (for example, garlic mustard may be treated in April). Broadcast application begins after July 1 due to songbird nesting restrictions, and typically concludes by September 30.

Treatment typically occurs once per year, with follow-up entry in subsequent years as needed. If additional entries occur in the same year, another treatment method is typically used. Regarding the duration of treatment

- Hand application only takes minutes to hours at a particular site. Depending on access, we may be able to treat a few acres per day.
- Several miles of road may be treated per day if using a tank sprayer mounted to a utility terrain vehicle.
- Broadcast application typically takes a few hours.

Cut Stem, Cut Surface, and Stem Injection for Invasive Plant Treatment

Cut stem, cut surface, and stem injection treatments may occur using products containing glyphosate, imazapyr, or triclopyr as active ingredients.

- Cut stem treatment is also referred to as cut and frill or hack and squirt. The bark of target vegetation is cut, leaving at least one inch of uncut bark between incisions for effective herbicide translocation. We look for stems that are 2-inches or greater in diameter at breast height. Because this method is labor intensive, we typically focus on mature seed producing shrubs and trees, or shrubs and trees near sensitive sites where we are trying to avoid non-target effects.
- Cut surface treatment is also referred to as cut stump. We cut woody plant material, severing the stem to create a stump, and then spray the outer 2 inches of the stem with herbicide. We focus on stems that are 2 inches or greater in diameter, and select larger, taller plants like buckthorn. Because this treatment method is labor intensive, we typically only use it in locations where it is undesirable to leave standing dead material.
- During stem injection, woody vegetation is injected with herbicide using a needle. It is labor intensive, and primarily occurs near sensitive sites where we are trying to avoid non-target effects or when it is desirable to leave standing dead trees. We typically focus on larger stems, usually 4-inches or greater in diameter.

Implementation occurs during periods of low sap flow. This is typically between June 1st and November 1st for most species, although some species may be treated earlier, later, or in the dormant season. Timing can also depend on weather conditions (for example, treatment may be delayed if weather during the spring is particularly cold; access during winter may impede treatment in the dormant season, etc.).

Treatment typically occurs once per year, with follow-up entry in subsequent years as needed. If additional entries occur in the same year, another treatment method is typically used. Regarding the duration of treatment:

- For cut stem application, we typically spend minutes to a day at a particular site.

- Cut surface application takes a similar amount of time, but due to its labor-intensive nature we may spend several days at a particular site.
- Stem injection is completed in just a few hours at any site.

Soil Application for Invasive Plant Treatment

Herbicide is applied directly to the soil by hand or using a broadcast sprayer. Products containing imazapic, imazapyr, indaziflam or sulfometuron methyl as an active ingredient may be used.

Soil application is a pre-emergent treatment method that typically occurs between April and early May when soil temperatures reach 55 degrees Fahrenheit. A small rain event is needed after treatment to incorporate herbicide into the soil.

Treatment typically occurs once per year, with follow-up entry in subsequent years as needed. If additional entries occur in the same year, another treatment method is typically used. We typically spend a few hours to a day at any given site.

Basal Spray Application for Invasive Plant Treatment

This method is used for stems that are less than 6 inches in diameter at breast height. Products containing triclopyr as an active ingredient may be used. A backpack sprayer is used to completely spray around individual stems approximately 12 to 15 inches above ground.

Application may occur any time when stems are dry. It may be possible to treat a few acres per day.

Treatment typically occurs once per year, with follow-up entry in subsequent years as needed. If additional entries occur in the same year, another treatment method is typically used. Duration depends on stem density but is typically minutes to hours at any location.

Aerial Application for Invasive Plant Treatment

The Allegheny National Forest has unique challenges with respect to treating invasive plant infestations. While ground-based treatment practices are important elements of integrated pest management programs, effectiveness may be limited by certain species or site characteristics.[5] As a result, there are certain situations where aerial treatment may result in more effective results with less disturbance, less product used, less applicator exposure, and fewer resource conflicts when compared to ground-based methods.

Our proposed action for aerial treatment has been refined and narrowed since scoping and is now limited to small-scale testing of aerial application for invasive plant treatment using unmanned aerial systems (more commonly referred to as drones). Specifically, we would use drones on less than 200 acres annually, which represents a small percentage of herbicide application on the Allegheny National Forest.[6]

This limited proposal is intended to help us better understand treatment effectiveness, cost effectiveness, and changes in the capability of this emerging technology over time. If this experience demonstrates that aerial application is effective, we may eventually consider expanding aerial treatments to include more acres or the use of helicopters for application. An expanded program, however, would require a

5. This is true, for example, where: (1) invasive plants are exceptionally tall and infestations are exceptionally dense; (2) multiple types of invasive plants are present; (3) infestations are particularly large, requiring landscape-scale treatment; and (4) ground-based access is difficult due to steep slopes or remote locations.

6. An exact percentage is difficult to predict, but is expected to be between 0 percent and 4.8 percent of combined annual herbicide treatments when considered in context of invasive plant treatments (1,500 to 2,500 acres per year), reforestation treatments (2,183 acres per year, on average), and treatments under electric utility right-of-way special use authorizations (482 acres per year, on average).

determination of National Environmental Policy Act adequacy, or separate environmental review process, before approval. This approach would provide the public with an opportunity to review, comment on, and object to the broader use of aerial application, if proposed in the future.

Characteristics we would consider when selecting sites for aerial treatment include those listed in table 7. Treatment would begin after July 1 due to songbird nesting restrictions and typically conclude by September 1. It would typically occur once per year for invasive plant treatments. If treatment is needed in subsequent years, another method would likely be used if access is available. The duration of treatment would be minutes to hours depending on equipment limitations.

Table 7. Characteristics to consider for aerial treatment site selection

Subject	Characteristics
Access	Areas with minimal or without motorized road or trail access.
Disturbance	Areas where ground-based application would cause more ground disturbance and compaction. For example, areas where wet or hydric soils surround treatment areas.
Applicator Exposure and Risk	Areas where drone use would result in less applicator exposure due to a reduction in the number of workers needed, potential for exposure, or time required for application. Areas that are remote or have steep slopes where drone use would reduce the risk of slips, falls, and other potential applicator injuries.
Drift	Areas where off-site drift can be minimized using available application equipment.
Size of Infestation	Areas with small infestations (typically less than 1 acre) where drone use would increase effectiveness by allowing us to treat locations that are away from the main seed source.
Plant Height and Density	Areas where plants are so tall and dense that they cannot be effectively or efficiently treated with ground-based application methods.
Irregular Plant Distribution	Areas with irregular infestations, intermingled with desirable plant species or sensitive areas, where drone use would increase selectivity of treatment and decrease non-target effects by providing aerial spot treatment of the area.
Resource Conflicts	Areas where ground-based treatment would conflict with seasonal restrictions on activity intended to protect nesting and immature wildlife.
Infrastructure Corridors	Utility corridors where treatment is needed to help maintain infrastructure and reduce the potential for service interruptions.

Interfering Vegetation Treatment Methods

Foliar Application for Interfering Vegetation Treatment

Foliar herbicide application may occur using backpack spraying, tank spraying, and air blast. Products containing imazapyr and triclopyr may be used.

Implementation would mostly occur in stands where glyphosate or sulfometuron methyl application was previously approved through site-specific analysis, but may occasionally occur to support reforestation in other areas after appropriate consideration.[7]

7. Application in stands damaged by future storm events is one example of how this decision may be applied to areas not covered by previous site-specific analysis. If interfering vegetation treatments are needed to regenerate stands to desirable species after a wind event, for example, herbicide application may occur under this decision if the treatment method, active ingredient, and parameters for application are appropriate considering silvicultural prescriptions, ground conditions, and natural resources present in the area.

Backpack application typically occurs between mid-May and the end of September for most species, but some species may be sprayed earlier. Broadcast application for reforestation typically occurs between August and September.

Treatment for reforestation purposes is typically a one-time event. Subsequent herbicide treatments are unlikely to occur for several decades. Backpack application typically takes minutes to hours, and broadcast application a few hours, in any given stand.

Cut Surface and Stem Injection for Interfering Vegetation Treatment

Cut surface and stem injection treatments may occur using products containing imazapyr and triclopyr as active ingredients.

Implementation occurs during periods of low sap flow. This is typically between June 1 and November 1 for most species, although some species may be treated earlier, later, or in the dormant season. Timing can also depend on weather conditions (for example, treatment may be delayed if weather during the spring is particularly cold; access during winter may impede treatment in the dormant season, etc.).

Treatment for reforestation purposes is typically a one-time event. Subsequent herbicide treatments are unlikely to occur for several decades.

Cut surface applications are labor intensive. It may take several days to complete in any given stand. Stem injection is often completed in just a few hours in any given stand.

Basal Spray Application for Interfering Vegetation Treatment

This method is used for stems that are less than 6 inches in diameter at breast height. Products containing triclopyr as an active ingredient may be used.

Application may occur any time when stems are dry. Reforestation treatment would typically occur once per year, with follow-up treatment possible the next year. Subsequent herbicide treatments are unlikely to occur for several decades. Duration depends on stem density but is typically minutes to hours at any location.

Active Ingredients

Glyphosate

Glyphosate is a broad-spectrum, non-selective herbicide that can control most annual and perennial plants including many grasses, forbs, vines, shrubs, and trees. It works by preventing the synthesis of amino acids required for plant growth and is one of the most used herbicides in natural areas. It is primarily used by the Forest Service for conifer release, site preparation, and invasive plant control (Syracuse Environmental Research Associates 2011a, page 5).

Glyphosate has been used on the Allegheny National Forest for several decades, and we plan to use it to treat a variety of species including, but not limited to:

- glossy and common buckthorn;
- purple loosestrife;
- all knotweeds (Japanese, Giant, and hybrids);
- Japanese stiltgrass;
- garlic mustard;
- Japanese barberry; and
- multiflora rose.

Application would most likely occur near administrative sites, recreation sites, roads and trails, forested areas, riparian areas, rights-of-way, openings, and areas approved for vegetation management. The forest plan currently restricts application near water. This project includes a proposed forest plan amendment, however, that if approved would allow us to use aquatic formulations of glyphosate up to the water's edge.

Example products include Rodeo, Round Up Pro ATU, and Aquaneat, although other products containing the same active ingredient may also be used. Please note, however, that we would not use formulations that contain polyoxyethylene tallow amine as a surfactant. Application rates are summarized in table 8 and table 9.

Imazapic

Imazapic is a non-selective herbicide used to control some annual and perennial plants including grasses and forbs. It works by preventing the synthesis of amino acids required for plant growth and can be used post-emergent (after weeds are established and growing) or as a pre-emergent applied to the soil before weeds germinate (Syracuse Environmental Research Associates 2004a, page 4-3).

Imazapic is primarily used by the Forest Service for invasive plant treatment and rights-of-way management (Syracuse Environmental Research Associates 2004a, page 2-1). We plan to use it to treat a variety of species including, but not limited to Japanese stiltgrass, reed canary grass, and common reed.

Application would most likely occur near administrative sites, recreation sites, roads and trails, forested areas, riparian areas, rights-of-way, openings, and areas approved for vegetation management. Example products include Plateau, although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

Imazapyr

Imazapyr is a non-selective herbicide used to control a variety of grasses, broadleaf weeds, vines, and woody species. It works by preventing the synthesis of amino acids required for plant growth. Although it can be used as a pre- or post-emergent herbicide, it is most often used in a post-emergent setting to control vegetation that is vigorously growing (Syracuse Environmental Research Associates 2011b, page 5). It does not readily break down in the plant which makes it especially effective at controlling large woody species.

Imazapyr is primarily used by the Forest Service for invasive plant control, conifer release, and site preparation (Syracuse Environmental Research Associates 2011b, page 5). It has been used on the Allegheny National Forest for more than twenty years by electric utility companies. We plan to use it to treat a variety of species including, but not limited to mountain laurel, glossy buckthorn, common buckthorn, autumn olive, and striped maple.

Application would most likely occur near administrative sites, recreation sites, roads and trails, forested areas, rights-of-way, openings, and areas approved for vegetation management. Example products Arsenal, although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

Indaziflam

Indaziflam is a broad-spectrum, non-selective pre-emergent herbicide used to control many weed seedlings by inhibiting seedling emergence and root development. It works by inhibiting the production of cellulose in plant cells and is primarily used by the Forest Service "to control undesirable vegetation while allowing re-establishment of desirable perennial grasses, forbs, shrubs, and trees" (Kestrel Tellevate 2020, page 24). We plan to use it to treat a variety of species including, but not limited to, Japanese stiltgrass.

Application would most likely occur near administrative sites, recreation sites, roads and trails, forested areas, right of ways, openings, and areas approved for vegetation management. Example products include Esplanade F and Esplanade 200 SC, although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

Metsulfuron Methyl

Metsulfuron methyl is a selective pre-emergent and post-emergent herbicide used to control weeds and woody plants. It works by inhibiting an enzyme that is essential for plant growth[8] (Syracuse Environmental Research Associates 2004b, pages 2-1 and 4-1). It is primarily used by the Forest Service for invasive plant control (Syracuse Environmental Research Associates 2004b, pages 2-1), and has been used on the Allegheny National Forest for more than twenty years by electric utility companies. We plan to use it to treat a variety of species including, but not limited to, glossy buckthorn, tree of heaven, striped maple, and birch.

Application would most likely occur in forested habitats. Example products include Escort XP, although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

Sethoxydim

Sethoxydim is a selective post-emergent herbicide used to control annual and perennial grasses (Syracuse Environmental Research Associates 2001, page 2-1). It works by preventing the synthesis of lipids with little or no impact on broadleaf herbs or woody plants.

Sethoxydim has been used on the Allegheny National Forest since 2021 to control Japanese stiltgrass along roads and trails and near recreation and administrative sites. We plan to use it to treat a variety of species including, but not limited to Japanese stiltgrass, canary reed grass, and common reed.

Application would most likely occur near rights-of-way, administrative sites, recreation sites, and roads and trails. Example products include Segment II and Poast, although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

Sulfometuron Methyl

Sulfometuron methyl is a non-selective herbicide used to control the growth of broadleaf weeds and grasses. It works by preventing the synthesis of amino acids required for plant growth and can be used post-emergent (after weeds are established and growing) or as a pre-emergent applied to the soil before weeds germinate. It is primarily used by the Forest Service for reforestation site preparation but may also be used for control of invasive plants. Sulfometuron methyl has been used on the Allegheny National Forest for several decades, and we plan to use it to treat a variety of species including, but not limited to hayscented fern, grass species, , and Japanese stiltgrass.

Application would most likely occur near administrative sites, recreation areas, roads and trails, and areas approved for vegetation management. Example products include Oust XP, although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

8. Specifically, “[m]etsulfuron methyl inhibits acetolactate synthase (ALS), an enzyme that catalyzes the biosynthesis of three branched-chain amino acids, all of which are essential for plant growth” (Syracuse Environmental Research Associates 2004b, page 4-1).

Triclopyr

Triclopyr is a selective systemic herbicide used to control woody and herbaceous broadleaf plants with little or no impact on grasses. It works by mimicking the plant hormone auxin, causing uncontrolled plant growth. It is primarily used by the Forest Service for conifer release, hardwood release, invasive plant control, site preparation, and rights-of-way management (Syracuse Environmental Research Associates 2016, page 4).

Triclopyr has been used on the Allegheny National Forest for several decades by electric utility companies, and we plan to use it to treat a variety of species including, but not limited to:

- mountain laurel;
- glossy buckthorn;
- common buckthorn;
- autumn olive; and
- American beech.

Application would most likely occur near forested areas and areas approved for vegetation management.

Example products include Garlon 3A (triethylamine salt) and Garlon 4 (butoxyethyl ester), although other products containing the same active ingredient may also be used. Application rates are summarized in table 8 and table 9.

Other Active Ingredients

In the future, other herbicides may be used, without further National Environmental Policy Act review, if the following conditions are met:

1. The treatment is registered by the U.S. Environmental Protection Agency for use on the target species.
2. A human health and ecological risk assessment has been conducted to estimate risk to human health and non-target organisms.
3. A risk comparison is conducted to compare the human health and ecological risks of the active ingredient with the risks of those considered in this environmental assessment.
4. If the risks posed by the active ingredient fall within the range of those considered in this environmental assessment, the responsible official would provide public notice, post related information online, and provide a 30-day public review and comment period.
5. The responsible official, after considering public comments, prepares a supplemental information report to document that the treatment meets all applicable requirements and is now authorized for use.[9]

9. The responsible official may elect to use alternative procedures to satisfy conditions 4 and 5 if they achieve the same intent.

Application Rates

Application rates for herbicides included in the proposed action are listed below in table 8 (typical rates) and table 9 (maximum rates). The rates are displayed in pounds of acid equivalent per acre.

Table 8. Typical rates for herbicide application measured in pounds acid equivalent per acre

Method	Aerial	Basal Bark	Cut Stem	Cut Surface	Foliar Broadcast	Foliar Hand	Soil Broadcast	Soil Hand	Stem Injection
Glyphosate	1.0	na	1.0	1.0	1.0	1.0	na	na	1.0
Imazapic	0.1	na	na	na	0.1	0.1	0.1	0.1	na
Imazapyr	1.0	na	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Indaziflam	na	na	na	na	na	na	0.046	0.046	na
Metsulfuron Methyl	0.03	na	na	na	0.03	0.03	na	na	na
Sethoxydim	0.281	na	na	na	0.281	0.281	na	na	na
Sulfometuron Methyl	0.09	na	na	na	0.09	0.09	0.09	0.09	na
Triclopyr	1.0	1.0	1.0	1.0	1.0	1.0	na	na	1.0

na = not applicable

Table 9. Maximum rates for herbicide application measured in pounds acid equivalent per acre

Method	Aerial	Basal Bark	Cut Stem	Cut Surface	Foliar Broadcast	Foliar Hand	Soil Broadcast	Soil Hand	Stem Injection
Glyphosate	4.0	na	4.0	4.0	2.0	4.0	na	na	4.0
Imazapic	2.0	na	na	na	2.0	2.0	2.0	2.0	na
Imazapyr	1.5	na	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Indaziflam	na	na	na	na	na	na	0.091	0.091	na
Metsulfuron Methyl	0.15	na	na	na	0.15	0.15	na	na	na
Sethoxydim	0.375	na	na	na	0.375	0.375	na	na	na
Sulfometuron Methyl	0.19	na	na	na	0.19	0.19	0.19	0.19	na
Triclopyr	4.0	4.0	4.0	4.0	4.0	4.0	na	na	4.0

na = not applicable

Design Features for Invasive Plant and Interfering Vegetation Treatments

The proposed action would be implemented in accordance with forest plan standards, guidelines, and suitability determinations. In addition, the design features listed below are incorporated into the proposed action.

Herbicide Application

Glyphosate

Please see forest plan standards and guidelines, including those proposed for amendment in this project.

Imazapic

1. Imazapic is not registered for aquatic application as of this writing. If registered in the future, appropriate buffers shall be developed and applied.
2. Imazapic shall not be applied to surface waters, regardless of whether a formulation registered for aquatic application becomes available in the future.
3. For broadcast foliar mechanical (airblast) application, the following buffers and application procedures shall be observed to provide water quality protection:
    a. Imazapic shall not be applied within 25 feet of each side of perennial streams, impoundments, seeps, springs, or intermittent streams with flowing water the day of spraying.
    b. Imazapic shall not be applied within 25 feet of wet areas (standing water), including vernal ponds, with no defined outlet.
    c. Imazapic shall not be applied within 10 feet of each side of dry intermittent streams, dry seeps, and dry springs.
    d. Airblast shall be directed away from the buffer area when applications are made within 75 feet of the edge of the buffer.
4. For directed foliar backpack application, the following buffers shall be used to provide water quality protection:
    a. Imazapic shall not be applied to surface waters.
    b. Imazapic shall not be applied within 10 feet of standing or flowing water.
    c. Imazapic shall not be applied within 10 feet of dry intermittent stream courses, dry springs, or dry seeps.

Imazapyr

5. Imazapyr shall not be applied to surface waters, regardless of whether the formulation used is registered for aquatic application.
6. For broadcast foliar mechanical (airblast) application, the following buffers and application procedures shall be observed to provide water quality protection:
    a. Imazapyr shall not be applied within 25 feet of each side of perennial streams, impoundments, seeps, springs, or intermittent streams with flowing water the day of spraying.
    b. Imazapyr shall not be applied within 25 feet of wet areas (standing water), including vernal ponds, with no defined outlet.
    c. Imazapyr shall not be applied within 10 feet of each side of dry intermittent streams, dry seeps, and dry springs.
    d. Airblast shall be directed away from the buffer area when applications are made within 75 feet of the edge of the buffer.
7. For directed foliar backpack and for cut surface application methods, the following buffers shall be used to provide water quality protection:
    a. Only aquatic labeled formulations of imazapyr shall be applied up to the edge of water, including some species that may be rooted in water.

b. Only aquatic labeled formulations of imazapyr shall be applied within 10 feet of standing or flowing water.

c. Only aquatic labeled formulations of imazapyr shall be applied within 10 feet of dry intermittent stream courses, dry springs, or dry seeps.

Indaziflam

8. Indaziflam is not registered for aquatic application as of this writing. If registered in the future, appropriate buffers shall be developed and applied.

9. Indaziflam shall not be applied to surface waters, regardless of whether a formulation registered for aquatic application becomes available in the future.

10. For broadcast foliar mechanical (airblast) application, the following buffers and application procedures shall be observed to provide water quality protection:

    a. Indaziflam shall not be applied to surface waters.

    b. Indaziflam shall not be applied within 50 feet of each side of perennial streams, impoundments, seeps, springs, or intermittent streams with flowing water the day of spraying.

    c. Indaziflam shall not be applied within 50 feet of wet areas (standing water), including vernal ponds, with no defined outlet.

    d. Indaziflam shall not be applied within 25 feet of each side of dry intermittent streams, dry springs, and dry seeps.

    e. Airblast shall be directed away from the buffer area when mechanical applications are made within 100 feet of the edge of the buffer.

11. For directed foliar backpack application, the following buffers shall be used to provide water quality protection:

    a. Indaziflam shall not be applied to surface waters.

    b. Indaziflam shall not be applied within 25 feet of standing or flowing water.

    c. Indaziflam shall not be applied within 25 feet (0.19 pound per acre) of dry intermittent stream courses, dry springs, or dry seeps.

Metsulfuron Methyl

12. Metsulfuron methyl is not registered for aquatic application as of this writing. If registered in the future, appropriate buffers shall be developed and applied.

13. Metsulfuron methyl shall not be applied to surface waters, regardless of whether a formulation registered for aquatic application becomes available in the future.

14. For broadcast foliar mechanical (airblast) application, the following buffers and application procedures shall be observed to provide water quality protection:

    a. Metsulfuron methyl shall not be applied within 25 feet of each side of perennial streams, impoundments, seeps, springs, or intermittent streams with flowing water the day of spraying.

    b. Metsulfuron methyl shall not be applied within 25 feet of wet areas (standing water), including vernal ponds, with no defined outlet.

c. Metsulfuron methyl shall not be applied within 10 feet of each side of dry intermittent streams, dry seeps, and dry springs.

d. Airblast shall be directed away from the buffer area when applications are made within 75 feet of the edge of the buffer.

15. For directed foliar backpack application, the following buffers shall be used to provide water quality protection:

    a. Metsulfuron methyl shall not be applied to surface waters.

    b. Metsulfuron methyl shall not be applied within 10 feet of standing or flowing water.

    c. Metsulfuron methyl shall not be applied within 10 feet of dry intermittent stream courses, dry springs, or dry seeps.

Sethoxydim

16. Sethoxydim shall not be applied to surface waters, regardless of whether the formulation used is registered for aquatic application.

17. Sethoxydim shall not be applied in locations where groundwater, standing water, or flowing water could be affected.

18. When using utility vehicle-mounted tank sprayers (with a hand-operated wand at the end of a hose), or backpack sprayers, the following buffers and tactics shall be used to provide water quality protection:

    a. Sethoxydim shall not be applied within 10 feet of standing water, vernal ponds, or perched water tables with no defined outlet.

    b. Sethoxydim shall not be applied within 10 feet of each side of perennial streams, impoundments, seeps, springs, or intermittent streams with flowing water the day of spraying.

    c. Sethoxydim shall not be applied within 10 feet of dry intermittent stream courses, dry springs, or dry seeps.

    d. Sethoxydim shall not be applied within 5 feet from the center of ditch lines that drain into streams or wet areas. (Ditch lines that do not drain directly into wet areas, flowing water, dry intermittent streams, dry springs or dry seeps do not need to be buffered.)

19. When using utility vehicle-mounted tank sprayers with a boom mount application, the following buffers and tactics shall be used to provide water quality protection:

    a. Sethoxydim shall not be applied within 25 feet of wet areas or each side of flowing water.

    b. Sethoxydim shall not be applied within 10 feet of water-free, occasionally watered settings.

    c. When applying sethoxydim next to ditch lines that drain into streams or wet areas, either point the sprayer away from the ditch line or apply a 5 foot buffer. Ditch lines that do not drain directly into wet areas, flowing water, dry intermittent streams, dry springs or dry seeps do not need to be buffered.

20. For broadcast foliar mechanical (airblast) application, the following buffers and application procedures shall be observed to provide water quality protection:

a. Sethoxydim shall not be applied within 50 feet of wet areas or each side of flowing water.

b. Sethoxydim shall not be applied within 25 feet of water-free, occasionally watered settings.

c. When applying sethoxydim next to ditch lines that drain into streams or wet areas, either point the sprayer away from the ditch line or apply a 10 foot buffer. Ditch lines that do not drain directly into wet areas, flowing water, dry intermittent streams, dry springs or dry seeps do not need to be buffered.

d. During broadcast foliar mechanical application, airblast will be directed away from the buffer when application occurs within 75 feet of the perimeter.

21. To increase areas available for sethoxydim application, delineated buffer distances on water features may be narrowed to a buffer of 5 feet, and buffers on ditch lines may be reduced to 0 feet, based upon field conditions at the time of spraying. Buffer distances will be maintained if any of the following are present:

    a. A half-inch or more rainfall event (within a 24-hour period) is predicted in the 3-day weather forecast from the time of application.

    b. Evidence of surface flow can be seen (for example, leaf racks, bare mineral soil, exposed roots, etc.).

    c. Soil texture (subsoil at about 12 inches) is either:

        i. loamy sand or sand (when moist can't make a ball, can barely make a ball or ball falls apart when attempting to pick up with other hand); or

        ii. has more than 65 percent coarse fragment (rock) content by volume.

    d. Soils are very moist, wet, or saturated (observe to 12 inches).

    e. Lack of an organic horizon (excluding loose leaf litter).

Sulfometuron Methyl

Please see forest plan standards and guidelines.

Triclopyr

22. Triclopyr shall not be applied to surface waters, regardless of whether a formulation registered for aquatic application becomes available in the future.

23. For broadcast foliar mechanical (airblast) application, the following buffers and application procedures shall be observed to provide water quality protection:

    a. Triclopyr shall not be applied within 25 feet of each side of perennial streams, impoundments, seeps, springs, or intermittent streams with flowing water the day of spraying.

    b. Triclopyr shall not be applied within 25 feet of wet areas (standing water), including vernal ponds, with no defined outlet.

    c. Triclopyr shall not be applied within 10 feet of each side of dry intermittent streams, dry seeps, and dry springs.

    d. Airblast shall be directed away from the buffer area when applications are made within 75 feet of the edge of the buffer.

24. For directed foliar backpack and for cut surface application methods, the following buffers shall be used to provide water quality protection:

    a. Only aquatic labeled formulations of triclopyr shall be applied up to the edge of water, including some plants that may be rooted in water.

    b. Only aquatic labeled formulations of triclopyr shall be applied within 10 feet of standing or flowing water.

    c. Only aquatic labeled formulations of triclopyr shall be applied within 10 feet of dry intermittent stream courses, dry springs, or dry seeps.

Wildlife, Fish and Sensitive Plant Habitat

Plants

25. Herbicide treatments that use boom sprayers, air blast sprayers, or aerial application will be evaluated on a site-specific basis to avoid impacts from drift if they are near known to be occupied by species that are listed under the Endangered Species Act, proposed for listing under the Endangered Species Act, or listed as regional forester sensitive species. An appropriately sized buffer, or avoidance through timing of treatment, would be determined based on topography and the potential for soil mobility of the herbicide.

Timber Rattlesnake

26. In areas where active timber rattlesnake denning, basking or gestation habitat is present, avoid mastication, mowing, and air-blast spraying within 50 feet of these sites during the time period between April 1 and October 31.

Bats--Federally Listed Threatened, Endangered or Proposed and Regional Forester's Sensitive Species

27. Application of all treatments will be planned to avoid or minimize direct and indirect effects to known bat hibernacula and maternity roosts occupied by species that are listed under the Endangered Species Act, proposed for listing under the Endangered Species Act, or listed as regional forester's sensitive species.

28. To protect potential roost trees, select and apply herbicides in a manner to minimize mortality to non-targeted trees greater than 3-inches diameter at breast height. There are few known active maternity roosts on the Allegheny National Forest. The classification of historic and newly detected maternity roosts acquired from ongoing bat surveys will be incorporated as best available science and these areas will be buffered accordingly. Herbicide treatments within buffered areas will be prohibited during the primary pup season.

Monarch Butterfly and West Virginia White Butterfly

29. If pollinators are active in or near the treatment area, where possible, delay treatments or select treatment methods that would minimize exposure to individuals.

30. Where possible, use herbicides before plants in the target area flower to minimize exposure to pollinators after flowering occurs.

West Virginia White Butterfly

31. Select and apply herbicides in a manner to minimize impacts to toothwort.

32. Where West Virginia white (egg, larvae, adult) is present on garlic mustard, minimize damage to the

plant from April to June.

Wood Turtle

33. In areas where wood turtles have been documented, apply a buffer of 300 feet from the nearest stream (within 15 acres of home range) where no mechanical equipment will be used between the dates of April 1st and October 31st. In some unique habitats (e.g., the beanfields, buzzard swamp, etc.), a negative survey for presence may be substituted.

Scenic Integrity

34. Give special consideration to any treatments within areas that have high or very high scenic integrity objectives to ensure consistency with forest plan direction.

35. Give special consideration to any treatments within 300 feet of concern level 1 and 2 travel routes and viewing platforms to ensure consistency with forest plan direction.

36. To ensure consistency with applicable laws, regulations, and policies, give special consideration to any treatments within Congressionally or administratively designated areas that are managed for the conservation of scenic values.

Forest Plan Amendment

We are proposing to amend the forest plan by making the changes identified in appendix B of this document. The amendment is being proposed under the 2012 Planning Rule and is subject to the objection procedures of 36 C.F.R. part 219 subpart B.[10] Substantive requirements of the 2012 Planning Rule that are likely to be directly related to the proposed forest plan amendment are listed below.

Sustainability

Ecosystem Integrity (36 C.F.R. section 219.8(a)(1))

Air, Soil, Water (36 C.F.R. section 219.8(a)(2))

Riparian Areas (36 C.F.R. section 219.8(a)(3))

Diversity of Plant and Animal Communities

Ecosystem Plan Components (36 C.F.R. section 219.9(a))

Multiple Use

Integrated Resource Management for Multiple Use (36 C.F.R. section 219.10(a))

10. In contrast, the proposed invasive plant and interfering vegetation treatments will be subject to the objection procedures of 36 C.F.R. part 218 subparts A and B.

Alternatives Considered

No Herbicide Application

During the scoping period, one commenter expressed support for invasive plant treatments but recommended removing chemical treatments from the proposed action. The responsible official and interdisciplinary team considered whether it would be possible to fulfill the need for action by exclusively using manual and mechanical treatment methods but determined that doing so is not feasible.

Manual controls are best suited for smaller plants with a shallow root system growing in loose soil. Unfortunately, many invasive plants are not small, do not have a shallow root system, and are not in loose soil. Examples include Japanese knotweed, glossy buckthorn, multiflora rose, Japanese barberry, wild parsnip, goat's rue, and others. As a result, manual controls alone cannot be used to effectively control infestations in many areas.

Mechanical controls reduce standing biomass and weaken root systems. Most invasive plants, however, will simply grow back after mechanical treatment occurs. It may be possible to control some species with multiple entries over many years, but this is not effective for all species and is cost intensive, labor intensive, and may have undesirable effects on soil, wildlife, and native plants. As a result, mechanical controls alone cannot be used to effectively control infestations in many areas. Instead, they are best suited for accessing locations where invasive plant densities are extremely high and reducing the amount of herbicide needed for successful treatment.

Environmental Effects

Human Health and Safety

To analyze the effects of herbicide use on human health and safety, we utilized risk assessments that quantitatively evaluate the probability that an herbicide might pose harm to humans. The Syracuse Environmental Research Associates, Inc. risk assessments (2001–2016), and Kestrel Tellevate LLC risk assessment (2020), contain information about herbicide toxicity, exposure, dose-response relationships, and risk characterization for workers and the general public.

The primary characterization of risk used in our analysis is the hazard quotient for various application scenarios. To calculate the hazard quotient, we divide an estimated dose by the reference dose. A reference dose is the dose the Environmental Protection Agency estimates to be without an appreciable risk of adverse effects over a lifetime of daily exposure (Baynes 2012). If the resulting value is 1.0 or less, then significant toxic effects are unlikely for that specific herbicide application.

Hazard quotients vary based on the herbicide applied, application method, and application rate (typical or maximum). They are calculated for three scenarios. The most plausible scenario is referred to as the central estimate, and it is bracketed by less plausible estimates for the lower and upper boundaries of exposure (Syracuse Environmental Research Associates 2014).

Direct and Indirect Effects

General Public

Application scenarios where the general public could potentially be exposed to a dose greater than the reference dose are summarized in appendix C. Hazard quotients vary based on herbicide, application method, and application rate. The majority have hazard quotients of 1.0 or less at the lower, central, and upper estimates. Some, however, have a greater hazard quotient in scenarios where:

- A 28-pound child drinks 1.0 or 1.5 liters of water from a three-foot deep 0.25 acre pond contaminated with 200 gallons of herbicide solution shortly after the spill occurs.
- A naked child is sprayed directly during a ground broadcast application, is completely covered (100 percent of the surface area of the body is exposed), and the herbicide not effectively removed for 1 hour.
- An adult female consumes a certain amount[11] of contaminated fruit or vegetation immediately after or within 90 days of treatment.
- A young woman is accidentally sprayed over the feet and lower legs, and the herbicide not effectively removed for 1 hour.
- An adult female wearing shorts and a t-shirt comes into contact with treated vegetation for a period of 1 hour on the day of treatment and does not effectively remove the herbicide for 24 hours.

These scenarios are highly unlikely to occur, and are used because the risk assessments are intended to be extremely conservative with respect to potential effects on the general public (Syracuse Environmental Research Associates 2014). Any related risks can be sufficiently reduced or mitigated by:

- Implementing a spill plan.
- Placing signs to let the public know where and when herbicide use will occur.
- Placing signs during or after application.
- When appropriate, using indicator dyes to show the public that vegetation has been treated.

Workers

Application scenarios where workers could potentially be exposed to a dose greater than the reference dose are summarized in appendix C. Hazard quotients vary based on herbicide, application method, and application rate. The majority have hazard quotients of 1.0 or less, and no hazard quotients exceed 1.0 at the lower exposure estimate. Some, however, have a greater hazard quotient at the central or upper estimates.

At the central estimate, workers could potentially be exposed to a dose greater than the reference dose in the following circumstances:

- A worker wears gloves grossly contaminated by imazapic or triclopyr butoxyethyl ester at the maximum rate for 1 hour.
- General worker exposure for triclopyr (backpack, ground broadcast, and aerial application) at the maximum rate.

At the upper estimate, workers could potentially be exposed to a dose greater than the reference dose in the following circumstances:

- A worker wears gloves grossly contaminated by triclopyr butoxyethyl ester at the typical rate for 1 hour.
- A worker wears gloves grossly contaminated by imazapyr or triclopyr butoxyethyl ester at the maximum rate for 1 hour.

11. The amount needed to exceed a hazard quotient of 1.0 varies based on the individual's body weight and when it is consumed.

- General worker exposure for triclopyr (backpack, ground broadcast, and aerial application) and indaziflam (aerial application only) at the typical rates.
- General worker exposure for triclopyr (backpack, ground broadcast, and aerial application), indaziflam (backpack, ground broadcast, and aerial application), and sulfometuron methyl (ground broadcast) at the maximum rates.

Proper safe handling procedures, and personal protective equipment, are anticipated to minimize the risk to workers. However, mild exceedances for general use at the central rate of exposure indicate that extra care should be used while applying the herbicide at the maximum rate. Maximum rate applications are expected to make up a small proportion of herbicide use on the Allegheny National Forest, and the use of best management practices and good industrial hygiene are anticipated to reduce the risk to workers for these treatments.

Cumulative Effects

The cumulative effects analysis considered past, present, and reasonably foreseeable future aerial and ground application of herbicides on private and public lands in and immediately adjacent to the Allegheny National Forest.

For the general public and for herbicide applicators, there would be no cumulative effects from herbicide treatments under the proposed action because there would be no exposure overlap in time (that is, a person would not be exposed to multiple herbicide applications in the same 24 to 48-hour period).

The likelihood of timing overlap is remote because our treatment areas would be posted so the public could avoid them. Allegheny National Forest workers, cooperators or contractors who apply herbicides are not likely to re-enter a treated area through coordination and signage and/or use of dyes.

Soil and Water

Effects of Manual Controls

Manual controls (hand cutting, digging, and pulling) are limited to small (less than 100 square feet) infestations, and leaves non-target species. Manual treatments could result in soil displacement and exposed mineral soil that could be susceptible to erosion, but impacts would be anticipated to be minimal and short term due to persistence of non-target species, loosening of soil that would result in increased infiltration rates, and limited size of treatment area. Impacts would be anticipated to recover naturally within two growing seasons. No heavy equipment would be involved in this treatment, therefore no detrimental disturbance from compaction or rutting would occur. It is unlikely that any erosion and sediment control best management practices would be necessary for manual digging and pulling. Due to the small area, persistence of non-target species, anticipated rapid recovery, and shallow (less than 6 inches) disturbance, no increased susceptibility to mass movement would be anticipated.

Effects of Mechanical Controls

Mowing and Mastication requires the use of heavy equipment, however the equipment used for these treatments are on lighter end of the spectrum and therefore have a lower potential for compaction and rutting, especially track mounted skid steers typically used for mastication which has a very low ground pressure. Rutting is still possible but should be rare and isolated in nature if adhering to forest plan standards and guidelines. Mowing and mastication leaves the mulched residue on site. Some soil displacement and exposure of mineral soil could occur from turning of tracked equipment or the masticator/mower, but these areas should be small and isolated with short term impacts that would recover naturally within a growing season or two. Additionally, the residue from the treatment would

provide ground cover preventing widespread erosion and would filter sediment out of runoff from any isolated bare ground patches.

No increased susceptibility to erosion or mass movement would be anticipated because plant roots are left in place, excavation of slope is not occurring, and no changes in hydrology are anticipated.

Nutrients are left on site in the form of residue. Treatment would accelerate nutrient cycling process by making more biomass available and in smaller pieces that are easier to decompose. No significant loss of nutrients is anticipated as release of nutrients through decomposition would occur during the growing season to be taken up by plants.

Effects of Chemical Controls

Soil Disturbance

Chemical treatment would not expose the soil to erosion. Treatment would kill vegetation leaving residue present on the surface and keep roots intact in the soil maintaining soil stability. Treating cut stumps, cut stem, or basal bark treatments would kill target vegetation and prevent resprouting without disturbing soils through stump removal. Other physical effects to soils are reflective of the method of application and size of equipment needed for treatment.

Hand treatment and aerial treatment would have no other direct or indirect effect on soil. Tank sprayers mounted to utility terrain vehicle and associated equipment will primarily be used for roadside treatment, which would not have an impact on soil resources. If used off road, soil impacts should be minimal and rare because the equipment has very low ground pressure. Rutting is possible but should be rare and isolated in nature if implementing according to the forest plan standards and guidelines. Broadcast treatment typically uses a high-volume air blast system mounted to a large skidder. The skidder is typically track mounted to better navigate over stumps and down trees, which lowers ground pressure of the equipment. Depending on vegetation density, it can reach 30 to 40 feet on either side of the equipment. Treatment utilizes existing skid trail network to the extent practical and minimizes traveling over the same area more than once. The treatment for reforestation typically occurs in the dry season (July through September) when soils have low moisture contents and higher resistance to deformation. Implementing according to the forest plan standards and guidelines, soil disturbances should be limited in extent and severity. Any impacts from heavy equipment operation from broadcast treatment would be anticipated to be minimal in extent, short term in duration, and would recover naturally.

No increased susceptibility to mass movement would be anticipated because plant roots are left in place, excavation of slope is not occurring, and no changes in hydrology are anticipated.

Nutrients would be left on site in the form of residue. Treatment would accelerate nutrient cycling process by making more biomass available for decomposition. No significant loss of nutrients is anticipated as release of nutrients through decomposition would occur during the growing season when they can be taken up by plants.

Glyphosate

Glyphosate is registered for both terrestrial and aquatic application. It degrades through microbial metabolism and has low mobility. Its half-life in soil ranges from 1 or 2 days to 10 weeks, with an average of 47 days. Its half-life in water ranges from 12 days to 10 weeks (Tu et al. 2001; USDA Forest Service 2007b, appendix G).

Glyphosate has no known effects to soil microbial communities or nutrient cycling when applied at normal dosages, (Edwards and Pimentel 1989, Rose et al. 2016), and has limited mobility from being strongly adsorbed to soil particles and short half-life. The precaution of not disturbing soils before

treatment is designed to limit movement of the soil adsorbed product off site via erosion, which is likely the only mode of transport for the product to enter waters, other than direct application or drift.

Application of glyphosate that adheres to label requirements and forest plan standard and guidelines, even with modified aquatic buffers as proposed in this project, are expected to protect water quality, soil productivity, and soil ecosystems.

Imazapic

Imazapic is registered for terrestrial application only. It degrades through microbial metabolism and has low to moderate mobility depending on soil type (sandy and other highly permeable soils may result in more vertical movement). Its half-life in soil ranges from 7 to 150 days, with an average of 120 days. Its half-life in water is approximately 1 to 2 days, degrading quickly through photolysis (Tu et al. 2001).

Imazapic has moderate potential for leaching, especially in highly permeable soils with shallow water tables. The extent of soils on the Allegheny National Forest that is highly permeable with shallow water tables is limited, with only 0.3 percent (2,633 acres) within the Allegheny National Forest proclamation boundary. These soils are comprised of the Atkins, Rexford, Palms, and medihemists and medisaprists soil series and are situated on floodplains. Caution should be taken when using the product on floodplain soils that are highly permeable and have a shallow water table. Most of the soils in the Allegheny National Forest that contain a shallow water table have a confining layer that perches the shallow water table and results in lateral subsurface flow.

Wind erosion is a low concern on the Allegheny National Forest due to udic moisture regime of the region and abundance of vegetation to limit ground wind speeds in the forest. However, areas potentially susceptible to wind erosion are susceptible to water erosion and transport of the chemical in runoff with sediment. Caution should be exercised when using the product in or around ditch lines to ensure that the product would not cause unintended consequences if it migrated from the treatment area. Application on floodplains and around ditches should be conducted at the discretion of the qualified Forest Service Pesticide Applicator on site.

Because imazapic is not registered for aquatic use, the proposed action includes design features of vegetated buffers around aquatic features to capture and renovate any runoff or lateral flow of leachate from treatment areas.

Application of imazapic that adheres to label requirements, project design features, and forest plan standards and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Imazapyr

Imazapyr is registered for both terrestrial and aquatic application. It degrades through microbial metabolism and has low to moderate mobility depending on pH (there is limited mobility in soils below pH 5; in soils above pH 5, there is greater mobility and increased risk of runoff and leaching). Its half-life in soil ranges from 25 to 141 days and is influenced by soil moisture.[12] Its half-life in water averages 2 days, with no reports of contamination in water (Tu et al. 2001).

The degradation of Imazapyr is faster with higher soil moisture. Due to the udic moisture regime of the region, it is anticipated that the half-life in soil would be faster than average. Imazapyr is also influenced by soil pH, with increased adsorption that limits mobility in acidic environments. Due to acidic geology on the Allegheny National Forest, soil pH (in the upper part) is typically in the range of 3.5 to 4.5 and is rarely naturally above 5.0 (Long et al. 2022; Bailey et al. 2021; USDA Natural Resources Conservation

12. In drought conditions, imazapyr could persist for more than one year (Tu et al. 2001).

Service, unpublished Allegheny National Forest soil chemistry monitoring data). Therefore, conditions present in the project area favors the increased adsorption and limited mobility of imazapyr.

Areas where the pH is greater than 5.0 would be limestone treated travel surfaces and adjoining areas. These areas have highly compacted native materials that restrict water infiltration and therefore do not have a risk of leaching to ground water, but they are prone to runoff which could result in the chemical migrating from the treatment area. Ditches in these areas are designed to discharge stormwater into a buffer area to infiltrate and renovate stormwater prior to it reaching a stream, and these locations typically contain target individuals and seeds that would have also been treated. Additionally, imazapyr is registered as an aquatic formulation, therefore effects would be minimal if it were to migrate to a stream.

Wind erosion is a low concern on the Allegheny National Forest due to udic moisture regime of the region and abundance of vegetation to limit ground wind speeds. However, areas potentially susceptible to wind erosion are susceptible to water erosion and transport of the chemical in runoff with sediment. Imazypyr is registered for aquatic use, and therefore under this proposed action could be applied up to aquatic features. If non-aquatic formulations are to be used, the proposed action includes required vegetated buffers around aquatic features to capture and renovate any runoff or lateral flow of leachate from treatment areas.

With the limited mobility in the region, migration to an aquatic feature is unlikely to occur, and has a rapid degradation rate if the chemical were to reach water. Caution should still be exercised when using the product in or around ditch lines of roads that have been treated with limestone to ensure that the product would not cause unintended consequences if it migrated from the treatment area.

Application of imazapyr that adheres to label requirements, project design features, and forest plan standard and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Indaziflam

Indaziflam is registered for terrestrial application only. It degrades through biotic degradation and has moderate mobility in soil. Its half-life in soil exceeds 150 days and is persistent in anaerobic environments. Its half-life in water can exceed 200 days, but may be less than 4 days in clear, shallow waters due to photolysis (US EPA 2010).

Indaziflam has a long half-life in soil and water (except for clear shallow waters with high sun exposure) and has moderate mobility. The Eslanade 200 SC label cautions that groundwater could be contaminated in areas with soils that are permeable with a shallow water table. The extent of soils on the Allegheny National Forest that are highly permeable with shallow water tables is limited, with only 0.3 percent (2,633 acres) within the proclamation boundary. Comprised of the Atkins, Rexford, Palms, and medihemists and medisaprists soils, these soils are situated on floodplains. Caution should be taken when using the product on floodplain soils that are highly permeable and have a shallow water table. Most of the soils in the Allegheny National Forest that contain a shallow water table have a confining layer that perches the shallow water table and results in lateral subsurface flow.

Due to its persistence in soil, indaziflam has higher likelihood of transport via runoff. Because indaziflam is not registered for aquatic use, the proposed action includes required vegetated buffers around aquatic features, including standing water, to capture and renovate any runoff or lateral flow of leachate from treatment areas.

Additionally, the label states that the product shall not be applied “when circumstances favor movement from treatment sites,” which should include evidence of surface water flow. Caution should be exercised when using the product in or around ditch lines to ensure that the product would not cause unintended consequences if it migrated from the treatment area.

Application of indaziflam that adheres to label requirements, project design features, and forest plan standard and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Metsulfuron Methyl

Metsulfuron methyl is registered for terrestrial application only. It degrades through microbial activity and has moderate mobility (with greater mobility in alkaline soils and less in acidic soils). Its half-life in soil ranges from 6 to 180 days, with an average of 30 days.[13] Its half-life in water is approximately 3 weeks at 25 degrees Celsius in soils at pH 5.0 (Extension Toxicology Network 1996, Maznah et al. 2020).

Metsulfuron methyl has moderate mobility in acidic environments as is found on the Allegheny National Forest. There is some potential for leaching to groundwater. Most of the soils in the Allegheny National Forest that contain a shallow water table have a confining layer that perches the shallow water table and results in lateral subsurface flow. Because metsulfuron methyl is not registered for aquatic use, the proposed action includes design features of vegetated buffers around aquatic features to capture and renovate any runoff or lateral flow of leachate from treatment areas.

Metsulfuron methyl has higher solubility and mobility in alkaline soils. Alkaline soils on the Allegheny National Forest are restricted to limestone treated travel surfaces and adjoining areas. These areas have highly compacted native materials that restrict water infiltration and therefore do not have a risk of ground water contamination, but they are prone to runoff which could result in the chemical migrating from the treatment area. Caution should be exercised when using the product in or around ditch lines to ensure that the product would not cause unintended consequences if it migrated from the treatment area.

Application of metsulfuron methyl that adheres to label requirements and forest plan standard and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Sethoxydim

Sethoxydim is registered for terrestrial application only. It rapidly degrades through microbial metabolism and photolysis and has high mobility in soils. Soil mobility and the potential for movement, however, is limited by rapid degradation. Its half-life in soil ranges from a few hours to 25 days but is typically 4 to 5 days. Its half-life in water is less than 1 hour due to photolysis (Tu et al. 2001).

Sethoxydim has rapid degradation rates in the soil and water. Even though sethoxydim has high mobility its likelihood of migration is minimal due to its rapid degradation rates.

Because sethoxydim is not registered for aquatic use, the proposed action requires vegetated buffers around aquatic features to capture and renovate any runoff or leachate from treatment areas.

Application of sethoxydim that adheres to label requirements, project design features, and forest plan standard and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Sulfometuron Methyl

Sulfometuron methyl is registered for terrestrial application only. It degrades through hydrolysis, with some microbial metabolism. Soil mobility is moderate, increasing with higher pH and lower organic matter contents. Its half-life in soil ranges from 20 to 28 days, with the most rapid degradation at lower pH values via hydrolysis but can be up to 8 weeks in anaerobic environments. Its half-life in water

13. Metsulfuron methyl degrades faster under acidic conditions. In soils with higher moisture content, and higher temperature, residual activity could affect plant establishment for 22 months (Extension Toxicology Network 1996, Maznah et al. 2020).

depends on pH but degrades through hydrolysis and is typically between 1 day (low pH) and 2 months (high pH) (USDA Forest Service 2007b, Appendix G, Extension Toxicology Network 1996).

Sulfometuron methyl has the potential to migrate with runoff in areas where there is a lack of organic matter on the soil surface (USDA Forest Service 2007b, Appendix G). Vegetated buffer widths are identified in the forest plan (USDA Forest Service 2007a, pages 57–58) to protect aquatic features and wet areas, including standing water, to capture and renovate any runoff from treatment areas.

Soils on the Allegheny National Forest typically have high soil organic matter contents (typically with an organic horizon on the surface) and low soil pH (typically under pH 5) (Bailey et al. 2021; Long et al. 2022; USDA Natural Resources Conservation Service, unpublished Allegheny National Forest soil chemistry monitoring data). These conditions favor the more rapid rate of degradation and decreased mobility for sulfometuron methyl. Areas where the pH is higher that would result in more mobility of sulfometuron methyl would be limestone treated travel surfaces and adjoining areas. These areas tend to be lower in organic matter (depending on how frequently they are maintained), have highly compacted native materials that restrict water infiltration greatly reducing the risk of leaching to ground water, and are prone to runoff which could result in the chemical migrating from the treatment area. Caution should be exercised when using the product in or around ditch lines to ensure that the product would not cause unintended consequences if it migrated from the treatment area.

Application of sulfometuron methyl that adheres to label requirements and forest plan standard and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Triclopyr

Triclopyr is registered for both terrestrial (ester and salt formulations) and aquatic application (salt formulation only). It degrades through microbial metabolism, photolysis, and hydrolysis.[14] Soil mobility varies between the ester and salt formulations, with the ester formulation having low mobility and the salt formulation having high mobility.[15] Its half-life in soil ranges from 3 to 313 days, with an average of 30 days. Its half-life in water is approximately 4 days (Tu et al. 2001).

Triclopyr is proposed for application for cut stump, cut stem, basal bark and foliar treatments. Cut stump, cut stem, and basal bark treatments are low volume very targeted applications where negligible amount of product would reach the soil. Foliar applications have higher potential for some product to reach soil, but the product binds (or the salt formulation rapidly degrades to triclopyr acid which then binds) to soil, especially in high organic matter and low pH soils which are prevalent conditions on the Allegheny National Forest.

The product labels for Garlon 3A and Garlon 4 cautions that groundwater could be contaminated in areas with soils that are permeable with a shallow water table. The extent of soils on the Allegheny National Forest that are highly permeable with shallow water tables is limited, with only 0.3 percent (2,633 acres) within the proclamation boundary. Comprised of the Atkins, Rexford, Palms, and medihemists and medisaprists soils, these soils are situated on floodplains. These soils can have variable organic contents depending on how actively they flood. Caution should be taken when using the product on floodplain

14. In general, warm, moist soils with a high organic content will support the largest microbial populations and the highest rates of herbicide metabolism (Tu et al. 2001).

15. The ester formulation binds readily with the organic component of the soil, with adsorption rates increasing as organic content increases and soil pH decreases. The salt formulation does not readily bind to soil and can be mobile, however rapidly degrades to Triclopyr acid. Both ester and salt formulations will degrade rapidly in soils to triclopyr acid. Triclopyr acid has an intermediate soil adsorption and may have some mobility during the first significant rainfall, but triclopyr generally does not tend to move in significant quantities below the top 15 cm of soil (Tu et al. 2001).

soils that lack organic matter and are highly permeable with a shallow water table. Although any product that may leach would rapidly degrade through hydrolysis.

Limestone treated travel surfaces and adjoining areas where soil pH is higher could result in decreased adsorption of the ester formulation. These areas tend to be lower in organic matter (depending on how frequently they are maintained) and have highly compacted native materials that restrict water infiltration and therefore do not have a risk of leaching to ground water, but they are prone to runoff which could result in the chemical migrating from the treatment area. Caution should be exercised when using the non-aquatic formulation in or around ditch lines to ensure that the product would not cause unintended consequences if it migrated from the treatment area. Ditches in these areas are designed to discharge stormwater into a buffer area to infiltrate and renovate stormwater prior to it reaching a stream, and these locations typically contain target individuals and seeds that would have also been treated.

Aquatic formulations can be applied up to the edge of aquatic features, while the proposed action includes required vegetated buffers for non-aquatic formulations to adequately renovate runoff or leachate.

Application of triclopyr that adheres to label requirements, project design features, and forest plan standard and guidelines is expected to protect water quality, soil productivity, and soil ecosystems.

Modeling for Groundwater Leaching

In addition to reviewing the potential effects of each active ingredient, climate data and erosion modeling was also conducted to further evaluate the potential for groundwater leaching. We focused on a 112-acre area (Millstone Creek) on the southwest portion of the forest, which is the only area where a soil texture analysis identified potential groundwater leaching concerns due to the presence of sandy loams. A worst-case scenario was modeled to assume treatment on a stepper hillside (up to 50 percent slope) with little ground cover (40 percent) to simulate an invasive weed patch with little natural vegetation.

- The underlying soil horizons indicate a cemented lithic bedrock layer between 40 to 60 inches in depth. This layer acts as a barrier to quick groundwater penetration, which provides time for active ingredients to deteriorate without contaminating water resources.
- Limestone deposits are another vector where non-soils binding herbicides may have a potential to reach groundwater. Analysis of United States Geological Survey geology map units show no limestone deposits as a primary map unit on the forest. Limestone is present as a very minor sub rock type that may have some subsurface inclusions in the southeast portion of the forest. These areas have the same cemented lithic bedrock layer between 40 to 60 inches in depth, which acts as a barrier to groundwater penetration.

As a result, there is very little potential for contamination of ground water resources.

Modeling for Surface Runoff

Climate data and erosion modeling were also conducted to further evaluate the potential for surface runoff. We focused on a 36 acres area in the Muddy Form and Salmon Creek drainages on the southwest portion of the forest. This area was selected due to its high clay content, which creates a potential for runoff.

- The existing condition showed a potential of 0.07 inches of runoff from rainfall from three storm events in a 30-year period. The three storm events were from large storm events occurring at the maximum of one storm per 15 years plus.
- The worst-case scenario model showed a potential of 0.79 inches of runoff from rainfall from 100 storm events in a 30-year period.

- Although Hydrologic Group D soils have the potential for runoff in the spring, few treatments are anticipated to occur on these soil types when they are most susceptible to runoff. This is because these soils have higher potential for run off prior to green up and are less susceptible to runoff after evapotranspiration from green up helps to draw down water tables and function more like a Group C soil through the summer when chemical treatment of invasive plants typically occurs.

As a result, the potential for surface runoff in treated areas is low and would likely only occur if a heavy rainstorm occurs after treatment. Invasive plant treatments, moreover, are expected to reduce the risk of runoff as the spread of invasive plants slows and native vegetation reoccupies infested areas.

Cumulative Effects

The treatments proposed in this project may overlap with activities approved in other decisions. This would include, but is not limited to, timber harvesting, road maintenance and transportation management, and other efforts to control invasive plants and interfering vegetation.

Reforestation herbicide treatments would overlap with silvicultural activities. Typically, there is a timber harvest prior to herbicide treatment that would have established a skid trail network to utilize, but sometimes herbicide treatment will occur prior to timber harvest. Any impacts from equipment in either case would be small and isolated short-term impacts that should have sufficient time to recover prior to the next timber harvest entry which requires several years for tree seedlings to establish following treatment.

Treatments have the potential to overlap with other road maintenance and management activities. The proposed activities compared to maintenance activities would have negligible impacts to compaction, displacement, puddling/rutting, erosion, lack of ground cover, and increased susceptibility to mass movement.

Treatments may require retreatment within the same growing season utilizing a second treatment method (for example, mechanically cutting glossy buckthorn with a foliar herbicide treatment later that year). Implementing different treatment methods within the same growing season are not anticipated to result in any cumulative effects.

Repetitive (annual) treatments may be needed for invasive plant control. It is anticipated that subsequent treatments would be reduced in scope as control of invasive plant is achieved. Chemical impacts, if any, are short term to soil nutrient cycling and soil ecosystems with no known long-term impacts of repetitive treatments at normal field application rates.

Plants

Direct and Indirect Effects

Federally Listed and Proposed Species

A no effect determination was reached for small-whorled pogonia (threatened) and northeastern bulrush (endangered but recommended for delisting due to recovery).[16] Neither species has designated critical habitat on the Allegheny National Forest, and no individual plants or populations have ever been located during field surveys.

16. The most recent five-year review for northeastern bulrush recommended delisting due to recovery. As of this writing, however, delisting has not occurred. For additional information, see https://ecos.fws.gov/docs/five_year_review/doc6123.pdf.

If discovered before or during implementation, both species will be adequately protected by forest plan standards, guidelines, and project-specific design features. Treatment sites will be evaluated for habitat suitability and occupancy before implementation occurs, and implementation will be halted within 300 feet of small-whorled pogonia and northeastern bulrush plants or populations (USDA Forest Service 2007a, page 84). In addition, the proposed action includes a required design feature to evaluate herbicide treatments that use boom sprayers, air blast sprayers, or aerial application to avoid impacting nearby plants or populations should any be discovered.

Regional Forester Sensitive Species

Open Areas and Edges

Strict blue-eyed grass (*Sisyrinchium montanum* var. *crebrum*) may occur in open areas and edges. We determined that the proposed action may adversely impact individuals but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Direct and indirect effects to individual plants and their habitat would be negligible. Interfering vegetation treatments would not occur in open areas or edges because the areas are often wet and there is no canopy to treat, and any indirect effects from nearby canopy removal would likely provide a short-term beneficial effect to this habitat. Invasive plant treatments may result in some direct mortality while adjacent plants are being removed or treated, but adverse effects would be negligible due to the materials and methods used for treatment. Reducing abundance of non-native invasive plants and conserving sensitive species habitat would result in beneficial effects.

Non-Forested Areas

Xeric Areas

American fever-few (*Parthenium integrifolium*) may occur in non-forested xeric habitat. We determined that the proposed action may adversely impact individuals but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Direct and indirect effects to individual plants and their habitat would be negligible. Interfering vegetation treatments would not occur in the habitat (openings and roadsides) occupied by American fever-few. Invasive plant treatments may result in some direct mortality while adjacent plants are being removed or treated, but this effect would be negligible and outweighed by beneficial effects. Known invasive plant infestations tend to favor non-forest–xeric habitat, such as roadsides and openings within timber stands, and treatments in these areas would reduce encroachment and habitat alteration caused by woody invasive plants.

Project design features will protect known occurrences of these species. Any project effects would be to undiscovered populations and habitat and are unlikely because most activities would occur in forested habitats and would not result in large-scale changes to non-forest-xeric habitat. As a result, potential effects would be small in both magnitude and duration.

Hydric and Sphagnum-Dominated Wetlands

Species that may occur in non-forested hydric and sphagnum dominated wetlands are listed in table 10. For each species, we determined that the proposed action may adversely impact individuals but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Table 10. Regional forester sensitive plant species occurring in non-forest–hydric and sphagnum-dominated wetlands

Scientific Name	Common Name
Baptisia australis var. *australis*	Blue wild indigo
Bartonia paniculata	Twining screwstem, screwstem
Carex atherodes	Awned sedge
Carex magellanica ssp. *irrigua*	Boreal bog sedge
Eriophorum tenellum	Rough cotton-grass
Filipendula rubra	Queen-of-the-prairie
Gaultheria hispidula	Creeping snowberry
Hasteola suaveolens	Sweet-scented Indian plantain, false Indian plantain
Juncus filiformis	Thread rush
Panicum philadelphicum	Philadelphia panicgrass
Scirpus pedicellatus	Stalked bulrush

Direct and indirect effects to individual plants and their habitat would be negligible. Interfering vegetation treatments would not occur in open areas or edges because the areas are often wet and there is no canopy to treat, and any indirect effects from nearby canopy removal would likely provide a short-term beneficial effect to this habitat. Invasive plant treatments may result in some direct mortality while adjacent plants are being removed or treated, but this effect would be negligible because best management practices typically avoid these areas. Known invasive plant infestations (except for glossy buckthorn, Japanese stiltgrass, and Japanese barberry) tend to favor non-forest–xeric habitat, such as roadsides and openings within timber stands, and are less likely to occur in the hydric and sphagnum dominated wetlands where these species are present. Short-term adverse effects would be outweighed by the long-term beneficial effects of reducing competition for resources from invasive species.

Project design features will protect known occurrences of these species. Any project effects would be to undiscovered populations and habitat and are unlikely because most activities would occur in forested habitats and would not result in large-scale changes to hydric and sphagnum dominated wetlands. As a result, potential effects would be small in both magnitude and duration.

Mature Deciduous Mesic Forest

Species that may occur in shaded mature deciduous forest habitat are listed in table 11. In addition to these species, Fairywand (*Chamaelirium luteum*) may occur in partial shade. For each species, we determined that the proposed action may adversely impact individuals but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Table 11. Regional forester sensitive plant species occurring in shaded mature deciduous mesic forest

Scientific Name	Common Name
Actaea rubra	Red baneberry
Botrychium lanceolatum var. *angustisegmentum*	Lanceleaf grapefern, triangle moonwort
Botrychium oneidense	Bluntlobe grapefern
Botrychium simplex (Botrychium simplex v. *tenebrosum)*	Little grapefern, least moonwort
*Cardamine maxima (*Syn. *Dentaria maximia)*	Large toothwort
Corallorhiza odontorhiza	Autumn coralroot
Erythronium albidum	White fawnlily, white troutlily

Scientific Name	Common Name
Galearis spectabilis	Showy orchid
Goodyera repens	Dwarf/lesser rattlesnake-plantain
Panax quinquefolius	American ginseng
Tipularia discolor	Cranefly orchid, crippled cranefly
Actaea rubra	Red baneberry

Direct and indirect effects to individual plants and their habitat would be negligible. Interfering vegetation treatments may result in some adverse effects to habitat, but these effects are more likely to be in context of cumulative effects than direct or indirect.

Invasive plant treatments may result in some direct mortality while adjacent plants are being removed or treated, but this effect would be negligible because:

- The majority of known invasive plant infestations do not tend to favor these habitats. Most invasive species are sun loving and favor open canopies, except for glossy buckthorn (*Frangula alnus*), Japanese stiltgrass (*Microstegium vimineum* and Japanese barberry (*Berberis thungbergii*).
- Treatments will be designed to conserve sensitive plant habitat.
- The materials and methods used (hand pulling, weed whacking, mowing, backpack spraying, etc.) will have minimal impact on non-target species.

Interfering vegetation treatments may result in some direct mortality while adjacent plants are being removed or treated, and that habitat for species adapted to low light conditions may be adversely altered by opening the canopy. Direct and indirect effects will be limited, however, because interfering vegetation treatments under this decision are a substitute for previously approved broad-spectrum herbicide treatments. Although this decision may be used in the future to support reforestation in storm damaged stands, that would only occur where blowdown or similar natural events have already changed canopy conditions.

Project design features will protect known occurrences of these species. Any project effects would be to undiscovered populations and habitat and are unlikely to occur because the proposed action includes a required design feature to evaluate herbicide treatments that use boom sprayers, air blast sprayers, or aerial application to avoid impacting nearby plants or populations.

For these reasons, potential direct and indirect effects would be small in both magnitude and duration.

Mature Mixed Deciduous Mesic Forest

Species that may occur in shaded mature deciduous forest habitat are listed in table 12. For each species, we determined that the proposed action may adversely impact individuals but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Table 12. Regional forester sensitive plant species occurring in mature mixed deciduous mesic forest

Preferred Habitat	Scientific Name	Common Name
Partial Shade	*Platanthera hookeri*	Hooker's orchid
Shade	*Goodyera tesselata*	Checkered rattlesnake plantain
Shade	Viola selkirkii	Great-spurred violet
Sun to Partial Shade	*Juglans cinerea*	Butternut
Sun to Partial Shade	*Ribes lacustre*	Bristly black currant

Preferred Habitat	Scientific Name	Common Name
Partial Shade to Shade	*Amelanchier bartramiana*	Bartram shadbush
Partial Shade to Shade	*Ribes triste*	Swamp red currant
Partial Shade to Shade	*Stellaria borealis*	Mountain starwort
Partial Shade to Shade	*Taxus canadensis*	Canada yew

Invasive plant treatments may result in some direct mortality while adjacent plants are being removed or treated, but this effect would be negligible because:

- The majority of known invasive plant infestations do not tend to favor these habitats. Most invasive species are sun loving and favor open canopies, with the exception of glossy buckthorn (*Frangula alnus*), Japanese stiltgrass (*Microstegium vimineum* and Japanese barberry (*Berberis thungbergii*).
- Treatments will be designed to conserve sensitive plant habitat.
- The materials and methods used (hand pulling, weed whacking, mowing, backpack spraying, etc.) will have minimal impact on non-target species.

Interfering vegetation treatments may result in some direct mortality while adjacent plants are being removed or treated, and that habitat for species adapted to low light conditions may be adversely altered by opening the canopy. Direct and indirect effects will be limited, however, because interfering vegetation treatments under this decision are a substitute for previously approved broad-spectrum herbicide treatments. Although this decision may be used in the future to support reforestation in storm damaged stands, that would only occur where blowdown or similar natural events have already changed canopy conditions.

Project design features will protect known occurrences of these species. Any project effects would be to undiscovered populations and habitat and are unlikely to occur because the proposed action includes a required design feature to evaluate herbicide treatments that use boom sprayers, air blast sprayers, or aerial application to avoid impacting nearby plants or populations.

For these reasons, potential direct and indirect effects would be small in both magnitude and duration.

Cumulative Effects

Present and future projects on the Allegheny National Forest would continue to be guided by the direction and standards and guidelines in the forest plan to minimize impacts to threatened and endangered species, species proposed for federal listing, and sensitive species. Therefore, it is assumed that most adverse effects would be avoided.

Given the spatial and temporal scale of invasive plant treatments, potential for cumulative effects is low.

- Invasive plant and interfering vegetation treatments would be relatively small, well-defined spatial areas. Treatments would be confined to individual stems or areas of invasive plants and interfering vegetation while leaving interspersed non-target vegetation (habitat) intact. Habitat would not be removed or degraded, and incidental damage to non-target vegetation is not expected to have a meaningful impact. Treatments would typically occur once during a season, generally from late spring to mid-fall.
- Interfering vegetation treatments may overlap with timber management activities, which can result in the creation of canopy gaps that adversely affect habitat for species adapted to low light conditions. Any changes that do occur would result from previously approved decisions or

changed conditions due to blowdown or other natural events, and the interfering vegetation treatments approved here would not result in any additional openings to consider in context of cumulative effects.

Most exposure scenarios would not be expected to result in adverse effects. In the few scenarios when adverse effects could occur (for example, drift scenarios) design features would reduce the potential for impact. Design features would also reduce the potential for all project activities to disturb regional forester sensitive species. Because adverse effects of project activities would be very low, with very little additive effect, no significant cumulative effects are anticipated. Ultimately, reducing abundance of non-native invasive plants and conserving or restoring sensitive species habitat would result in beneficial effects to many threatened and endangered species, species proposed for federal listing, and sensitive species.

Aquatic Wildlife

The aquatic wildlife analysis focuses on amphibians, fish, mussels, and insects that are listed under the Endangered Species Act, proposed for listing under the Endangered Species Act, or listed as regional forester sensitive species.

Effects Common to All Aquatic Species

No direct or indirect effects to aquatic species or their habitats are expected. No effect on water quality and water quantity is expected. Dry or flowing streams, tributaries, water bodies, seeps, springs, and wetlands will be protected through the buffers and project specific design features. These design features were carefully developed and will be implemented as part of the proposed action to prevent herbicide from entering water and protect aquatic resources and will be applied to all Waters of the United States and the Commonwealth.

The forest plan's final environmental impact statement discusses the effects of herbicides on water quality with the implementation of forest plan standards and guidelines, and its analysis on pages 3-33 and 3-35 is incorporated by reference (USDA Forest Service 2007b). It finds that water quality will be maintained through buffering water resources, excluding treatment and/or equipment from buffer areas, and restricting application during wind and rain to avoid drift or runoff (see section VI. Management Requirements). Visual monitoring of herbicide damage to vegetation has been conducted within application buffers. It does not appear any herbicides have entered water courses on the Allegheny National Forest based on this vegetation monitoring, indicating that buffer widths are sufficient to prevent herbicides from entering any waterways. See USDA Forest Service 2014, pages 185–191.

In addition to complying with the standards and guidelines contained primarily in the 2500 Watershed and Air section, to protect the northern riffleshell and clubshell, the following more restrictive standards and guidelines apply to the "13 Percent Area" of the Allegheny National Forest.

Freshwater Mussels

Federally Listed Threatened and Endangered Species, and Species Proposed for Listing

There are six federally listed threatened or endangered freshwater mussels within the proclamation boundary, and a seventh has been proposed for listing (see table 13). Although there is currently no designated critical habitat, the U.S. Fish and Wildlife Service has proposed designating 1,115 river miles

as occupied critical habitat for the longsolid mussel.[17] The project area overlays a portion of that proposed designated critical habitat. For the reasons discussed below, we determined that the proposed action would have no effect to threatened or endangered species, and no effect on species proposed for listing.

Table 13. Federally listed mussels and species proposed for listing

Common Name	Scientific Name	Status	Preferred Habitat
Northern Riffleshell	*Epioblasma torulosa rangiana*	Endangered	Packed sand and gravel in riffles and runs
Snuffbox	*Epioblasma triquetra*	Endangered	Rivers and lakes, typically associated with riffles, though found in pools
Longsolid	*Fusconaia subrotunda*	Proposed Threatened	Medium to large rivers in gravel with a strong current
Sheepnose	*Plethobasus cyphyus*	Endangered	Sand and gravel areas within rivers
Clubshell	*Pleurobema clava*	Endangered	Clean, coarse sand-gravel substrate, often just downstream of a riffle
Rabbitsfoot	*Quadrula cylindrica*	Threatened	Small rivers to streams, often in slack water along the bank
Rayed Bean	*Villosa fabalis*	Endangered	Associated with willow stands along rivers, lakes, and streams

Direct and Indirect Effects

The Allegheny National Forest's mussels generally occur in large streams and rivers with clean, coarse sand and gravel within runs. Individuals are generally found below the substrate and rely on water infiltration into the interstitial zone for feeding and respiration. They release their larvae onto the gills of a suitable host fish, which then detach from the fish once they have matured into juveniles. Utilizing host fish allows mussels to disperse their offspring widely (USDA Forest Service 2012).

The primary threat to freshwater mussels is habitat degradation through siltation, sedimentation, and the introduction of pollutants. Mussels are filter feeders, and their feeding and respiration may be impacted by increased sedimentation. They are also susceptible to heavy metals, pesticides, and changes in water chemistry (USDA Forest Service 2012).

A combination of manual, mechanical, and chemical control methods would be used to reduce or eradicate invasive plant infestations at various locations. Implementing the proposed action would have no direct adverse effects on any threatened and endangered mussels or mussels proposed for listing. Project design features, forest plan standards and guidelines, and Pennsylvania best management practices are expected to maintain or improve water quality and quantity in this project. All activities would be required to maintain or improve the water quality standards of the streams in the project area through the Pennsylvania Department of Environmental Protection's anti-degradation requirement (Pennsylvania Department of Environmental Protection 2022).

Moreover, activities that treat and reduce the spread of infestations are thought to be beneficial for all aquatic species including mussels by maintaining native plant diversity, which may enhance their reproductive success and survival rates (USDA Forest Service 2007a).

17. Ninety-nine miles of the Allegheny River in Warren, Crawford, Forest, Venango, and Clarion Counties, Pennsylvania, from Kinzua Dam, Warren County, downstream to the Pennsylvania Route 58 crossing at Foxburg, Clarion County, Pennsylvania.

Cumulative Effects

No effects are anticipated for any freshwater mussel species. Accordingly, there will be no cumulative effects when combined with the effects of past, present, or reasonably foreseeable future activities in the project area.

Regional Forester Sensitive Species

There are seven freshwater mussel species on the regional forester sensitive species list. Because the longsolid mussel is proposed for federal listing, its effects are evaluated above in the context of species proposed for listing. The remaining six species, listed in table 14, are evaluated as sensitive species. A no impact determination was reached for each.

Table 14. Regional forester sensitive mussel species

Common Name	Scientific Name	Preferred Habitat
Creek heelsplitter	*Lasmigona compressa*	Medium to large stream
Rainbow	*Villosa iris*	Rivers
Round pigtoe	*Pleurobema sintoxia*	Rivers
Threeridge	*Amblema plicata*	Rivers
Wabash pigtoe	*Fusconaia flava*	Rivers
White heelsplitter	*Lasmigona complanata*	Rivers

Direct and Indirect Effects

The primary threats to mussels in the project area are habitat degradation through siltation and sedimentation. Mussels are filter feeders, and their feeding and respiration may be impacted by increased sedimentation. Mussels are also susceptible to heavy metals, pesticides, and changes in water chemistry (USDA Forest Service 2007b).

The direct and indirect effects of the proposed action are the same as those previously discussed in context of threatened and endangered mussels and effects common to all aquatic species. While there is an abundance of potentially suitable habitat throughout the project area for many of these species, project specific design features have been developed and would be implemented for the express purpose of protecting aquatic species and habitats. Accordingly, the actions authorized in this project will have no effect on sensitive mussels.

Cumulative Effects

No effects are anticipated. Accordingly, there will be no cumulative effects when combined with the effects of past, present, or reasonably foreseeable future activities in the project area.

Amphibians

A no impact determination was reached for eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*), an aquatic salamander and regional forester sensitive species with specialized habitat requirements.

Hellbenders respire while submerged using highly vascular lateral skin folds. This method of respiration leaves hellbenders dependent on environments with cool and rapidly moving water, allowing for a higher dissolved oxygen content and the passage of large amounts of water over the lateral skin folds. Eastern hellbenders also specialize in habitats with gravel substrate and large flat rocks which they utilize for hiding and reproduction (Williams et al. 1981). Sedimentation in streams may be a cause of hellbender decline by reducing suitable microhabitat (Mayasich et al. 2003).

In 2008, the Forest Service and Western Pennsylvania Conservancy began an extensive assessment of hellbender communities throughout the Allegheny National Forest. As a result of those surveys, eastern hellbenders and their suitable habitat are known to be present in the Allegheny River, Clarion River, and larger tributaries including Tionesta Creek.

Direct and Indirect Effects

The direct and indirect effects of the proposed action are the same as those previously discussed in context of threatened and endangered mussels and effects common to all aquatic species. While hellbenders and their suitable habitat are present in the Allegheny River and West Branch Tionesta Creek, project specific design features have been developed and would be implemented as part of the proposed action specifically for the purpose of protecting aquatic habitats and species. Accordingly, the actions authorized in this project will have no effect on eastern hellbenders.

Cumulative Effects

No effects are anticipated. Accordingly, there will be no cumulative effects when combined with the effects of past, present, or reasonably foreseeable future activities in the project area.

Insects

The regional forester sensitive species list contains nine odonates, commonly known as dragonflies and damselflies (see table 15). Odonates spend their juvenile period living as predatory aquatic larva prior to leaving the water to emerge as adults. After emergence, adults may range over long distances while foraging and searching for breeding locations and mates (Paulson 2011).

Table 15. Regional forester sensitive aquatic insect species that may be affected

Common Name	Scientific Name	Preferred Habitat
Green-faced clubtail	*Gomphus viridifrons*	Small stream to river
Harpoon clubtail	*Phanogomphus descriptus*	Medium to large streams
Maine snaketail	*Ophiogomphus mainensis*	Medium to large streams
Mocha emerald	*Somatocholora linearis*	Small to large forested streams and rivers
Mustached clubtail	*Gomphus adelphus*	Small streams to rivers/wetlands
Rapids clubtail	*Gomphus quadricolor*	Large streams to rivers/wetlands
Sable clubtail	*Gomphus rogersi*	Medium to large forested streams/ wetlands
Ski-tailed emerald	*Somatochlora elongata*	Large streams
Zebra clubtail	*Stylurus scudderi*	Medium streams

The U.S. Environmental Protection Agency, Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, and others have conducted invertebrate surveys in potentially suitable habitat throughout the Allegheny National Forest. Specifically, surveys occurred in 1994, 1997, and from 2004 to 2010. The target of aquatic invertebrate surveys is often not the invertebrates themselves but water quality, for which the number and richness of taxa act as a proxy indicator. In aquatic invertebrate studies targeting water quality specimens are generally identified to the order, family, or genus depending on the type of study. Because most aquatic invertebrate studies done on the Allegheny National Forest are for the purpose of water quality, species level distribution information is lacking.

The most significant threats to odonates are habitat destruction, siltation, drought or water overuse, and severe flooding (Paulson 2011). There are a variety of threats to odonates and their habitat within and

adjacent to the Allegheny National Forest. These threats include impoundments, dredging, excessive sedimentation, agricultural non-point source pollution, the removal of streamside vegetation, and predation from a variety of organisms such bats, fish, and reptiles. See the Allegheny National Forest Addendum to Biological Evaluation April 2012 (USDA Forest Service 2012) for more specific information about threats to odonates.

These odonates can be found in lotic environments ranging from tiny spring fed streams to large, fast flowing rivers. Past threats on the Allegheny National Forest include the removal of streamside vegetation and the removal of large wood from streams. Both actions directly degrade odonate habitat (Paulson 2011, USDA Forest Service 2007b). On the Allegheny, the main threat to these odonates at present is the destruction of larval microhabitat from the effects of siltation.

No effects are anticipated on juvenile odonates from this project. The impact on terrestrial insects, such as adult odonates, would be limited to a few individuals. As a result, for each of these species, we reached the determination that the proposed action may adversely impact individuals but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Direct and Indirect Effects

Proposed activities with the potential to affect these odonates include manual (hand cutting, digging, and pulling), mechanic (cutting, mastication, and mowing), and chemical (herbicide application) treatments.

- *Juveniles Odonates* (aquatic) – Implementing the proposed action would have no direct adverse effects on any aquatic species and specifically juvenile (aquatic) odonates, over the period covered by this decision.
- *Adult Odonates* (terrestrial) – Noise and movement associated with manual, mechanical, and chemical (herbicide) treatments of infestations could potentially alter the movement patterns of individual terrestrial insects, including adult odonates. However, those impacts would be minimal, short in duration, temporary, and localized. Most treatments would not require the use of motorized equipment. For all treatments, work in areas of suitable or occupied habitat would be limited. Additionally, implementing the proposed action is not expected to significantly change the vegetation component of terrestrial (that is, riparian) odonate habitat.

Herbicides could have a direct impact on terrestrial insects if they are sprayed. However, proposed treatments would only occur in localized areas, away from wetlands and their associated vegetation, which would reduce the potential for impact to a few individuals. It is uncertain if odonates use invasive or interfering vegetation but removing these will provide the opportunity for native plants to become established.

Cumulative Effects

No effects are anticipated for juvenile (aquatic) odonates or any aquatic species from either the proposed action and no action alternatives. However, the noise and movement associated with manual, mechanical, and chemical (herbicide) treatments could potentially alter the movement patterns of individual terrestrial insects, including adult odonates. Accordingly, there may be cumulative effects when combined with the effects of past, present, or reasonably foreseeable future activities, but those effects are not expected to be significant as they are short term and limited in scale.

Fish

The regional forester sensitive species list contains five species of fish (see table 16). For each of these species, we reached a no impact determination.

The primary threats to sensitive species fish in the project area are habitat degradation through siltation and sedimentation. Increased sediment can decrease the ability of fish to find food or to detect predators and prey, thereby increasing stress. Sediments may also smother fish eggs, mussels, and other aquatic invertebrates which are an important food sources for fish. Fish are also susceptible to heavy metals, pesticides, and changes in water chemistry (USDA Forest Service 2007b.

Table 16. Regional forester sensitive fish species

Common Name	Scientific Name	Preferred Habitat
Spotted darter	*Etheostoma maculatum*	River
Ohio lamprey	*Ichthyomyzon bdellium*	Large stream to river
Mountain brook lamprey	*Ichthyomyzon greeleyi*	Large stream to river
Burbot	*Lota spp.*	Deep, cold waters of lakes and rivers
Northern madtom	*Noturus stigmosus*	River

Direct and Indirect Effects

The direct and indirect effects of the proposed action are the same as those previously discussed in context of threatened and endangered mussels and effects common to all aquatic species. While there is an abundance of potentially suitable habitat throughout the project area for many of these species, project specific design features have been developed and would be implemented for the express purpose of protecting aquatic species and habitats. Accordingly, the actions authorized in this project will have no effect on sensitive fish.

Cumulative Effects

No effects are anticipated. Accordingly, there will be no cumulative effects when combined with the effects of past, present, or reasonably foreseeable future activities in the project area.

Terrestrial Wildlife

Federally Listed and Proposed Species

Northern Long-Eared Bat

The northern long-eared bat is listed as endangered under the Endangered Species Act.

From 1998 through 2010, the northern long-eared bat was the second most common species captured on the Allegheny National Forest, making up 27 percent of the total bats captured. Since the onset of white-nose syndrome in northwest Pennsylvania in 2011, captures have declined and represented only 9 percent of the total captures in 2013 and 2014 surveys. Although the relative abundance of northern long-eared bat has decreased, the spatial distribution remains relatively wide-spread across the Allegheny National Forest and the species may occur wherever suitable habitat is present (USDI Fish and Wildlife Service 2015).

Additional mist net surveys and follow-up telemetry in 2014 and 2015 on the Allegheny National Forest resulted in the documentation of four northern long-eared bat roosts. Three of these roosts are maternity roosts (that is, had either juveniles or reproductive adult females tracked to them). There are four caves within or near the Allegheny National Forest boundary that are known hibernacula based on fall swarm surveys or internal surveys conducted during the hibernation period.

Direct and Indirect Effects

Direct effects that could occur as a result of project activities include exposure to chemicals and their associated toxicity, bodily contact with mechanical equipment, and disturbance to roosting bats. Manual, chemical, and mechanical methods of treatments for invasive and interfering vegetation would not target potential roost trees (greater than or equal to 3 inches diameter at breast height). Design features included in the proposed action would minimize the potential for drift to impact non-target species. Application of all treatments will be planned to avoid or minimize effects to known bat hibernacula and maternity roosts including no herbicide treatments around known maternity sites during the primary pup season. Additionally, northern long-eared bats are not expected to be exposed to herbicides or mechanical equipment because the treatments would occur during the daytime when northern long-eared bats are not active and are roosting within crevices and cracks in rocks and features in trees. Roosting features would be expected to provide protection from droplets that may result from drift, and roosting often occurs above the ground level where treatments would primarily occur.

The disturbances of greatest concern to northern long-eared bats include those that would affect maternity colonies. However, the Eastern Region (Region 9) programmatic biological assessment for the threatened northern long-eared bat categorized ground-based herbicide application methods under reforestation and site preparation (USDA Forest Service 2015, pages 52–54) and concluded that manual and mechanical herbicide application methods, as are proposed in this project, "will not have a negative effect or reduce winter, spring, summer, or fall habitat for the [northern long-eared bat], nor are they likely to disturb individuals" (USDA Forest Service 2015, page 54). Additionally, design features, including but not limited to those derived from forest plan standards and guidelines and the programmatic biological assessment, would provide protections to known maternity colonies and hibernacula from potential impacts resulting from all project activities.

Indirect exposure to herbicides is not anticipated. Northern long-eared bats would not be expected to consume herbicides directly after they are applied to vegetation because they are insectivores, and they would also not glean insects from such short vegetation. Therefore, there is no indirect exposure of northern long-eared bats to herbicides by feeding or foraging on insects.

Northern long-eared bats roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags that are typically greater than or equal to 3 inches diameter breast height (USDI Fish and Wildlife Service 2015). Tree removal for northern long-eared bats is defined as any manipulation of sapling, snag or any form of woody vegetation likely to be used by northern long-eared bats (USDI Fish and Wildlife Service 2016). Drift from broadcast (ground or aerial) applications of herbicides may result in incidental injury or mortality to non-target trees greater than 3 inches diameter at breast height if enough herbicide contacts the foliage of the tree. The potential for mortality is expected to be minimal to none, due to the implementation of forest plan standards and guidelines and specific design features to minimize drift and mortality to non-target trees greater than or equal to 3 inches diameter at breast height (see design features). Additionally, the number of remaining potential roosting trees in and/or adjacent to any particular broadcast (ground or aerial) treatment area would be expected to provide adequate opportunities for roosting, either as overstory trees immediately above treatment sites or trees adjacent to treatment sites. Therefore, the potential for minimal removal of potential roost trees would result in an insignificant and unmeasurable impact to winter, spring, summer, or fall habitat for the northern long-eared bat.

All forest plan standards and guidelines that apply to bat species and protect water quality will be implemented to reduce effects to the northern long-eared bat. In addition, the conservation measures located on pages 67–68 of the Forest Service Eastern Region programmatic biological assessment for the northern long-eared bat (USDA Forest Service 2015) will be implemented where applicable.

Cumulative Effects

Implementation of this project may overlap with other management actions that could affect northern long-eared bats. This includes the application of herbicides under other project decisions, and disturbances from timber harvesting, road construction, clearing for oil and gas pads, urban development, recreational activities, and prescribed fire. Given the spatial and temporal scale of invasive plant treatments as well as implementation of design features to reduce impacts, the potential for cumulative effects is low.

- Invasive plant and interfering vegetation treatments would be relatively small, well-defined spatial areas.
- Treatments would be confined to individual stems or areas of invasive plants and interfering vegetation while leaving interspersed non-target vegetation (habitat) intact.
- Habitat would not be removed or degraded, and incidental damage to non-target vegetation is not expected to have a meaningful impact.
- Treatments would typically occur once during a season, generally from late spring to mid-fall.
- Treatment implementation time will vary from a few minutes, hours or days depending on method and size of treatment area.

As a result, there would be very little additive effect from the ongoing and foreseeable activities occurring on both federal and non-federal lands within the analysis area.

Determination

The Eastern Region (Region 9) programmatic biological assessment for the threatened northern long-eared bat categorized herbicide application methods under reforestation and site preparation (USDA Forest Service 2015, pages 52–54) and concluded that manual and mechanical herbicide application methods, as are proposed in this project, "will not have a negative effect or reduce winter, spring, summer, or fall habitat for the [northern long-eared bat], nor are they likely to disturb individuals" (USDA Forest Service 2015, page 54). However, a conservative approach has been taken in this analysis by accepting the potential mortality to non-target trees greater than 3 inches that could provide roost habitat. Incidental mortality is expected to be minimal to none and additionally, because treatments would be widely distributed, small and localized, the potential mortality would result in an insignificant and unmeasurable impact to winter, spring, summer, or fall habitat for northern long-eared bats. The potential for disturbance resulting for noise and human activity associated with all treatment types would be minimized with design features to protect known and occupied northern long-eared bat hibernacula and maternity roosts. Therefore, under the proposed action the determination for northern long-eared bat is may affect, not likely to adversely affect.

Tri-Colored Bat

The U.S. Fish and Wildlife Service has proposed to list the tri-colored bat as endangered due to the risk of extinction resulting from the primary threat of the ongoing spread of white-nose syndrome. Suitable summer brood-rearing and foraging habitat is present for this species on the Allegheny National Forest. Tri-colored bats seem to prefer watercourses for foraging but are not restricted to these sites and will feed at forest edges.

Direct and Indirect Effects

Direct effects to consider include exposure to chemicals, mechanical and manual equipment, and the potential disturbance associated with the implementation of the treatments. Direct exposure to chemicals and equipment is not expected because the actions will occur during the day when tri-colored bats are not

active, within the protection of a roost feature or den, and above understory vegetation where treatments are occurring. Disturbance associated with the noise and human activity resulting from treatment implementation may cause a short-term disruption to individuals' roosting behavior. Disturbance would be minimized through implementation of design features to avoid herbicide treatments within a buffer around known maternity sites during the primary pup season.

Indirect effects to habitat could occur but are expected to be minimal to none. Drift from broadcast (ground and aerial) applications of herbicides may contact non-target vegetation that could result in injury or mortality to potential roost or nest trees. Treatments would occur in small areas spread across the forest and, therefore, if impacts were to occur, they would be limited in scale and widely distributed. Design features to minimize drift and impacts to non-target vegetation will also provide protections to potential roost and nest trees. Therefore, potential impacts to habitat are not expected to result in a meaningful impact to tri-colored bat.

Design features will include surveys prior to treatment and protections as needed for federally listed threatened, endangered, or proposed species and for regional forester sensitive species, including the tri-colored bat.

Cumulative Effects

Implementation of this project may overlap with other management actions that could affect northern long-eared bats. This includes the application of herbicides under other project decisions, and disturbances from timber harvesting, road construction, clearing for oil and gas pads, urban development, recreational activities, and prescribed fire. Given the spatial and temporal scale of invasive plant treatments as well as implementation of design features to reduce impacts, the potential for cumulative effects is low.

- Invasive plant and interfering vegetation treatments would be relatively small, well-defined spatial areas.
- Treatments would be confined to individual stems or areas of invasive plants and interfering vegetation while leaving interspersed non-target vegetation (habitat) intact.
- Habitat would not be removed or degraded, and incidental damage to non-target vegetation is not expected to have a meaningful impact.
- Treatments would typically occur once during a season, generally from late spring to mid-fall.
- Treatment implementation time will vary from a few minutes, hours or days depending on method and size of treatment area.

As a result, there would be very little additive effect from the ongoing and foreseeable activities occurring on both federal and non-federal lands within the analysis area.

Determination

Tri-colored bats may be disturbed by the noise and activity associated with project actions. Mortality to potential roost and den trees could occur as a result of drift but is expected to be incidental and not widespread and therefore not expected to result in a meaningful impact on habitat. Additionally, design features would minimize the potential for disturbance at known sites as well as to non-target trees, resulting in minimal impacts to the species. Therefore, the proposed action *will not jeopardize the continued existence* of the tri-colored bat.

Regional Forester Sensitive Species

Twelve regional forester sensitive species (sensitive species) are known to occur, or have been known to occur, on the Allegheny National Forest within the past 20 years (see table 17). Because the tri-colored bat was recently proposed for federal listing as endangered, it was also discussed above as a species proposed for federal listing.

Table 17. Regional forester sensitive terrestrial species

Common Name	Scientific Name	Primary Habitat
Little Brown bat	*Myotis lucifugus*	Mature Mixed Hardwood/Conifer
Northern flying squirrel	*Glaucomys sabrinus*	Mature Mixed Hardwood/Conifer
Tri-colored bat	*Perimyotis subflavus*	Mature Mixed Hardwood/Conifer/Edges
Northern goshawk	*Accipter gentilis*	Mature Mixed Hardwood/Conifer
Swainson's thrush	*Catharus ustulatus*	Mature Mixed Hardwood/Conifer
Timber rattlesnake	*Crotalus horridus*	Mature Mixed Hardwood/Conifer
Wood turtle	*Glyptemys insculpta*	Forested Riparian and Wetlands
Eastern box turtle	*Terrapene carolina carolina*	Mature Mixed Hardwood
Four-toed salamander	*Hemidactylium scutatum*	Forested Riparian and Wetlands
Eyed brown	*Lethe eurydice*	Forested, open wetland / sedge meadows (Hydric)
Monarch butterfly	Danaus plexippus	Open areas, opening inclusions, roadside edges and waste areas that contain host and nectaring plants (for example, milkweed)
Little Brown bat	*Myotis lucifugus*	Mature Mixed Hardwood/Conifer

For all treatment methods, project design features will be used to mitigate impacts. Invasive plant and interfering vegetation treatments are highly targeted treatments on the area of the infestation. Infestations are generally small, scattered patches of plants within the larger project area unit. Due to the relatively small and scattered nature of areas of invasive plants, effects from most treatments are not expected to extend past the immediate treatment site for more than a few feet, if any. Very little habitat will be affected.

The use of herbicides at a maximum application rate would be limited. If any maximum rates were to be used in a given year, less than 50 acres in any one contiguous area would be anticipated. These rates may be needed in areas where infestations of non-native invasive plants have been long established and the seed bank is great, where the number of treatment cycles (per season or year) would need to be minimal, or where multiple entries or a combination of mowing, cutting, and masticating of vegetation first is not feasible.

With no action, habitat availability and quality would remain the same under current management. However, over time, there could be a reduction in quality and quantity of habitat available if existing or new invasive species, or interfering vegetation are able to persist and spread without more intensive and adaptive management treatment options like those available under the proposed action. Some invasive plant species may not be controlled. Therefore, some of these species would continue to increase, with potential negative consequences to native plant communities and dependent wildlife. The use of herbicides or other treatments has the potential to maintain or promote habitat quality for prey species by reducing the risk that non-native plant species invade disturbed areas and limit the regeneration of native vegetation. Examples of the negative impacts of invasive species include Japanese knotweed and glossy buckthorn, both of which are very common on the Allegheny National Forest. Japanese knotweed continues to be a problem along major rivers, roads and openings and threatens to reduce the diversity of native vegetation

in riparian habitat on the Allegheny National Forest. The fruit of glossy buckthorn contains a natural laxative which prevents the animals that feed on the fruit from absorbing beneficial sugars.

Mammals

Northern Flying Squirrel, Little Brown Bat, and Tri-colored Bat

Primary habitat components for the northern flying squirrel include a mature mixed coniferous and deciduous forest with a closed canopy and a permanent water source. Eastern hemlock is usually a chief habitat component. The most recent documentation of northern flying squirrels within the Allegheny National Forest proclamation boundary was in 2018.

The little brown bat inhabits mature mixed deciduous and coniferous forests. The little brown bat was once considered common because of its wide distribution, conspicuous maternity colonies, and relatively stable populations. This species hibernates in caves and emerging evidence demonstrates that this bat is in sharp decline due to the rapidly spreading white-nose syndrome that has resulted in several extirpations. If unchecked, white-nose syndrome is ultimately expected to cause regional and range-wide extinction of the little brown myotis in a very short ecological time frame (Kunz et al. 2010).

Primary habitat components for the little brown bat include a mature mixed coniferous/deciduous forest with a closed canopy and a permanent water source. Eastern hemlock is usually a chief habitat component. The most recent documentation of northern flying squirrels within the Allegheny National Forest proclamation boundary was in 2018.

Discussion on the tri-colored bat is discussed above in “Federally Listed and Proposed Species” and is herein incorporated by reference.

Direct and Indirect Effects

Direct effects to consider include exposure to chemicals, mechanical and manual equipment, and the potential disturbance associated with the implementation of the treatments. Direct exposure to chemicals and equipment is not expected because the actions will occur during the day when northern flying squirrel, little brown and tri-colored bat are not active, within the protection of a roost feature or den, and above understory vegetation where treatments are occurring. Disturbance associated with the noise and human activity resulting from treatment implementation may cause a short-term disruption to individuals’ roosting behavior.

Indirect effects to habitat could occur but are expected to be minimal to none. Drift from broadcast (ground and aerial) applications of herbicides may contact non-target vegetation that could result in injury or mortality to potential roost or nest trees. Treatments would occur in small areas spread across the forest and therefore if impacts were to occur, they would be limited in scale and widely distributed. Design features to minimize drift and impacts to non-target vegetation will also provide protections to potential roost and nest trees. Therefore, potential impacts to habitat are not expected to result in a meaningful impact to northern flying squirrel and little brown bat.

Project effects on the tri-colored bat are discussed above in “Federally Listed and Proposed Species” and are herein incorporated by reference.

Design features will include surveys prior to treatment and protections for sensitive species as needed.

Determination

Northern flying squirrel, little brown bat, and tri-colored bat may be disturbed by the noise and activity associated with project actions. Mortality to potential roost and den trees could occur as a result of drift but is expected to be incidental and widespread and therefore not expected to result in a meaningful impact on habitat. Additionally, design features would minimize the potential for disturbance at known sites and minimize impacts to non-target trees, resulting in minimal impacts to these species. Therefore, the determination under the proposed action for northern flying squirrel, little brown bat, and tri-colored bat is may adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Birds

Northern Goshawk and Swainson's Thrush

Northern goshawks utilize a variety of habitats to meet life history needs, but mid to late structural forests are considered the primary nesting habitat. There are known nest sites on the Allegheny National Forest.

Although Swainson's thrush is on the regional forester sensitive species list, they are common and apparently increasing on the Allegheny National Forest in appropriate habitat: dense hemlock-lined ravines or swampy bottoms with dense hemlock (USDA Forest Service 2021a). Recent surveys looking for this thrush across the Allegheny National Forest in 2015 indicated that it was present on 79 percent of 53 sampling points (Dowlan 2015, unpublished).

Direct and Indirect Effects

The direct exposure of chemicals to northern goshawk and Swainson's thrush is not likely because they are both very mobile and there are no hazard quotient values for exposure from direct spray (from the proposed herbicides) that exceed the level of concern.

At a typical application rate of Triclopyr, the upper bound hazard quotient values exceed the level of concern for small birds consuming fruit. Although the diet of a Swainson's thrush is primarily from insects, it also includes berries, which presents the potential for a negative impact. Design features would limit the window of time in which consumption could occur and treatments would be small in size and widely distributed across the forest, therefore effects would be anticipated to be minimal. Disturbance resulting from the noise and human activity during chemical, mechanical, and manual treatments can result in disrupting nesting, foraging, and roosting behaviors. Design features to treat invasive vegetation outside of the breeding season and to survey treatment areas for sensitive species and provide conservation measures will provide protections to both northern goshawks and Swainson's thrush by minimizing impacts to individuals, disturbance during the nesting season, and the potential exposure of Swainson's thrush to contaminated berries.

Indirect effects to non-target vegetation components within the habitat (that is, trees and shrubs) can occur but are expected to be minimal to none. Drift from broadcast (ground and aerial) applications of herbicides may contact non-target vegetation that could result in injury or mortality to potential non-target vegetation, but design features will minimize drift and impacts to non-target species and treatments would occur in small areas widely distributed across the forest. Therefore, impacts to northern goshawk and Swainson's thrush habitat are expected to be negligible.

Determination

The determination under the proposed action for northern goshawk is no impact because direct impacts are not expected to occur and the potential for damage to non-target vegetation is so minimal the impacts to habitat would be negligible.

The determination under the proposed action for Swainson's thrush is may adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing because of the potential for adverse effects to occur if consumption of berries contaminated with triclopyr occurs, incidental injury or mortality to trees and shrubs, and because noise and human activity may result in disturbance to individuals. However, design features would 1) minimize the effects of potential impacts resulting from disturbance to individuals and during the breeding season, 2) minimize to eliminate mortality to non-target vegetation in the habitat, and 3) limit the availability of potentially contaminated berries to a period outside of the breeding season. Therefore, overall impacts to Swainson's thrush are expected to be minimal.

Reptiles and Amphibians

Primary Habitat

Timber Rattlesnake

This snake favors second-growth woodlands, where an abundance of rodents may be found, mountainous or hilly deciduous or mixed deciduous-coniferous forests often with rocky outcroppings, steep ledges, and rockslides that might provide opportunities for basking, gestation and den sites. Activity is primarily diurnal in spring and fall and they are more crepuscular/nocturnal in the summer. When winter sets in, fissures in rocky places provide passage to deep dens for hibernation. Rattlesnake dens are known to occur on the Allegheny National Forest.

Eastern Box Turtle

Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. They have been described as one of the most terrestrial turtles, compared to other turtles in Pennsylvania, but it uses a combination of both terrestrial and riparian habitat. In some areas they move seasonally from fields in spring to forest in summer. They commonly enter pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. Egg laying sites often are sandy or loamy soils in open areas; females may move from bottomlands to warmer and drier sites to nest (NatureServe 2022). Eastern box turtles are active during daylight hours in spring and fall, but in hot summer most activity is in the morning and after rains. Box turtles are generally inactive during cold winter weather.

Wood Turtle and Four-Toed Salamander

The wood turtle and four-toed salamander both depend on, and are good indicators of, riparian habitat, integrity, and water quality. Both species use boggy stream-sides and beaver-influenced impoundments. Although they may have slightly different requirements for various parts of their life cycle, they utilize the same forested riparian and wetland environments.

Semi-open savannah/orchard habitat associated with riparian areas contain the highest probability for micro-habitat inclusions suitable to wood turtle nesting habitat. Wood turtles use riparian areas through much of its life, primarily for nesting and denning, they will also use non-aquatic habitats during the year to meet other resource needs. Wood turtle sightings have been documented on the forest as a result of surveys. Wooded riparian flood plains are abundant on the Allegheny National Forest, however, riparian flood plains that possess enough openings in the canopy to support a thick herbaceous understory may be limiting.

Like the wood turtle, the four-toed salamander is associated with riparian corridors and a variety of wetlands but will utilize moist terrestrial forest environments often associated with vernal pools. The movements of plethodontids (lungless salamanders) are poorly documented, but home ranges likely tend

to be very small, on the order of a few meters to a few dozen meters in length or diameter. Yet, on occasion, dispersing individual's likely travel at least several hundred meters (NatureServe 2022) therefore, individuals will inhabit upland as well as riparian and aquatic environments throughout the time of year in which they are active.

Direct and Indirect Effects

Terrestrial Environments

The timber rattlesnake, eastern box turtle, wood turtle, and four-toed salamander are all vulnerable to exposure to chemicals used in broadcast (ground and aerial) treatments because they are slow moving and less likely to escape the activity. However, there are no hazard quotient values for exposure from direct spray (from the proposed herbicides) that exceed the level of concern. Their slow movements can also make them vulnerable to injury or mortality from mechanical treatments and motorized equipment used to broadcast herbicides, but less likely from manual treatments. Disturbance resulting from the noise and human activity during chemical, mechanical, and manual treatments can result in disrupting nesting, foraging or hunting, and basking behaviors. Design features would minimize impacts to known sites and provide conservation measures if these species were observed during pre-treatment surveys, therefore minimizing direct impacts to individuals.

Indirect effects through the consumption of contaminated vegetation can be a concern for the wood turtle and eastern box turtle. The eastern box turtle would likely be more susceptible to exposure because it is more terrestrial than the wood turtle that utilizes riparian areas, which would also receive greater protections with design features. At a typical rate, indaziflam and triclopyr hazard quotient values exceed a level of concern for small birds (the surrogate for reptiles) with the chronic, and sometimes acute, consumption of contaminated vegetation. However, the proposed application of idaziflam would occur on bare soil and therefore would not be available for consumption on vegetation. The potential for adverse effects following the consumption of contaminated vegetation cannot be ruled out with the use of triclopyr. Imazapic can also have similar concerns, however the potential for occurrence would be limited to upper bound exposures at maximum application rates; and maximum application rates are less likely to occur. Although the potential for adverse effects can occur, treatments would be small and widely distributed, triclopyr would not be applied in riparian areas, and design features will provide protections to known habitats and occurrences, therefore the potential for individuals to be impacted is expected to be minimal.

Indirect effects to non-target vegetation components within the habitat can occur but are expected to be negligible. Drift from broadcast (ground and aerial) applications of herbicides may contact non-target vegetation that could result in injury or mortality to potential non-target vegetation, but design features will minimize drift and impacts to non-target species and treatments would occur in small areas widely distributed across the forest. Therefore, impacts to timber rattlesnake, Eastern box turtle, wood turtle and four-toed salamander habitat are expected to be negligible. Additionally, herbicide application would facilitate the establishment of early structural forest dominated by native vegetation that may support a more diverse and abundant small mammal population and improve foraging opportunities for timber rattlesnakes.

Aquatic Environments

The wood turtle, four-toed salamander, and often times the eastern-box turtle, typically occupy stream and riparian areas such as vernal ponds and seeps. The forest plan standards and guidelines (USDA Forest Service 2007a, pages 74–79) provide protection for suitable habitat including wetlands, riparian zones, vernal pools, springs, seeps and streams. This direction identifies key habitat features preferred by these

species, provides preferential treatment for these areas, and establishes buffer zones that ultimately ensure there is no adverse effect on potential habitat.

The potential for effects to water quality and aquatic organisms is largely associated with herbicide application on and around streams, lakes or wetlands. Herbicides may enter water in five ways: direct application, drift, mobilization in ephemeral stream channels, overland flow, and leaching through the soil. The proposed action for treatment of invasive species near water is not expected to result in measurable negative effects to aquatic ecosystems. All herbicide treatments would be done in accordance with product label requirements, Forest Service policies, regulations, and forest plan standards and guidelines and project specific design features for the protection of the eastern box turtle, wood turtle, and four-toed salamander would be adhered to. Project specific design features were carefully developed and will be implemented as part of the proposed action to prevent herbicide from entering water and protect aquatic environments.

Sedimentation is a habitat feature that can impact amphibians. Sedimentation resulting from proposed actions is not expected to have a measurable impact on aquatic species. Design criteria would limit use of heavy equipment and vehicles adjacent to waterbodies. Therefore, short-term sediment inputs would not be detectable given the buffer distance from riparian areas and the short duration of the application. It is possible to have short-term turbidity associated with manually pulling weeds that may be adjacent to a stream, and along road cuts and fills within riparian areas but soil disturbance would be minor and localized at an undetectable level in aquatic habitat or directly impact feeding behavior.

While proposed treatments may create a short-term impact to vegetation cover in riparian areas after invasive plants are removed, re-growth is expected to occur quickly and in the long term it would reduce the threat of loss of habitat and recovery of native habitats. The introduction and spread of invasive species, specifically Japanese knotweed, continues to be a problem along major rivers, roads and openings and threatens to reduce the diversity of riparian habitat. The full extent of Japanese knotweed occurring along streams is unknown and could potentially threaten habitat for these species.

Determination

Because the timber rattlesnake, eastern box turtle, wood turtle, and four-toed salamander are slow moving species, there is potential for individuals and nest sites to be exposed to project activities. Injury or mortality could occur to individuals and nests exposed to mechanical treatments or motorized equipment used to broadcast herbicides. Adverse effects to wood turtle and eastern box turtle could occur with the consumption of vegetation contaminated with triclopyr or imazapic. However, effects to timber rattlesnake, eastern box turtle, wood turtle, and four-toed salamander from proposed activities are expected to be minimal because treatments would be small and widely distributed, triclopyr would not be applied in riparian areas, and design features include conducting pre-treatment surveys, and provide protections to non-target vegetation, aquatic and riparian habitats, and sites with known occurrences. Therefore, the determination under the proposed action for timber rattlesnake, eastern box turtle, wood turtle, and four-toed salamander is may adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Invertebrates

Invertebrates discussed in this report are primarily terrestrial, although, like the eyed brown and West Virginia white, may also be associated with riparian areas. Invertebrates considered to be primarily aquatic are discussed in the aquatics report and included in the project record.

Primary Habitat

Monarch Butterfly

Monarch butterflies require host plants and flowering plants along their migration routes and in their summer breeding areas. Host plants for monarch caterpillars, are almost exclusively milkweeds (*Asclepias* spp.), and flowering plants provide nectar for adult butterflies (Kirschbaum et al. 2017). Milkweeds provide both nutrition and toxins that protect the caterpillars and adults from predation. Having both host and nectar plants available throughout the times when monarchs are present is critical. Nectar sources are important throughout the breeding season and particularly critical during migration. During the fall migration, monarchs need carbohydrates to fuel their flight and to build up fat reserves for the winter, during which time they feed very little or not at all. A variety of flowering plants are used during the fall migration. During migration at stopovers, they form communal roosts, which are usually in trees. Davis et al. (2012) concluded that monarchs are highly adaptable in terms of roost selection.

Recent analyses suggest the Allegheny National Forest is one six National Forests within the heart of the northern breeding range for monarchs and therefore may have higher densities of breeding monarchs (Kirschbaum et al. 2017). The Allegheny National Forest provides milkweed and a variety of flowering plants, therefore, where suitable habitat is present, it is considered occupied.

Eyed brown and West Virginia White

Eyed Brown is a non-migratory butterfly that occupies habitat in open sedge meadows or open wetlands including the more open parts of shrubby wetlands (NatureServe 2022). Adults typically occur in June or July in most of its' range and have one brood. Larvae overwinter in the third or fourth stage of development. The larvae feed on sedges and less often on grasses. Various sedges (*Carex stricta, C. lupulina, C. bromoides, and C. trichocarpa)* in the sedge family (*Cyperaceae*) serve as the host species for the caterpillar (Opler et al. 2010). Adults feed on sap, bird droppings, and occasionally flower nectar.

On the Allegheny National Forest, the Eyed Brown appears to be very low in abundance based on the recent Natural Heritage Inventory surveys conducted by the Western Pennsylvania Conservancy (2006–2009) and others (Rawlins et al. 1997, Rawlins et al. 1998, Rawlins et al. 1999). The most recent documentation of this butterfly was in the Buzzard Swamp area of Forest County (Western Pennsylvania Conservancy 2007).

The West Virginia White butterfly inhabits mesic hardwood forest, hardwood-northern conifer-mixed forests on rich soils, and hardwood swamps. Colonies do not occur in any kind of open habitat and adults do not readily leave the forests. They do not like open areas. The host plant West Virginia White butterfly uses are toothwort, *Cardamine diphylla*, perhaps *C. maxima*. Eggs are laid singly on the undersides of leaves and hatch in May and complete development by the beginning of June when they pupate and enter diapause until the following spring. The larvae feed on small forest plants in the mustard family (*Brassicaceae*) but toothworts are the most common. Adults feed on nectar from a variety of herbaceous spring flowers including garlic mustard and the larval foodplants. Females of the West Virginia White will oviposit on garlic mustard, which is lethal to the hatchlings. The highly invasive garlic mustard is believed to be the most serious threat to the West Virginia white butterfly (Nature Serve 2022).

There has been a single documentation of the West Virginia White within the Allegheny National Forest (Warren County) in recent years. Only one recorded sighting was made in the Buckaloons Recreation Area in 2007 or 2008 (USDA Forest Service 2021a).

Direct and Indirect Effects

Direct impacts to monarch butterfly, eyed brown, West Virginia white from exposure to chemical treatments are not expected because nearly all the hazard quotient values for proposed herbicides were

below the level of concern. One upper bound hazard quotient modestly exceeded the level of concern by a factor of 0.2 at the maximum application rate, which is less likely to be used. Therefore, adverse effects to individuals would be very minimal and unlikely to occur. Drift from broadcast applications could cause injury or mortality to host plants, however these impacts are expected to be minimal to none as result of design features to minimize exposure to host plants and therefore protecting the plant itself and any larvae and adults utilizing them. Where applicable, the timing of herbicide treatments would also be adjusted minimize impacts to adults and flowers that provide nectar for them. Individual eyed brown and their habitat would also be protected by design features to minimize impacts to riparian and wetland areas.

Mechanical treatments and mechanized equipment used for broadcast spraying could cause injury or mortality to adults but is not expected to impact host plants. Human presence would occur with all treatment types and could potentially alter the individual movement patterns of Monarch butterfly, eyed brown, and West Virginia white. However, proposed treatments would occur in localized areas, away from wetlands and unique vegetation such as the toothwort, and design features are included to minimize damage to all host plants, therefore reducing the potential impact to individuals.

It is uncertain if or how much these butterflies use invasive species, but by removing them there is an opportunity for native, nectar producing plants to become established. The continuous availability of floral sources for nectar and pollen collection throughout the season is vital for these species, particularly monarch. The use of the invasive garlic mustard plant by West Virginia white is well known and is believed to be the most serious threat to the West Virginia white butterfly (Nature Serve 2022), therefore treatments for this species would be beneficial.

Determination

Proposed actions would be widely distributed occurring in small, isolated and localized areas. Additionally, design features would provide protections to host plants and the larvae utilizing them and adjust the timing of herbicide treatments to minimize exposure to pollinators after flowering occurs. Consequently, the impacts on Monarch butterfly, eyed brown, and West Virginia white would be expected to be limited to a few individuals. Therefore, the determination under the proposed action for Monarch butterfly, eyed brown, and West Virginia white is may adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Cumulative Effects for Regional Forester Sensitive Species

Present and future projects on the Allegheny National Forest would continue to be guided by the direction and standards and guidelines in the forest plan to maintain habitat (at varying structural stages) and minimize impacts to sensitive species and threatened and endangered species. Therefore, it is assumed that adverse effects to regional forester sensitive species and federally listed species would be avoided.

Invasive plant and interfering vegetation treatments would be relatively small, well-defined spatial areas. Treatments would be confined to individual stems or areas of invasive plants and interfering vegetation while leaving interspersed non-target vegetation (habitat) intact. Habitat would not be removed or degraded, and incidental damage to non-target vegetation is not expected to have a meaningful impact. Treatments would typically occur once during a season, generally from late spring to mid-fall. Treatment implementation time will vary from a few minutes, hours or days depending on method and size of treatment area. Given the spatial and temporal scale of invasive plant treatments, potential for cumulative effects is low. Most exposure scenarios would not be expected to result in adverse effects. In the few scenarios when adverse effects could occur (for example, turtles potentially consuming vegetation contaminated with Triclopyr) design features would reduce the potential impact. Design features would also reduce the potential for all project activities to disturb sensitive species. Therefore, negative effects of project activities would be very low so there would be very little additive effect of the proposed action on

present and foreseeable actions. No significant cumulative effects to regional forester sensitive species. or federally listed wildlife are expected from the proposed action.

Recreation

Direct and Indirect Effects

The removal of invasive and interfering vegetation will have both adverse and beneficial effects. In the short-term, recreation sites and trails may be closed during treatment, and activities with a scenic component may be negatively affected by the appearance of openings or vegetation that is masticated, cut, or chemically treated. These effects are temporary and outweighed by mid to long-term improvements. Specifically:

- Access to fishing, boating and water-based recreation opportunities may increase, especially in the Allegheny and Clarion rivers as invasive plant infestations on river islands and along riverbanks are treated.
- Removal of large masses of invasive vegetation will improve views of specific landscape features from scenic trails and viewpoints.
- A naturalized landscape appearance may be maintained across more of the forest, which will help maintain or preserve the “Big Woods” character that is essential to many of the recreation experiences on the forest.

Aerial spraying would be limited to a small number of acres treated by drone to test the viability of this method. A small number of openings may increase in size over time, and a small number of additional openings may be created. Because some treatment methods involve re-entry over multiple seasons, it may take longer for areas to revegetate. This number of acres over the entire forest and 20-year project span would have nominal recreational impacts. Also, new or larger openings of this type may be used for hunting, wildlife and native plant viewing and dispersed camping, increasing recreational options in these areas.

Indirect impacts may include maintaining or improving unfettered access to various recreational resources; increased blockage of recreational sites by treatment equipment; increases in the smells, sights and sounds of equipment and other treatment activities, including methods of occasional small scale aerial application; and increasing the size of existing openings that are expanded to include treatment areas. Some recreational resources may be inaccessible during treatment. This could result in brief noticeable increase in the number social encounters or visitor impacts in other areas of the forest.

Cumulative Effects

Vegetation management and private mineral estate development are the main activities that could overlap with impacts to recreation.

Vegetation management activities on the Allegheny National Forest are carefully developed and implemented to achieve desired conditions. Some overlap between vegetation management and the invasive and interfering vegetation treatments proposed here is both anticipated and likely to occur.

Because timber harvest activities affect large acreages, have long timespans and occur across much of the forest, they may have a temporary moderate cumulative impact on the recreation resource in the short-term. Historically, these projects are undertaken, at least in part, to improve vegetative conditions and control invasives and interfering vegetation. Additionally, the openings and landings created by timber harvest activities are used by hunters (game are often attracted to these open areas), dispersed campers

and, and hikers. They may be expected to improve the long-term forage and habitat conditions for various wildlife species, supporting a robust hunting and wildlife viewing element of forest recreation.

There are an estimated 25,000 private oil and gas wells on the Allegheny National Forest (USDA Forest Service 2021b, page 228), and during forest plan revision we estimated that an additional 306 to 1,040 acres would be cleared annually as additional wells, well pads, roads, and accessory infrastructure are installed (USDA Forest Service 2007b, appendix F, page F-9). As a result, a considerable portion of the landscape is influenced by oil and gas development, and it is highly likely that some of the invasive and interfering vegetation treatments proposed here will overlap with past, present, or future private mineral estate development.

As discussed previously, invasive and interfering vegetation treatments may result in short-term effects to recreation with beneficial effects in the longer-term. These effects, however, are minor when compared to the effect of other activities and are unlikely to contribute to a cumulatively significant impact on recreation resources.

Scenery

Direct and Indirect Effects

In some areas, removing invasive vegetation may improve the visibility, accessibility, and natural appearance of scenic landscapes. The form, line, and color elements of scenic views may better achieve the scenic objectives, and opportunities to engage in recreation activities (for example, hiking, boating, and driving for pleasure) may increase as areas maintain or move towards the “Big Woods” character envisioned by the forest plan.

In other areas, a short-term reduction in scenic integrity or accessibility may occur. Dead or discolored plants may be apparent, masticated vegetation may be left on site, equipment use may be visible or evident, and recreation sites may be temporarily closed during active operations. However, adverse effects to scenery, if any occur, will be short-term and very minor because:

- Treatments included in the proposed action are limited to understory treatments that are unlikely to be visible beyond the immediate foreground (approximately 300 feet). No canopy gaps will be created and, except for very small-scale application of herbicide directly to soil, treatment will not result in noticeably bare ground.
- Discoloration and dead standing woody vegetation will only be noticeable for short periods of time (for most treatments, recovery occurs within one growing season or less). When this rapid recovery is considered in context of small treatment unit size, targeted application, and seasonal timing, among other things, it is clear that the majority of treated areas will maintain the desired scenic integrity levels during treatment.
- Although not anticipated, if scenic integrity is below the desired objective in any given area, forest plan direction provides a period of one to three years to return the scenic resource to scenic integrity levels designated in the forest plan. As green-up occurs, dead standing woody vegetation becomes less noticeable, and native plants rapidly reoccupy treated areas and diversity improves.

- During site-specific or annual implementation planning, staff will consider scenic integrity when selecting treatment areas. Special consideration will be given to any treatments in areas that have high or very high scenic integrity objectives to ensure consistency with forest plan direction. Similar consideration will be given to treatments within 300 feet of concern level 1 and 2 travel routes and viewing platforms. Treatments may occur if implementation will be consistent with the forest plan; if not, the areas will be excluded from the treatment program unless modified or proposed as part of a project-specific forest plan amendment. Due to this additional focus, and the fact that comparatively few treatments are anticipated in these areas, no significant effects are anticipated.

Interfering vegetation treatments are part of the silvicultural prescription for a forest stand, and the herbicide application proposed here would mostly substitute for previously approved glyphosate and sulfometuron methyl treatments. As a result, interfering vegetation treatments proposed here are not expected to affect scenery, with two exceptions:

- There may be a beneficial effect to scenery if imazapyr or triclopyr are applied in a way that is more selective or more effective in comparison to previously approved methods and active ingredients. This would help to reduce effects to scenic integrity by limiting non-target effects and improving the regeneration of desirable species.
- Although difficult to predict, implementation may potentially occur on a small number of acres not covered by previous site-specific analysis (for example, in stands damaged by future storm events where we are working to regenerate stands to desirable native and naturalized species). If this occurs, beneficial effects will include helping to restore the “Big Woods” character by regenerating damaged stands to a desirable native species composition. Adverse effects, if any occur, would be similar to those discussed previously for invasive plant treatments.

Cumulative Effects

Vegetation management and private mineral estate development are the main activities that could overlap with impacts to scenic integrity.

Vegetation management activities on the Allegheny National Forest are carefully developed and implemented to achieve desired conditions. Some overlap between vegetation management and the invasive and interfering vegetation treatments proposed here is both anticipated and likely to occur. Where activities do overlap, vegetation management would be the primary driver behind achievement of scenic integrity objectives. The treatments proposed here maybe contribute to a short-term reduction in scenic integrity, but scenery objectives would be quickly met and a positive long-term impact on scenic integrity would result.

There are an estimated 25,000 private oil and gas wells on the Allegheny National Forest, (USDA Forest Service 2021b, page 228), and during forest plan revision we estimated that an additional 306 to 1,040 acres would be cleared annually as additional wells, well pads, roads, and accessory infrastructure are installed (USDA Forest Service 2007a, page F-9). As a result, a considerable portion of the landscape is influenced by oil and gas development, and it is highly likely that some of the invasive and interfering vegetation treatments proposed here will overlap with past, present, or future private mineral estate development. . As discussed previously, invasive and interfering vegetation treatments may result in a short-term reduction in scenic integrity and beneficial effects in the longer-term. These effects, however, are minor when compared to the effect of other activities on scenic resources and are unlikely to contribute to a cumulatively significant impact on scenic integrity.

Public Involvement

The need for action, proposed action, and opportunities to participate in the planning process for this project were summarized in a scoping document. The scoping document was published in July 2022, and a legal notice to formally initiate the plan amendment process, and request comments on the proposed action, was published in the *Warren Times Observer* on July 28, 2022. Interested parties were invited by regular mail, email, and news release to comment and participate in project development.

In addition, we individually contacted Native American tribes to inform them of the project, request information to consider, and offer an opportunity to formally consult.

A summary of who we contacted is available in appendix D, and a summary of how comments were considered is available in appendix E.

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Appendix A – Invasive Plant Species of Concern

Current as of April 27, 2022. This list replaces any previous list of invasive plant species of concern for the Allegheny National Forest. This list does not imply any degree of inventory, control, or monitoring of a particular species, nor does it preclude other species from being inventoried, controlled, or monitored. This list will be updated as new information becomes available.

Please note that aquatic species are included below in table 18 and table 19 because the plants have been documented on the Allegheny National Forest or are on our watch list. Although some invasive species that are rooted in water may be treated under the proposed action, we do not intend to treat aquatic species in open water.

Table 18. Documented occurrences of invasive plants within the proclamation boundary of the Allegheny National Forest

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Aquatic	MYSP2	*Myriophyllum*	*spicatum*	European Water Milfoil	Waterbodies	Class B	2	2,3
Aquatic	POCR3	*Potamogeton*	*crispus*	Curly Pond weed	Warren County natural heritage report	Not listed	3	2,3

18. See http://plants.usda.gov/index.html.

19. **Class A noxious weeds**: Preventing new infestations and eradicating existing infestations of noxious weeds in this class is high priority. **Class B noxious weeds**: The Pennsylvania Department of Agriculture may require control of Class B weeds to contain an injurious infestation or may provide education or technical consultation. Class B noxious weeds are widely established in the Commonwealth and cannot be feasibly eradicated. **Class C noxious weeds**: Preventing introduction and eradicating infestations of noxious weeds in this class is the highest priority. Class C noxious weeds are any federal noxious weeds listed in 7 CFR 360.200 (relating to designation of noxious weeds) not established (not known to exist) in this Commonwealth, which are not referenced in Classes A or B. Class C noxious weeds are not known to exist in the Commonwealth but pose a potential threat if introduced and include weeds listed as federal noxious weeds.

20. **Category 1**: An early detection and rapid response species that should be treated anywhere located. **Category 2**: The species is on the 2022 Pennsylvania Noxious Weed Control List and should be treated anywhere regardless of the size of infestation. **Category 3**: The infestation presents a high ecological threat and should be treated anywhere regardless of infestation size. **Category 4**: Treatment is limited because the infestation presents a medium ecological threat. **Category 5**: Treatment is limited because the infestation presents a low ecological threat.

21. **Category 1**: Treatment of new infestations or sites; limited number of sites or acres infested. **Category 2**: Conservation of sites occupied by or providing habitat for endangered, threatened, candidate and sensitive plants and animals that are susceptible to harm from invasive species. **Category 3**: Conservation of special areas. **Category 4**: Treatment of sites with the greatest potential for spreading such as, but not limited to, trailheads, boat ramps, parking lots, recreation areas, and administrative sites. **Category 5**: Containment and control of established infestation.

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Aquatic	TRNA	*Trapa*	*natans*	Water chestnut	Mead Island, Allegheny River	Class A	2	1–5
Grass – Annual	MIVI	*Microstegium*	*vimineum*	Japanese stiltgrass; Nepalese browntop	Occurs in a utility right-of-way and road corridors	Class B	2	1–5
Grass – Perennial	MISI	*Miscanthus*	*sinensis*	Chinese silvergrass	Fourmile Project Area	Not listed	3	1–5
Grass – Perennial	PHAR3	*Phalaris*	*arundinacea*	Reed canarygrass	Occurs along most stream valleys and some road corridors or openings	Not listed	4	2,3
Grass – Perennial	PHAU7	*Phragmites*	*australis*	Common reed	Scattered occurrences along roadsides and openings	Not listed	3	1
Herb – Perennial	AEPO	*Aegopodium*	*podagraria*	Goutweed; Bishop's goutweed	Roadsides and openings	Not listed	3	1–5
Herb – Perennial	AJRE	*Ajuga*	*reptans*	Bugleweed	Wet areas, disturbed areas	Not listed	4	1,3,4
Herb – Biennial	ALPE4	*Alliaria*	*petiolata*	Garlic mustard	Occurs along most stream valleys and road corridors	Class B	2	1–5
Herb – Annual, Biennial	ANSY	*Anthriscus*	*sylvestris*	Wild chervil	Occurs along stream valleys and road corridors	Class A	3	1–5
Herb – Biennial	ARMI2	*Arctium*	*minus*	Lesser burdock	Scattered occurrences along roadsides and openings	Not listed	5	2,3
Herb – Perennial	ARVU	*Artemisia*	*vulgaris*	common mugwort; common wormwood	Scattered occurrences along roadsides and openings	Class B	2	1–5

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Herb – Perennial	CEJA	*Centaurea*	*jacea*	Brownray knapweed	Occurs along roadsides often associated with limestone surfacing	Not listed	3	1–5
Herb – Perennial	CENI2	*Centaurea*	*nigra*	Black knapweed	Morrison Project Area	Not listed	3	1–5
Herb – Perennial	CESTM	*Centaurea*	*stoebe ssp. micranthos*	Spotted knapweed (formerly C. maculosa, C. beibersteinii)	Occurs along roadsides often associated with limestone surfacing	Not listed	3	1–5
Herb – Biennial	CHMA2	*Chelidonium*	*majus*	Celandine	Infestation adjacent to former Irvine Estate, Conewango Ave., Warren, Pennsylvania	Not listed	4	2,3
Herb – Perennial	CIAR4	*Cirsium*	*arvense*	Canada thistle	Occurs along roadsides and openings	Class B	2	1–5
Herb – Biennial	CIVU	*Cirsium*	*vulgare*	Bull thistle	Occurs along roadsides and openings	Class B	2	1–5
Herb – Biennial	COMA2	*Conium*	*maculatum*	Poison hemlock	Occurs along roadsides and openings	Class B	2	2,3
Herb – Biennial	DACA6	*Daucus*	*carota*	Queen-Anne's lace	Occurs along roadsides and openings	Not listed	5	2,3
Herb – Biennial	DIFU2	*Dipsacus*	*fullonum*	Fuller's/common teasel (formerly D. sylvestris (DISY))	Roadsides and openings	Not listed	5	2,3
Herb – Perennial	EUCY2	*Euphorbia*	*cyparissias*	Cypress spurge	Occurs in area formerly known as Windy City – west of James City in opening	Not listed	1	1

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Herb – Perennial	FAJA2	*Fallopia*	*japonica var. japonica*	Japanese knotweed (syn. Reynoutria japonica, Polygonum cuspidatum)	Occurs along most major stream valleys and some road corridors or openings	Class B	2	1–5
Herb – Perennial	GAOF	*Galega*	*officinalis*	Goatsrue; professor-weed	Occurs along NFS* road 152 near Russell City, Pennsylvania and NFS road 122 Markham Run	Class A	2	1–5
Herb – Perennial	HEFU	*Hemerocallis*	*fulva*	Orange daylily	Roadsides, invading forested areas and wetlands	Not listed	3	1–5
Herb – Perennial	HEMA17	*Heracleum*	*mantegazzianum*	Giant hogweed	Once occurred at Buckaloons Recreation Area – treated by State and no documented occurrence since 2001	Class A	2	1–5
Herb – Biennial, Perennial	HEMA3	*Hesperis*	*matronalis*	Dame's Rocket	Occurs along most streams, rivers, wet ditches	Not listed	4	1–5
Herb – Perennial	HIAU	*Hieracium*	*aurantiacum*	Orange Hawkweed	Occurs along roadsides and openings	Not listed	5	2,3
Herb – Perennial	HICA10	*Hieracium*	*caespitosum*	Meadow hawkweed; yellow hawkweed	Occurs along roadsides and openings	Not listed	5	2,3
Herb – Perennial	IRPS	*Iris*	*pseudacorus*	Paleyellow iris	Occurs along roadsides, streams, wetlands	Not listed	3	1–5
Herb – Perennial	LYNU	*Lysimachia*	*nummularia*	Moneywort; creeping jenny	Wet areas, disturbed areas	Not listed	4	1–5

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Herb – Perennial	LYSA2	*Lythrum*	*salicaria*	Purple loosestrife	Scattered roadside occurrences	Class B	2	1–5
Herb – Annual, Biennial, Perennial	MEOF	*Melilotus*	*officinalis*	Yellow and white sweet clover (now considered one species)	Roadsides and openings	Not listed	3	1–5
Herb – Biennial	PASA2	*Pastinaca*	*sativa*	Wild parsnip	Roadsides and openings, sap causes blistering and skin changes to sunlight similar to giant hogweed	Class B	2	1–5
Herb – Perennial	RESA2	*Reynoutria*	*sachalinensis*	Giant knotweed	Roadsides, streams	Class B	2	1–5
Herb – Perennial	REBO	*Reynoutria*	*x bohemica*	Bohemian knotweed	Roadsides, streams	Class B	2	1–5
Herb – Perennial	SEVA4	*Securigera*	*varia*	Crown Vetch	Occurs along roadsides and openings	Not listed	4	1–5
Herb – Perennial	TAVU	*Tanacetum*	*vulgare*	Common tansy	Scattered roadside occurrences	Not listed	4	1–5
Herb – Perennial	TUFA	*Tussilago*	*farfara*	Coltsfoot	Roadsides, invades adjacent wet areas	Not listed	5	2,3
Herb – Perennial	TYAN	*Typha*	*angustifolia*	Narrow-leaved cattail	Scattered occurrences roadside ditches or wet areas	Not listed	3	1–5
Herb – Perennial	VAOF	*Valeriana*	*Officinalis*	Garden Valerian; Garden heliotrope	Roadsides, especially State Route 46 Smethport area	Not listed	3	1–5
Herb – Biennial	VETH	*Verbascum*	*thapsus*	Common mullein	Roadsides and openings	Not listed	5	3,4

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Shrub	BETH	*Berberis*	*thunbergii*	Japanese barberry	Once planted in wildlife openings	Class B	2	1–5
Shrub	BEVU	*Berberis*	*vulgaris*	Common barberry	Once planted in wildlife openings	Not listed	3	1–5
Shrub	ELUM	*Elaeagnus*	*umbellata*	Autumn olive	Once planted in wildlife openings	Not listed	3	1–5
Shrub	EUAL13	*Euonymus*	*alatus*	Winged euonymus	Administrative sites, NFS road 247	Not listed	3	1–5
Shrub	FRAL4	*Frangula*	*alnus*	Glossy buckthorn	Heavy infestations in southeastern part of the Allegheny National Forest – Bear Creek area	Class B	3	1–5
Shrub	LIOB	*Ligustrum*	*obtusifolium*	Border privet	Scattered occurrences	Not listed	3	1–5
Shrub	LIVU	*Ligustrum*	*vulgare*	Common privet; European privet	Scattered occurrences	Not listed	3	1–5
Shrub	LOMA6	*Lonicera*	*maackii*	Amur honeysuckle	Occurs along roadsides and openings	Not listed	3	1–5
Shrub	LOMO2	*Lonicera*	*morrowii*	Morrow's honeysuckle	Occurs along roadsides and openings	Not listed	3	1–5
Shrub	LOTA	*Lonicera*	*tatarica*	Tartarian honeysuckle	Occurs along roadsides and openings	Not listed	3	1–5
Shrub	LOBE	*Lonicera*	*X bella (morrowii × tatarica)*	Bell's honeysuckle	Occurs along roadsides and openings	Not listed	3	1–5
Shrub	RHCA3	*Rhamnus*	*cathartica*	Common buckthorn	Infestations in southeastern part of the Allegheny National Forest – Bear Creek area	Class B	2	1–5

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Shrub	RHSC3	*Rhodotypos*	*scandens*	Jetbead	Warren county natural heritage report	Not listed	3	1–5
Shrub	ROMU	*Rosa*	*multiflora*	Multiflora rose	Open areas – scattered infestations or some areas of heavy infestation	Class B	2	1–5
Shrub	RUPH	*Rubus*	*phoenicolasius*	Wineberry; wine raspberry	New York (state); southern Pennsylvania; Morrison Project Area	Not listed	1	1
Shrub	SPJA	*Spiraea*	*japonica*	Japanese spiraea	Common landscape planting escaping into surrounding landscapes, Irvine Estate, NFS road 176	Not listed	3	1–5
Shrub	VIOP	*Viburnum*	*opulus*	European cranberry bush; snowball bush	In Warren and McKean counties – Rhoads and Klein 1993	Not listed	4	2,3
Tree	ACPL	*Acer*	*platanoides*	Norway Maple	Invading forested areas – Buckaloons, Anders Run	Not listed	3	1–5
Tree	AIAL	*Alianthus*	*altisima*	Tree of Heaven	Occurs in Crescent Park, female tree near ball field adjacent to Mama Jane's (formerly Perkins) restaurant, Warren; along Conewango Creek by Pizza Hut.	Class B	2	1–5
Tree	AREL8	*Aralia*	*elata*	Japanese angelica tree; Hercules club	Scattered roadsides and openings	Class B	3	1–5

Habit	NRCS* Code[18]	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List[19]	Treatment Category by Species[20]	Treatment Category by Sites[21]
Tree	PYCA80	*Pyrus*	*calleryana*	Callery pear, Bradford Pear	Scattered roadsides and openings State Route 62	Class B	2	1–5
Vine	AKQU	*Akebia*	*quinata*	Five-leaf akebia	Small population adjacent to Irvine Estate	Class A	3	1–5
Vine	CEOR7	*Celastrus*	*orbiculatus*	Oriental bittersweet	Scattered occurrences	Class B	2	1–5
Vine	EUFO5	*Euonymus*	*fortunei*	Winter creeper; Climbing euonymus	Scattered occurrences, often planted and escaped from landscape waste dumping	Not listed	3	1–5
Vine	HEHE	*Hedera*	*helix*	English Ivy	Scattered roadsides and openings	Not listed	3	1–5
Vine	PATE11	*Pachysandra*	*terminalis*	Japanese Pachysandra	Administrative sites, roadsides	Not listed	3	1–5
Vine	PEPE35	*Persicaria*	*perfoliata*	Mile-a-minute	Occurs in counties to the east and south of the Allegheny National Forest (syn. *Polygonum perfoliatum*). Irvine Estate, Warren and Kinzua Valley Trail	Class B	2	1–5
Vine	VIMI2	*Vinca*	*minor*	Common periwinkle; myrtle	Scattered occurrences, however, dominates the site where it occurs	Not listed	3	1–5

* NRCS = Natural Resources Conservation Service, NFS = National Forest System.

Table 19. Early detection and rapid response species (not known to occur within the proclamation boundary of the Allegheny National Forest, but are a priority for treatment if located)

Habit	NRCS* Code	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List	Treatment Category by Species	Treatment Category by Sites
Aquatic – Perennial	EGDE	*Egeria*	*densa*	Brazilian waterweed, leafy elodea	USGS Nonindigenous Aquatic Species – southwest Pennsylvania, Allegheny County; Cleveland Ohio	Class A	1 and 2	1–5
Aquatic – Perennial	HYVE3	*Hydrilla*	*verticillata*	Hydrilla, waterthyme	EDDMapS* documents it in Crawford and Erie counties – closest to Allegheny National Forest	Class A	1 and 2	1–5
Aquatic – Perennial	HYMO6	*Hydrocharis*	*morsus-ranae*	European frog-bit	New York (state)	Class A	1 and 2	1–5
Aquatic – Perennial	LUGRH	*Ludwigia*	*grandiflora ssp. hexapetala*	Water primrose	New York (state)	Class A	1 and 2	1–5
Aquatic – Perennial	MYAQ2	*Myriophyllum*	*aquaticum*	Parrot feather	Pennsylvania – southcentral, northeast and southeast	Class B	1 and 2	1–5
Aquatic – Perennial	NYPE	*Nymphoides*	*peltata*	Yellow floating heart	Southeast Pennsylvania, Cleveland Ohio	Class A	1 and 2	1–5
Aquatic – Perennial	STAL6	*Stratiotes*	*aloides*	Water soldier	No County Data in USDA Plants	Class C	1 and 2	1–5
Grass – Annual	AVST	*Avena*	*sterilis*	Animated oat	No County Data in USDA Plants	Class A	1 and 2	1–5
Grass – Perennial	OPHIU2	*Oplismenus*	*undulatifolius*	Wavyleaf Basketgrass	Documented in West Virginia	Class A	1 and 2	1–5
Grass – Perennial	TRRA2	*Tripidium*	*ravennae ssp. rav ennae*	Ravenna, Pampas grass	New York (state) and Ohio	Class A	1 and 2	1–5
Grass – Perennial	SOBI2	*Sorghum*	*bicolor*	Shattercane	Documented in Pennsylvania south of I-80	Class B	1 and 2	1–5
Grass – Perennial	SOHA	*Sorghum*	*halepense*	Johnson grass	Clarion County	Class B	1 and 2	1–5

Habit	NRCS* Code	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List	Treatment Category by Species	Treatment Category by Sites
Herb – Annual	AMPA	*Amaranthus*	*palmeri*	Palmer ameranth; carelessweed	Documented in southeast Pennsylvania. Species listed as native in USDA Plants Database	Class A	1 and 2	1–5
Herb – Annual	AMTU	*Amaranthus*	*tuberculatus (syn. A. rudis)* considered one species now.	Roughfruit amaranth; common waterhemp, tall waterhemp	Documented in Venango County, Pennsylvania; Cattaraugus County, New York. Species listed as native in USDA Plants Database	Class A	1 and 2	1–5
Herb – Biennial, Perennial	CANU4	*Carduus*	*nutans*	Musk thistle	Potential for introduction in limestone surfacing	Class B	1 and 2	1–5
Herb – Annual, Vine	CUSCU	*Cuscuta spp.*	(not specified)	Dodder	Except for native species, parasitic plant	Class A	1 and 2	1–5
Herb – Annual, Biennial, Perennial	OROBA	*Orobanche spp.*	(not specified)	Broomrape	Except for native species, introduced; Orobanche minor – eastern Pennsylvania documented	Class A	1 and 2	1–5
Herb – Annual	DAST	*Datura*	*stramonium*	Jimsonweed	Documented in Pennsylvania south of I-80	Not listed	1	1–5
Herb – Perennial	EUES	*Euphorbia*	*esula*	Leafy spurge	Occurs in southwest and southeast Pennsylvania	Not listed	1	1–5
Herb – Annual	MYMU	*Mycelis*	*muralis*	Wall-lettuce	New York (state)	Not listed	1	1–5
Herb – Perennial	RAFI	*Ranunculus*	*ficaria (syn. Ficaria verna)*	Lesser Celandine	Occurs in southwest and southeast Pennsylvania. Found in lawn near Hickory Street Bridge, Warren	Class B	1	1–5
Shrub	BUDA2	*Buddleja*	*davidii*	Butterfly bush	Common ornamental, potential to escape into natural areas	Not listed	1	1–5

Habit	NRCS* Code	Genus	Species	Common Name	Comments	On Pennsylvania Noxious Weed List	Treatment Category by Species	Treatment Category by Sites
Tree	ALJU	*Albizia*	*julibrissin*	Silktree, Mimosa	Documented in eastern Pennsylvania, commonly used in landscaping.	Not listed	1	1–5
Tree	ELAN	*Elaeagnus*	*angustifolia*	Russian olive	Occurs in Ohio; Centre County Pennsylvania	Not listed	1	1–5
Tree	MEAZ	*Melia*	*azedarach*	Chinaberry	Documented in New York, landscape plant	Not listed	1	1–5
Tree	PATO2	*Paulownia*	*tomentosa*	Empress tree	Occurs in southwest and southeast Pennsylvania	Not listed	1	1–5
Tree	ULPU	*Ulmus*	*pumila*	Siberian elm	Documented in Pennsylvania south of I-80, landscape escape	Not listed	1	1–5
Vine	AMBR7	*Ampelopsis*	*brevipedunculata*	Porcelain-berry	Occurs in southwest and southeast Pennsylvania	Not listed	1	1–5
Vine	HUJA	*Humulus*	*japonicus*	Japanese hop	Pennsylvania – northwest, northeast, southeast, southwest	Class B	1 and 2	1–5
Vine	LOJA	*Lonicera*	*japonica*	Japanese honeysuckle	Creeping north, very common in Virginia	Not listed	1	1–5
Vine	PUMOL	*Pueraria*	*montana var. lobata*	kudzu	Occurs in southwest and southeast Pennsylvania	Class A	1 and 2	1–5
Vine	VINI3	*Vincetoxicum*	*nigrum*	Black swallowwort	Northeastern states (syn. *Cynanchum louiseae*)	Class B	1 and 2	1–5
Vine	CYRO8	*Vincetoxicum*	*rossicum*	Pale swallowwort	Northeastern states (syn. *Cynanchum rossicum*)	Class B	1 and 2	1–5

* NRCS = Natural Resources Conservation Service, EDDMapS = Early Detection and Distribution Mapping System.

Appendix B – Forest Plan Amendment Proposal

Part 2—Strategy

Forest Plan Objectives

2080 Noxious Weeds

Page 18

Type: Objective

Current wording:

Complete 300 to 600 acres of invasive plant treatment annually.

Proposed wording:

Complete 2,000 to 3,500 acres of invasive plant treatment annually.

Reason for change:

Based on recent implementation trends, we believe the estimated activity level should be increased to reflect the fact that more work is needed to conserve native plant and animal communities. This is because we are aware of more infestations, occupying a larger number of acres, than we knew of at the time of plan revision. The rate of infestation, moreover, can exceed 90 percent in some areas, and more invasive species are being documented each year.

Estimated Forest Activities

Table 2. Projected Management Activity Levels in the Selected Alternative

Page 22

Type: Estimate

Current wording:

Forest Plan Table 2: Project management activity levels in the selected alternative (average annual amount, first and second decade)

Management Activity	Project Level First Decade (acres)	Project Level Second Decade (acres)
Herbicide Treatments by Resource Objective		
Non-Native Invasive Species	110	110
Fuels, NNIS, Wildlife, Fish and Stream Activities		
NNIS Manual and Mechanical Treatment	500	500

Proposed wording:

Forest Plan Table 2: Project management activity levels in the selected alternative (average annual amount, first and second decade)

Management Activity	Project Level First Decade (acres)	Project Level Second Decade (acres)
Herbicide Treatments by Resource Objective		
Non-Native Invasive Species (NNIS)	110	2,000
Fuels, NNIS, Wildlife, Fish and Stream Activities		
NNIS Manual and Mechanical Treatment	500	750

Reason for change:

Based on recent implementation trends, we believe the estimated activity level should be increased to reflect the fact that more work is needed to conserve native plant and animal communities. This is because we are aware of more infestations, occupying a larger number of acres, than we knew of at the time of plan revision. The rate of infestation, moreover, can exceed 90 percent in some areas, and more invasive species are being documented each year.

Part 3—Design Criteria

2100 Environmental Management – Pesticide Use

Pesticide Application (includes herbicides and insecticides)

Page 54

Type: Standard

Current wording:

A qualified Forest Service Pesticide Applicator will be onsite during pesticide application to ensure compliance with applicable standards and guidelines.

Proposed wording:

When appropriate, a qualified Forest Service Pesticide Applicator will be onsite during pesticide application to ensure compliance with applicable standards and guidelines.

Reason for change:

The proposed change brings us in line with other land managers. Originally created for reforestation related broadcast application, this standard, unless modified, would substantially limit our capacity for all treatment types and purposes in the future. We will strive to be onsite during every broadcast application but may rely on contract provisions and performance history to determine where to be present if capacity prevents us from being onsite at all times.

Page 54

Type: Guideline

Current wording:

In cases of major defoliations, aerial applications of insecticides approved for aquatic use are permitted.

Proposed wording:

Not applicable – this guideline would be removed. See new section (Aerial Application) below.

Reason for change:

We are proposing to create more detailed direction for aerial application, which can be found further below.

Notification

Page 54

Type: Standard

Current wording:

Landowners adjacent to treatment areas will be notified prior to pesticide application. Residents occupying dwellings on adjacent private land will be notified 3 to 4 weeks before spraying begins and again, if requested by a landowner, 24 hours before treatment begins. Individuals (such as loggers, woodcutters, OGM operators, contractors, berry pickers, etc.) known to be using a proposed treatment area shall be notified before treatment begins.

Proposed wording:

Landowners adjacent to treatment areas will be notified 3 to 4 weeks before broadcast spraying begins and again, if requested by a landowner, 24 hours before treatment begins. Individuals (such as loggers, OGM operators, contractors, etc.) known to be using a proposed treatment area shall be notified before broadcast spraying begins. For spot treatments, notification may be accomplished by posting signs in accordance with other notification design features.

Reason for change:

Our mailing list for treatment notices is based on publicly available tax records which identify landowners, but not necessarily residents. Because we lack residency data, we are proposing to focus the first sentence of this standard on landowners. In the future, our notification letters will ask landowners to share any notices received with residents.

The requirement to notify woodcutters and berry pickers in the second sentence is removed to reduce duplication. These individuals are notified by posting signs that state which pesticide was used, a short message about how the herbicide works and who can be contacted for more information, which is required by another standard.

In addition, advanced notification will only be required for broadcast application. For spot application, areas may instead be marked with signs during the course of treatment.

Herbicide Surveys of Treatment Areas

Page 55

Type: Standard

Current wording:

Before treating an area with herbicide, a survey will be completed to determine the presence of species with viability concerns. If any species with viability concerns are located within treatment areas, adequate measures will be taken to conserve them.

Proposed wording:

Before treating an area with herbicide, a survey or review of available information will be completed to determine the presence of federally listed threatened or endangered species, or regional forester sensitive species. If any species are located within treatment areas, adequate measures will be taken to conserve them.

Reason for change:

Although the forest plan contains a list of “species with viability concerns,” the list is outdated and will be discontinued. As a result, we are refocusing this standard on threatened, endangered, and sensitive species and clarifying that it only applies to species that are federally listed or identified as regional forester sensitive species.

In addition, the proposed change will allow treatment to occur without a new field survey in certain areas. This will improve efficiency, and potentially expand capacity, by allowing us to rely on existing data if sufficient to reach effects determinations and make a decision.

Page 55

Type: Guideline

Current wording:

Stocking surveys should be done to assess interfering vegetation and tree seedling development prior to treatment and to monitor seedling development following treatment in all areas proposed for herbicide application. These surveys should identify the need for and monitor the effectiveness of the treatment.

Proposed wording:

Stocking surveys should be done to assess interfering vegetation and tree seedling development prior to treatment and to monitor seedling development following treatment in all areas proposed for herbicide application for reforestation purposes. These surveys should identify the need for and monitor the effectiveness of the treatment.

Reason for change:

The original intent of this guideline was to require stocking surveys before herbicide is applied for reforestation purposes (these surveys are not conducted prior to invasive plant treatments). To emphasize that intent, and avoid any confusion, we added the phrase “for reforestation purposes” to the end of the first sentence.

Page 55

Type: Guideline

Current wording:

The presence of nesting raptors (bald eagle, osprey, red-shouldered hawk, and northern goshawk) and great blue herons within one-quarter mile (1,320 feet) of the treatment area should be determined. If nesting raptors or herons are present, mechanical herbicide treatment and any mechanized travel within one-quarter mile of each nest location should be restricted or delayed until after young birds have fledged (normally after July 31).

Proposed wording:

The presence of nesting federally threatened or endangered species, or regional forester sensitive species of raptors and herons within one-quarter mile (1,320 feet) of the treatment area should be determined. If present, broadcast herbicide treatment and any mechanized travel within one-quarter mile of each nest location should be restricted or delayed until after young birds have fledged (normally after July 31).

Reason for change:

The original intent of this guideline was for it to apply to threatened, endangered, and sensitive species of raptors and herons. Because listed species change over time, we removed the examples and clarified that it applies to all species of raptors and herons that are federally listed or identified as regional forester sensitive species.

In addition, we replaced the term “mechanical herbicide treatment” with “broadcast herbicide treatment” in the second sentence. This change better reflects the correct application method referenced.

Herbicide Application

Page 55

Type: Guideline

Current wording:

Treatment area boundaries should be marked with flagging and/or paint, including the boundaries of buffer areas where treatment and/or equipment entry are not permitted.

Proposed wording:

Treatment area boundaries should be marked with flagging, paint, or delineated using maps or GIS data, including the boundaries of buffer areas where treatment and/or equipment entry are not permitted.

Reason for change:

The proposal reflects changes in technology since plan revision and will improve efficiency by allowing us to delineate boundaries on maps or using GIS data instead of physically marking them in the field.

Page 55

Type: Guideline

Current wording:

To minimize the need for re-treatment, foliar herbicide application should not occur when rain is anticipated within four hours at the treatment site.

Proposed wording:

To minimize the need for re-treatment, foliar herbicide application should occur consistent with label direction for rain fastness.

Reason for change:

The proposed change will bring this guideline in line with current science and label direction for rain fastness, which may be more or less than the timing originally stated in the forest plan.

Page 55

Type: Guideline

Current wording:

To minimize the need for re-treatment, do not use cut stump, injection, or cut and fill herbicide application or methods during heavy sap flow (March through May).

Proposed wording:

To minimize the need for re-treatment, consider local sap flow conditions March through May before using cut stump, injection, or cut and frill herbicide application methods.

Reason for change:

This represents a minor clarification and no change in effect or intent. We were required to consider and avoid treatment during heavy sap flow, when doing treatments at that time might create a need for re-treatment. This rewording achieves the same intent.

It also corrects a minor typo. The word “fill” in the original text should be “frill.”

Page 55

Type: Guideline

Current wording:

In areas managed using an even-aged silvicultural system, the contiguous area of broadcast herbicide application within one operating season should generally not be significantly larger than the maximum final harvest size for each management area as specified in the forest plan (i.e., 40 acres for MA 3.0 and 20 acres for MA 6.1). Exceptions include treatments responding to overstory mortality, blowdown, or catastrophic damage, or treatments designed to achieve wildlife structural or habitat objectives, and landscape restoration goals.

Proposed wording:

The contiguous area of broadcast herbicide application within one operating season should generally not be significantly larger than the maximum final harvest size for each management area as specified in the forest plan. Exceptions include treatments responding to overstory mortality, blowdown, or catastrophic damage, or treatments designed to achieve wildlife structural or habitat objectives, uneven-aged treatments, and landscape restoration goals (including non-native invasive plant treatments).

Reason for change:

This represents a minor clarification and no change in effect or intent.

The adjusted wording ties the contiguous area of broadcast herbicide application to specific management area direction. The intent remains the same and uneven-aged treatments are added to the list of exceptions for clarification.

The parenthetical reference to final harvest sizes has been removed to reduce duplication with other forest plan content and reflect the fact that sizes may be larger in some cases.

Because the original intent of this guideline was in context of reforestation herbicide treatments, non-native invasive plant treatments are added to the list of exceptions.

Page 55

Type: Guideline

Current wording:

Unless identified otherwise through environmental analysis, seeded roads, landings, or pits within treatment areas should not be treated with herbicides.

Proposed wording:

Not applicable. We are proposing to remove this guideline.

Reason for change:

The original intent of this guideline was to avoid treating areas that were seeded for erosion control. Unfortunately, non-native invasive plants are commonly found in these areas and need treatment to avoid becoming infestations.

Page 55

Type: Guideline

Current wording:

Certain areas should receive special consideration and may not be treated until September 1. Such areas include, but are not limited to, those where numerous desired tree seedlings are present and where sulfometuron methyl will adequately control the competing vegetation. Late season herbicide application generally causes.

Proposed wording:

Certain areas being treated with broadcast spraying for reforestation purposes should receive special consideration and may not be treated until September 1. Such areas include, but are not limited to, those where numerous desired tree seedlings are present and where sulfometuron methyl will adequately control the competing vegetation. Late season herbicide application generally causes minimal damage to desired seedlings.

Reason for change:

This guideline was originally written for reforestation purposes, with the intent of protecting seedlings. Because it was not intended to constrain non-native invasive plant treatment, clarification is added to the first clause of sentence one.

Page 55

Type: Guideline

Current wording:

During injection and cut and frill herbicide treatment, glyphosate should not be used to treat competing stump sprouts originating from the same stump as desired trees, or to control competing trees within 5 feet of trees of the same species left standing as desired trees.

Proposed wording:

During basal bark, injection, cut stump, and cut and frill treatment, herbicide should not be used to treat competing stump sprouts originating from the same stump as desired trees, or to control competing trees within 5 feet of trees of the same species left standing as desired trees.

Reason for change:

Expanded to include additional treatment methods, and apply to herbicide beyond glyphosate, to improve efficiency and better conserve desirable species.

Page 56

Type: Guideline

Current wording:

For cut surface treatments, herbicide should be applied at concentrations equal to or less than 50 percent of the maximum concentration permitted by the label, through proper application technique and timing.

Proposed wording:

Not applicable. We are proposing to remove this guideline.

Reason for change:

Unfortunately, higher concentrations are sometimes needed to treat non-native invasive plant infestations. As a result, removing this guideline will allow us to use up to the maximum concentration allowable by the product label. Nonetheless, in accordance with other design features, we will continue to limit concentration dosage to the amount needed for effective treatment.

Page 56

Type: Guideline

Current wording:

To minimize the need for retreatment, glyphosate should be applied to the cut stump immediately (within 1 hour) following cutting of the stem during cut stump treatment.

Proposed wording:

To minimize the need for retreatment, herbicide should be applied to the cut stump in accordance with label direction following cutting of the stem during cut stump treatment.

Reason for change:

The proposed change expands this guideline to all herbicides used, not just glyphosate, and brings design features into line with product label direction.

Notification

Pages 56 and 57

Type: Standard

Current wording:

Signs will be placed along the perimeter of treatment areas where these areas are adjacent to roads, trails, recreation areas, administrative sites, or at any other location where the public can be expected to enter the treatment area. These signs will state which pesticide was used, a short message about how the herbicide works and who can be contacted for more information. These signs will be posted before herbicide treatment and for at least 30 days following treatment.

Proposed wording:

Signs will be placed at treatment areas where these areas are adjacent to roads, trails, recreation areas, administrative sites, or at any other location where the public can be expected to enter the treatment area. These signs will state which active ingredient was used, and who can be contacted for more information. These signs will be posted before or during treatment and for an appropriate time afterward.

Reason for change:

This is a minor change for efficiency purposes. It allows signs to be posted during implementation, as well as before, and clarifies that signs may be posted just where public encounters are most likely rather than around the entire treatment perimeter. It also reflects changes in sign content.

Page 57

Type: Standard

Current wording:

Qualified Forest Service personnel will be at each treatment site during herbicide application to caution visitors to stay away from the equipment and crew and to respond to their questions and concerns.

Proposed wording:

When appropriate, qualified Forest Service personnel will be at each treatment site during herbicide application to caution visitors to stay away from the equipment and crew and to respond to their questions and concerns.

Reason for change:

The proposed change brings us in line with other land managers. Originally created for reforestation related broadcast application, this standard—unless modified—would substantially limit our capacity for all treatment types and purposes in the future. We will strive to be onsite during every application, particularly those where there may be interface with public uses. However, we rely on contract provisions, performance history, and public use of areas to determine where to be present if capacity prevents us from being onsite at all times.

Buffers – Glyphosate

Page 57

Type: Standard

Current wording:

For directed foliar backpack and for cut surface application methods, the following buffers and application procedures shall be observed to provide water quality protection:

- Glyphosate shall not be applied to surface waters.
- Glyphosate shall not be applied within 10 feet of standing or flowing water.
- Within 10 feet of a dry intermittent stream course, dry springs, and dry seeps, only the cut surface herbicide treatment technique shall be used with glyphosate.
- Glyphosate shall not be applied to cut stems in the stream channel.

Proposed wording:

For directed foliar backpack and for cut surface application methods, the following buffers and application procedures shall be observed to provide water quality protection:

- Glyphosate shall not be applied to surface waters, regardless of whether a formulation registered for aquatic application would be used.
- Only aquatic labeled formulations of glyphosate shall be applied up to the edge of water, including some plants that may be rooted in water.
- Only aquatic labeled formulations of glyphosate shall be applied within 10 feet of standing or flowing water.
- Only aquatic labeled formulations of glyphosate shall be applied within 10 feet of a dry intermittent stream course, dry springs, and dry seeps.
- Only aquatic labeled formulations of glyphosate shall be applied to cut stems in the dry stream channel.

Reason for change:

The proposed changes will allow us to better conserve native species in riparian zones by treating non-native invasive plants found up to the water's edge (for example, knotweed) and some species that may be rooted in water (for example, purple loosestrife). To allow for this, we will allow the use of aquatic formulations of glyphosate to be applied up to the water's edge and remove the treatment type limitation for dry intermittent stream courses, dry springs, and dry seeps.

Buffers

Page 58

Type: Guideline

Current wording:

Buffer areas should be delineated along roadside ditches and cut banks where runoff into a stream or soil erosion could occur. Specific buffer widths will be determined during the site-specific analysis for specific treatment proposals.

Proposed wording:

Buffer areas for broadcast spraying should be delineated along roadside ditches and cut banks where runoff into a stream or soil erosion could occur. Specific buffer widths will be determined during the site-specific analysis for specific treatment proposals.

Reason for change:

The original intent of this guideline was to establish buffers for broadcast spraying. To avoid any confusion, we are adding "for broadcast spraying" to the first sentence.

Page 58

Type: Guideline

Current wording:

In order to minimize possible spraying of non-target vegetation when using mechanical broadcast application methods, do not apply herbicides if the wind speed exceeds 10 mph in open areas or 4 mph under the canopy in the treatment area.

Proposed wording:

In order to minimize possible spraying of non-target vegetation when using foliar application methods, do not apply herbicides if the wind speed exceeds 10 mph in open areas or 4 mph under the canopy in the treatment area.

Reason for change:

To better reflect actual practice, we are proposing to expand this guideline from mechanical broadcast application to all methods of foliar application (including backpack application).

Human Exposure

Page 58

Type: Guideline

Current wording:

Certain areas slated for September treatment will receive special consideration and should not be treated over the Labor Day weekend (Friday through Monday). Such areas include but are not limited to those where seedlings are present and where sulfometuron methyl will adequately control the competing vegetation, those subject to a large amount of summer public use, and areas having occupied residences within 1,000 feet.

Proposed wording:

Certain areas slated for treatment will receive special consideration and should not be treated over holiday weekends, such as areas subject to a large amount of summer public use, and areas having occupied residences within 1,000 feet.

Reason for change:

The proposed change expands our obligation to avoid treatment during periods of high visitor use, and better reflects current practice. It does this by requiring consideration at all times of year (not just Labor Day weekend) and removing the example that is focused on just one treatment type and active ingredient.

Page 59

Type: Guideline

Current wording:

Manually applied foliar herbicides should not be applied to vegetation taller than the shoulder height of the application personnel.

Proposed wording:

To minimize potential worker exposure, backpack applied foliar herbicides should not be applied to vegetation above shoulder height of the application personnel.

Reason for change:

This reflects a minor change to provide clarity and bring the guideline more in line with our original intent to avoid spraying in ways that would increase worker exposure.

Page 59

Type: Guideline

Current wording:

Areas requiring small spot treatments for plantings should generally be done with manual equipment.

Proposed wording:

Areas requiring small spot treatments should be done with the most selective equipment and application method that achieves treatment objectives.

Reason for change:

The proposed change expands the application of this guideline to all spot treatments, not just treatments for plantings. It brings the forest plan direction in line with current practice.

Aerial Application (New Section)

New Addition

Type: Standard

Proposed wording:

All aviation activities will be in accordance with Forest Service Manual and Forest Service Handbook direction. An aviation safety plan will be developed prior to aerial spray applications.

New Addition

Type: Standard

Proposed wording:

Application will occur per label instruction.

New Addition

Type: Standard

Proposed wording:

Aerial spray units will be delineated prior to spraying to ensure only appropriate portions of the unit are treated. To ensure that aerial treatments stay within intended treatment areas, application will follow GPS coordinates or otherwise be monitored during flight to ensure it occurs within the delineated areas.

New Addition

Type: Standard

Proposed wording:

Weather conditions will be monitored on-site (for example, temperature, humidity, wind speed and direction), spot forecasts will be reviewed before and during treatment for adverse weather conditions, and application adjusted or discontinued based on weather conditions.

New Addition

Type: Standard

Proposed wording:

Aerial spraying will be discontinued if pesticide is drifting beyond the treatment area and/or wind speed exceeds those recommended on the product's label.

New Addition

Type: Standard

Proposed wording:

Implementation direction for water quality protection and sufficient buffers around aquatic, streamside, or wetland areas will be established using label directions, site conditions, and knowledge from resource specialists.

New Addition

Type: Guideline

Proposed wording:

Areas within one-quarter mile of active bald eagle, raptor, and great blue heron nests will be excluded from aerial treatment to reduce disturbance from low-flying aircraft unless the responsible official determines that doing so would be infeasible or result in undesirable effects to ecosystem integrity.

New Addition

Type: Guideline

Proposed wording:

Aerial pesticide application should only occur if ground-based control methods are unlikely to achieve objectives, aerial treatments are more targeted than ground-based methods, or if treatment areas are inaccessible.

New Addition

Type: Guideline

Proposed wording:

To reduce drift into non-target areas, manage droplet size with nozzle type, size and drift control agents during aerial spraying, as recommended by the pesticide label.

New Addition

Type: Guideline

Proposed wording:

Where applicable, all ground-based protections measures should also apply to aerial application.

Appendix C – Summary of Herbicide Exposure Scenarios

Table 20 lists general public exposure scenarios for the Allegheny National Forest typical application rate and indicates which herbicides have a hazard quotient greater than one in any of the three estimates of exposure (lower, central, and upper bounds of exposure).

Table 20. General public exposure scenarios for the Allegheny National Forest typical application rate, and herbicides with a hazard quotient (HQ) greater than 1 in lower, central, and upper bounds of exposure

Exposure Type	Scenario	Receptor	HQ greater than 1 Lower Bounds of Exposure	HQ greater than 1 Central Bounds of Exposure	HQ greater than 1 Upper Bounds of Exposure
Accidental acute exposures	Direct spray of child; whole body	Child	None	None	None
Accidental acute exposures	Direct spray of woman; feet and lower legs	Adult Female	None	None	triclopyr BEE
Accidental acute exposures	Water consumption (spill)	Child	None	None	glyphosate (both formulations), imazapic, sethoxydim, triclopyr TEA and BEE
Accidental acute exposures	Fish consumption (spill)	Adult Male	None	None	None
Accidental acute exposures	Fish consumption (spill)	Subsistence Populations	None	None	None
Non-accidental acute exposures	Vegetation contact; shorts and t-shirt	Adult Female	None	None	None
Non-accidental acute exposures	Contaminated fruit	Adult Female	None	None	triclopyr TEA and BEE
Non-accidental acute exposures	Contaminated vegetation	Adult Female	None	Triclopyr TEA and BEE	glyphosate (both formulations), triclopyr TEA and BEE
Non-accidental acute exposures	Swimming; one hour	Adult Female	None	None	None
Non-accidental acute exposures	Water consumption (ambient)	Child	None	None	None
Non-accidental acute exposures	Fish consumption	Adult Male	None	None	None
Non-accidental acute exposures	Fish consumption	Subsistence Populations	None	None	None

Exposure Type	Scenario	Receptor	HQ greater than 1 Lower Bounds of Exposure	HQ greater than 1 Central Bounds of Exposure	HQ greater than 1 Upper Bounds of Exposure
Chronic and longer term exposures *	Contaminated fruit	Adult Female	None	None	triclopyr TEA and BEE
Chronic and longer term exposures *	Contaminated vegetation	Adult Female	None	None	triclopyr, TEA and BEE
Chronic and longer term exposures *	Water consumption	Adult Male	None	None	None
Chronic and longer term exposures *	Fish consumption	Adult Male	None	None	None
Chronic and longer term exposures *	Fish consumption	Subsistence Populations	None	None	None

* mg or kg per day

Table 21 lists general public exposure scenarios for the maximum application rate and indicates which herbicides have a hazard quotient greater than one in any of the three estimates of exposure (lower, central, and upper bounds of exposure).

Table 21. General public exposure scenarios for the maximum application rate, and herbicides with a hazard quotient (HQ) greater than 1 in lower, central, and upper bounds of exposure

Exposure Type	Scenario	Receptor	HQ greater than 1 Lower Bounds of Exposure	HQ greater than 1 Central Bounds of Exposure	HQ greater than 1 Upper Bounds of Exposure
Accidental acute exposures	Direct spray of child; whole body	Child	None	None	triclopyr BEE, imazapic
Accidental acute exposures	Direct spray of woman; feet and lower legs	Adult Female	None	None	triclopyr TEA and BEE
Accidental acute exposures	Water consumption (spill)	Child	imazapic	None	glyphosate (both formulations), imazapic, imazapyr, sethoxydim, triclopyr TEA and BEE
Accidental acute exposures	Fish consumption (spill)	Adult Male	None	None	None
Accidental acute exposures	Fish consumption (spill)	Subsistence Populations	None	None	None
Non-accidental acute exposures	Vegetation contact; shorts and t-shirt	Adult Female	None	None	triclopyr BEE
Non-accidental acute exposures	Contaminated fruit	Adult Female	None	None	triclopyr TEA and BEE

Exposure Type	Scenario	Receptor	HQ greater than 1 Lower Bounds of Exposure	HQ greater than 1 Central Bounds of Exposure	HQ greater than 1 Upper Bounds of Exposure
Non-accidental acute exposures	Contaminated vegetation	Adult Female	None	Triclopyr TEA and BEE	glyphosate (both formulations), imazapic, triclopyr TEA and BEE
Non-accidental acute exposures	Swimming; one hour	Adult Female	None	None	None
Non-accidental acute exposures	Water consumption (ambient)	Child	None	None	None
Non-accidental acute exposures	Fish consumption	Adult Male	None	None	None
Non-accidental acute exposures	Fish consumption	Subsistence Populations	None	None	None
Chronic and longer term exposures *	Contaminated fruit	Adult Female	None	None	triclopyr TEA and BEE
Chronic and longer term exposures *	Contaminated vegetation	Adult Female	None	Triclopyr TEA	imazapic, indaziflam, sulfometuron methyl, triclopyr TEA and BEE
Chronic and longer term exposures *	Water consumption	Adult Male	None	None	None
Chronic and longer term exposures *	Fish consumption	Adult Male	None	None	None
Chronic and longer term exposures *	Fish consumption	Subsistence Populations	None	None	None

* mg or kg per day

Table 22 lists worker exposure scenarios for the Allegheny National Forest typical application rate and indicates which herbicides have a hazard quotient greater than one in any of the three estimates of exposure (lower, central, and upper bounds of exposure).

Table 22. Worker exposure scenarios where herbicides have a hazard quotient (HQ) greater than 1 at the Allegheny National Forest typical application rate

Exposure Type	Scenario	HQ greater than 1.0 Lower Bounds of Exposure	HQ greater than 1.0 Central Bounds of Exposure	HQ greater than 1.0 Upper Bounds of Exposure
Accidental and Incidental Exposures	Contaminated gloves, 1-minute	None	None	None
Accidental and Incidental Exposures	Contaminated gloves, 1-hour	None	None	Triclopyr BEE
Accidental and Incidental Exposures	Spill on hands, 1-hour	None	None	None

Exposure Type	Scenario	HQ greater than 1.0 Lower Bounds of Exposure	HQ greater than 1.0 Central Bounds of Exposure	HQ greater than 1.0 Upper Bounds of Exposure
Accidental and Incidental Exposures	Spill on lower legs, 1-hour	None	None	None
General Exposures *	Backpack	None	None	Triclopyr TEA and BEE (chronic), indaziflam
General Exposures *	Ground broadcast	None	None	Triclopyr TEA and BEE (chronic)
General Exposures *	Aerial	None	None	Indaziflam

* mg or kg per day

Table 23 lists worker exposure scenarios for the maximum application rate and indicates which herbicides have a hazard quotient greater than one in any of the three estimates of exposure (lower, central, and upper bounds of exposure).

Table 23. Worker exposure scenarios where herbicides have a hazard quotient (HQ) greater than 1 at the maximum application rate

Exposure Type	Scenario	HQ greater than 1.0 Lower Bounds of Exposure	HQ greater than 1.0 Central Bounds of Exposure	HQ greater than 1.0 Upper Bounds of Exposure
Accidental and Incidental Exposures	Contaminated gloves, 1-minute	None	None	None
Accidental and Incidental Exposures	Contaminated gloves,1-hour	None	Imazapic, triclopyr BEE	Imazapic, triclopyr BEE
Accidental and Incidental Exposures	Spill on hands, 1-hour	None	None	None
Accidental and Incidental Exposures	Spill on lower legs, 1-hour	None	None	None
General Exposures *	Backpack	None	Triclopyr TEA and BEE	Triclopyr TEA and BEE (chronic), indaziflam
General Exposures *	Ground broadcast	None	Triclopyr TEA and BEE	Indaziflam, sulfometuron methyl, triclopyr TEA and BEE (chronic)
General Exposures *	Aerial	None	Triclopyr TEA and BEE	Triclopyr TEA and BEE

* mg or kg per day

Appendix D – Agencies and Persons Contacted

Tribes

Absentee Shawnee Tribe of Indians of Oklahoma
Cayuga Nation
Delaware Nation
Delaware Tribe of Indians
Eastern Shawnee Tribe of Oklahoma
Oneida Indian Nation
Oneida Nation
Onondaga Nation
Saint Regis Mohawk Tribe
Seneca Nation of Indians
Seneca-Cayuga Nation
Shawnee Tribe
Stockbridge-Munsee Band of Mohican Indians
Tonawanda Band of Seneca
Tuscarora Nation

Federal Agencies

U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
USDA Natural Resources Conservation Service

State Agencies

Allegany State Park
New York Department of Environmental Conservation
Pennsylvania Bureau of State Parks
Pennsylvania Department of Agriculture
Pennsylvania Department of Conservation and Natural Resources
Pennsylvania Department of Environmental Protection
Pennsylvania Department of Transportation
Pennsylvania Fish and Boat Commission
Pennsylvania Game Commission
Pennsylvania Governor's Advisory Council on Hunting, Fishing and Conservation
Pennsylvania Governor's Advisory Council on Invasive Species
Pennsylvania Hardwoods Development Council

Local Governments, Commissions, and Agencies

Barnett Township Supervisors
Bradford Township Supervisors
Brokenstraw Township Supervisors
Cherry Grove Township Supervisors
Conewango Township Supervisors
Corydon Township Supervisors
Deerfield Township Supervisors
Elk County Commissioners
Elk County Planning Department
Elk Township Supervisors
Forest Area School District
Forest County Board of County Commissioners
Forest County Commissioners
Foster Township Supervisors
Glade Township Supervisors
Green Township Supervisors
Hamilton Township Supervisors
Hamlin Township Supervisors
Harmony Township Supervisors
Hickory Township Supervisors
Highland Township Supervisors
Howe Township Supervisors
Jenks Township Supervisors
Jones Township Supervisors
Kane Area School District
Kingsley Township Supervisors
Lafayette Township Supervisors
Lewis Run Borough
Limestone Township Supervisors
McKean County Commissioners
McKean County Conservation District
McKean County Planning Commission
Mead Township Supervisors
Millstone Township Supervisors
Pleasant Township Supervisors
Ridgway Township Supervisors
Sheffield Township Supervisors
Spring Creek Township Supervisors
Tidioute Borough

Tionesta Township Supervisors
Triumph Township Supervisors
Warren County Commissioner
Warren County Commissioners
Warren County Planning and Zoning Office
Watson Township Supervisors
Wetmore Township Supervisors

Visitor Bureaus

Allegheny National Forest Visitors Bureau
Pennsylvania Great Outdoors Visitors Bureau
Warren County Visitors Bureau

Universities

Indiana University of Pennsylvania
Pennsylvania State Cooperative Extension
Pennsylvania State University

Business, Development, Forestry, and Minerals Associations

Allegheny Forest Alliance
Allegheny Hardwood Utilization Group
Bradford Area Chamber of Commerce
Kane Area Development Center
North Central Forest Landowners Association
North Central Pennsylvania Regional Planning and Development Commission
Pennsylvania Forest Industry Association
Pennsylvania Forest Products Association
Pennsylvania Forestry Association
Pennsylvania Grade Crude Coalition
Pennsylvania Independent Oil and Gas Association
Ridgway Chamber of Commerce
Warren County Chamber of Business and Industry

Local Businesses

Allegheny Particleboard
Clarion Boards, Inc.
Collins-Kane Hardwood
Domtar
Ed Kojancic Inc.
Forecon, Inc.
Forest Investments Associates
Gary Pierotti Consulting Forester
Generations Forestry
Green Wood Resources Global
Landvest
Manulife Investment Management
Matson Lumber Company
Murdock Forest Management, LLC.
Payne Enterprises
Ram Forest Products
Three Rivers Forestry

Natural Resource, Conservation and Outdoor Organizations

Allegheny Alive
Allegheny Defense Project
American Forests
American Rivers
Audubon Community Nature Center
Audubon Society
Cook Forest Conservancy
Ducks Unlimited
Friends of the Allegheny Wilderness
Headwaters Charitable Trust
Headwaters RC& D
Kinzua Quality Deer Cooperative
National Wild Turkey Federation
Pennsylvania Firefly Festival Committee
Pennsylvania Striped Bass Association
Pennsylvania Wilds Center
Penn Soil RC & D Council
Pennsylvania Falconry and Hawk Trust
Pennsylvania Federation of Sportsmen and Conservationists
Pennsylvania Organization for Watersheds and Rivers
Pheasants Forever, Chapter 630
Roger Tory Peterson Institute of Natural History
Ruffed Grouse Society
Seneca Rocks Audubon Society
Sierra Club
The Nature Conservancy
Trout Unlimited
U.S. Endowment for Forests and Communities
Western Pennsylvania Conservancy
Wilderness Watch
Woodcock Limited of Pennsylvania

Recreation Associations and Clubs

Allegheny Federation of Snowmobile Clubs
Allegheny Hike, Bike, and Ski Association
Allegheny Outdoor Club
American Recreation Coalition
American Sportfishing Association
American Trails
Cross Country Ski Areas Association
East Coast Four Wheel Drive Association
Forest County ATV Club
Forest County Snowmobile Club
Friends of Twin Lakes
Kane Area Snowmobile Club
Keystone Trails Association
Kinzua Outdoors
Kinzua Valley Trail Club
Marienville Trail Riders Snowmobile Club
National Forest Recreation Association
North Country Trail Association, Allegheny National Forest Chapter
Northern Allegheny Mountain Bike Association
Pennsylvania Recreation and Parks Society
Pennsylvania Federation of Sportsmen's Clubs
Pennsylvania State Snowmobile Association
Seneca Highlands Snowmobile Club
Sportsmen's Club of Forest County
Tionesta Valley Snowmobile Club
Trail Association of the McKean / Elk Divide
Tuna Valley Trail Association
Warren Archery Club
Warren County Snowmobile Club
Willow Creek Snowmobile Club
Willow Creek Sportsman's Club

Outfitters and Guides

Allegheny Guide Service
Allegheny Mountain Tours
Allegheny Outfitters
Allegheny River Fly Fishing Company
Allegheny Wilderness Outfitters
Burdick's Lodge Hunting and Guide Service
Keystone Canoe and Kayak Rentals
Lazy River Canoe Rental
North Country Outfitters and Fishing Charter Service
Outback Adventures
Riverside Guide Service
Sherk's Guide Service
The Fly Fishing Coach

Campgrounds and Lodges

Allegheny Whitetails
Bettum's Idlewood Campground
Black Bear Campground
Brokenstraw Valley Camping Sites
Forest Ridge Campground/Cabins
Kibbe's Island Park Campground
Kinzua East KOA Campground
Lantz Corners Getaway
Lewis' Campground
Penn Highlands Campground
The Forest Lodge and Campground
Whispering Winds Campground
Woodhaven Campground

Equestrian Ranches and Groups

Flying W Ranch
Hickory Creek Wilderness Ranch
Sharon's Horse Haven
Summers Allegheny Trail Ride

Concessionaires

Allegheny Site Management

Youth Groups

Boy Scouts of America
Girl Scouts of Western Pennsylvania

Interested Individuals

In addition, we contacted 40 individuals who previously asked to be contacted about new projects. A list of individuals contacted is available in the project record.

Appendix E – How Scoping Comments Were Considered

Two comment letters were received during the scoping period. Text from the comment letters is quoted or paraphrased below and is followed by a description of how we considered the comments while developing this environmental assessment. In addition:

- A representative from U.S. Environmental Protection Agency Region III confirmed that our scoping document was received and they requested a copy of the environmental assessment by email. A copy of this environmental assessment will be provided as requested.
- No comments or requests to consult were received from Native American tribes.
- No comments were received from local governments, state government, or other agencies.

1. **"We encourage you to use your partners (local, state, and private) as well as 'citizen scientists' for early detection, focusing your resources on aggressive treatments."**

   The Forest Service is encouraged to create a surfacing inspection and certification program as a preventative to measure to reduce the risk of accidentally spreading invasive species.

   The Forest Service "should include public education on invasives in the landscape and their threats to the natural landscape, wildlife, and water quality as part of your management efforts."

These recommendations are appreciated.

Regarding partnerships and outreach, we coordinate with local, state, and federal partners, the Allegheny Plateau Invasive Plant Management Area, and the Allegheny Forest Health Collaborative, among others. We are also happy to work with interested volunteers and hope to expand our volunteer and partnership opportunities in the future for early detection and public education.

We are working on a surfacing inspection program, likely modeled after a framework created by the North American Invasive Species Management Association. As of this writing, the program remains in development.

2. **"[W]e must protect the health and safety of people, pets, farms, and wildlife that could be affected by the use of herbicides that are applied aerially. We point this out only as a concern and not an objection to aerial applications. Your staff's experience and due caution will satisfy us of this concern."**

Our proposed action for aerial application has been considerably refined and narrowed since scoping. It is now limited to small-scale testing of drone application for invasive plant treatment on less than 200 acres annually. This narrower focus would allow us to gain valuable experience to determine whether and how to use this application method, while ensuring that the public would have an opportunity to review, comment on, and potentially object to the broader use of aerial application, if proposed in the future. In addition:

- The effects analysis considers how herbicide application may affect human health and natural resources.
- The proposed forest plan amendment includes many restrictions to ensure aerial application occurs safely.

- Project-specific design features, which are in additional to applicable forest plan standards and guidelines, were added to the proposed action.

3. **"We do object to the fact that federal agencies (including the USFS) sometimes use non-native species in land management efforts. In the 2007 LRMP, pg. 53, the Biological Diversity Guidelines state that non-native plants should be used 'where natural revegetation is sparse or unlikely to occur.' We would like to see this removed from the ANF's LRMP. Frankly, those who live in this region find that prolific natural revegetation (not a lack of it) is the problem. We do not know to what extent the ANF has used non-native plants, but there is no situation in which . . . it is acceptable to introduce non-native species in the name of conservation when we are working so hard to control so many of them."**

Desirable non-native plants are used to a limited extent, and typically include species introduced long ago that are now commonly planted by many public and private entities, they are considered 'non-invasive' or they may be native to North America, but historically not known to occur on the Allegheny National Forest. Examples include:

- Apple, crabapple, blueberry (while native, sometimes only available stock are varieties), and red spruce (native, limited distribution historically on the Allegheny National Forest) which are sometimes planted as soft mast for wildlife.
- Common oat and winter wheat, which are sometimes included in seed mixes as a cover crop for a quick growing (weeks), but not lasting vegetation (one growing season) to lessen soil and erosion.
- Alsike clover, ladino clover, and red clover, which are sometimes included in seed mixes as a legume for wildlife purposes.

After reviewing the forest plan guidelines, we believe the wording could be improved to better reflect our intent and current practices. It may, for example, be more helpful for guidelines to speak in terms of native and naturalized species rather than native and desirable non-native species. This is a change we will consider making in the future. We are hesitant to do so immediately, however, because it is probably best addressed at the same time as emerging land management strategies like the introduction of crop wild relatives[22] and assisted migration.[23]

4. **Due to the seriousness of the threat posed by invasive species, the Forest Service should temporarily waive forest plan standards that restrict mechanical treatments in certain management areas.**

Mechanical treatments in wilderness and wilderness study areas are prohibited by forest plan standards that restrict "motorized equipment or mechanical transport . . . except for fire suppression and in situations that threaten the health and safety of visitors . . ." (USDA Forest Service 2007a, pages 118 and 125).

These standards arguably impose a greater restriction than the Wilderness Act and Forest Service Manual for management of congressionally designated wilderness areas.

- The Wilderness Act may allow mechanized treatment if doing so is "necessary to meet minimum requirements for the administration of the area[.]" 16 U.S.C. section 1133(c).
- The Forest Service Manual provides management direction that mirrors the Wilderness Act. Motorized equipment and mechanical transport may be used in certain instances "[t]o meet minimum needs for protection and administration of the area as wilderness[.]" This includes

22. https://www.fs.usda.gov/wildflowers/ethnobotany/wildrelatives.shtml.

23. https://www.fs.usda.gov/ccrc/topics/assisted-migration.

situations where essential activities are impossible to accomplish by nonmotorized means. USDA Forest Service 2021c.

In the future, we may consider amending these standards to better align with the Wilderness Act. This could be accomplished by modifying them to restrict motorized equipment or mechanical transport except as necessary to meet minimum requirements for the administration of the area.

Manual treatments in wilderness areas were previously authorized in the Pleasant project decision, and at this time we have not identified a need for mechanical treatments in wilderness or wilderness study areas. As a result, we considered expanding the proposed plan amendment to include this change but declined in order to maintain focus on lands where invasive plant treatments under this decision are most likely to occur. We will reconsider our decision in the future, however, if our knowledge or conditions change to the point where mechanized treatments appear needed for minimum protection and administration.

5. **"[W]e would also encourage exploration of the use of goats as a natural method of mechanical control in situations where non-selective herbicides would otherwise be prescribed. While this may or may not work on all species in all locations, it is worth investigating to reduce the amount of chemicals used on our forest."**

We considered adding grazing to the proposed action but would like to gain more information and experience with the use of goats before evaluating their use at a broader scale. In particular, we would like to learn more about local goat supplies, fencing requirements, cost effectiveness, and their potential effects on native plants. If there is an available supply, and we determine there are suitable locations for their use, a categorical exclusion could likely be applied to authorize their use at a proposed site.

6. **"Using chemicals simply will not conserve native plants nor wildlife habitat. Instead, herbicides will get into the air, soil, water, and lungs of living things, and cause illness and genetic mutations. Invasive plants may be detrimental, but there are other ways to control them."**

   What are the economic costs to people that result from herbicide use? For example, medical costs or costs to school districts. "I am not asking about risk and risk assessments which are nonsense."

   "Glyphosate . . . is not good for humans, animals, soil, air and water. DO NOT USE IT. Come into the 21st century and manually control whatever it is."

   "Keep glyphosate out of riparian areas and anywhere in or near water, soil, lungs, and air. Whether or not glyphosate has a low toxicity value for aquatic use or not, DO NOT USE IT. Err on the side of life."

We considered an alternative that would exclusively rely on manual and mechanical treatment methods for invasive plant treatment. Unfortunately, we do not believe a program that relies only on manual and mechanical treatments is feasible in context of our need for action. Our rationale for this determination is discussed in the environmental assessment.

Due in part to the concerns expressed here, our proposed action has been modified since scoping.

- Aerial application is now limited to small-scale testing of drone application for invasive plant treatment on less than 200 acres annually. This narrower focus would allow us to gain valuable experience to determine whether and how to use this application method, while ensuring that the public would have an opportunity to review, comment on, and object to the broader use of aerial application, if proposed in the future.
- Due to concerns specific to glyphosate, we expanded the proposed action to include herbicides containing metsulfuron methyl as an active ingredient. This provides us with another option to consider in places where glyphosate is typically used.

- Project-specific design features, which are in addition to applicable forest plan standards and guidelines, were added to the proposed action.

In addition, the effects analysis considers how herbicide application may affect human health and natural resources.

7. What are interfering plants interfering with. USFS plans to grow trees for commercial use and profit. Is that a higher use than having native plants? More clean air, water and soil? Or are interfering plants interfering with land management for hunters and prey they want."

National Forest System lands are managed for multiple purposes.[24] Although our management activity is generally expected to have a positive impact on local communities, we do not manage the landscape for commercial use or profit. Economic contributions, instead, are a byproduct of our efforts to manage lands to achieve a variety of desired conditions.

The Allegheny National Forest is divided into several management areas. These areas are managed, actively or passively, to pursue different desired conditions over the short, mid, and long-term. Some, for example, are managed using even and uneven-aged methods, while others are focused on wilderness, scenery, research, developed recreation, remote recreation, or other purposes. Management areas, and the desired conditions we pursue in each, are discussed in the forest plan.

Areas suitable for timber harvesting are managed using a variety of sustainable forest management practices. This includes the use of appropriate reforestation activities to ensure adequate tree seedlings develop where deer and interfering plants would otherwise limit their establishment or survival (USDA Forest Service 2007b, page 1-11). Examples of undesirable species include, but are not limited to, ferns, grasses, striped maple, beech, and birch.

- "Fern and grass vegetation will persist unless it becomes shaded by woody vegetation such as beech, striped maple, or sweet birch. Where present, this interfering woody vegetation would similarly control light as low shade, which would prevent many seeds from germinating or prevent most seedling species from becoming established. In addition, this vegetation will aggressively occupy the site. That makes conditions difficult for new seedlings to compete for moisture and soil nutrients." USDA Forest Service 2007b, page 3-128.
- American beech trees are subject to beech bark disease complex. "As beech scale complex continues to spread within the [Allegheny National Forest], individual beech and northern hardwood stands with concentrated pockets of beech will be affected by mortality of larger beech trees and subsequent root-sprout origin beech regeneration. As almost all beech seedlings are of root sprout origin, those that do develop into saplings and small poles are clones of susceptible parent trees and will also be affected by beech bark disease complex. The effects of beech bark disease prevent beech trees from growing to maturity and often results in early death" (USDA Forest Service 2007b, page 3-128).
- "Striped maple is a relatively small and short-lived tree species. It persists well in shaded conditions and multiplies effectively. If released to full sunlight, it grows rapidly and aggressively for about 30 years. At this point it becomes susceptible to wind or ice damage. Many of these trees die due to mechanical failure (breakage) of their roots or stems. In this case the tree often resprouts prolifically from the root or stump and repeats the cycle" (USDA Forest Service 2007b, page 3-129).

24. "It is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes." 16 U.S.C. section 528.

- "Sweet birch can withstand moderate to high deer pressure when it becomes established in quantity and has been increasing in abundance in recent years on the Allegheny National Forest as deer browsing impacts have declined in some areas. Sweet birch is of intermediate shade tolerance and grows rapidly in partial or full sunlight. As birch matures and grows to sawtimber size on the Allegheny National Forest, it is often affected by nectria fungus and develops cankers in the main stem. The canker usually substantially reduces the commercial value of the trees and often results in mechanical failure (breakage) of the stem. Few birch trees on the Allegheny National Forest exceed 60 years of age (Morin et al. 2006; USDA Forest Service 2007b, page 3-129)."

8. "Do not change the forest plan to allow aerial spraying."

The forest plan currently includes the following guideline: "[i]n cases of major defoliations, aerial applications of insecticides approved for aquatic use are permitted" (USDA Forest Service 2007a, page 54). This guideline constrains forest health treatments in response to the expansion of defoliating insects and is not intended to restrict aerial application methods for other purposes. Because the forest plan is otherwise silent on aerial application and does not restrict its use for other management purposes, a forest plan amendment is not needed for aerial invasive and interfering vegetation treatments to move forward in this or another project.

Instead of allowing aerial spraying, the proposed amendment creates standards and guidelines to constrain its future use. Although the proposal is somewhat duplicative of current law and policy, it serves to reinforce that – if this or any other project approves aerial application in the future – the following would need to occur:

- An aviation safety plan would be developed.
- Application would be restricted in accordance with label instruction.
- Aerial spray units would be delineated and appropriately monitored to ensure treatment occurs solely within the intended areas.
- Weather conditions would be closely monitored, and treatment would be adjusted or discontinued as needed.
- Buffers would be established to protect water resources, and certain species of nesting birds.
- Aerial application would need to be limited in nature, occurring only if occur if ground-based control methods are unlikely to achieve objectives, aerial treatments are more targeted than ground-based methods, or if treatment areas are inaccessible.
- Special consideration would be provided to droplet size to reduce the potential for drift.
- All other ground-based protection measures would be implemented where applicable.

In addition, our proposed action has been modified since scoping. Aerial application is now limited to small-scale testing of drone application for invasive plant treatment on less than 200 acres annually. This narrower focus would allow us to gain valuable experience to determine whether and how to use this application method, while ensuring that the public would have an opportunity to review, comment on, and object to the broader use of aerial application, if proposed in the future.