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Guidelines for Managing Sites with Ash To Address the Threat of Emerald Ash Borer On Forestry-Administered Lands

BACKGROUND

The ash genus (*Fraxinus*) in Minnesota comprises some 900 million trees and is the second most common hardwood tree genus in the state. EAB was discovered in the United States in 2002 and is now present in 13 states and 2 Canadian Provinces. It was found in Minnesota in 2009; currently EAB's only known occurrence within Minnesota is in the cities of St. Paul and Minneapolis. EAB populations can spread rapidly in infested firewood, logs, and ash nursery stock. Therefore, it is assumed that EAB will soon infest Minnesota's forested areas and cause significant impact to the ash resource. Experience from other states has shown that EAB kills 99+% of the ash in a stand once that stand becomes infested. This level of impact is greater than what occurred with American elm following the introduction of Dutch elm disease to Minnesota.

To date there has been no evidence of resistance to EAB within any North American ash species. Resistance does exist in some Asian ash species. Subtle differences in susceptibility to EAB between white, green, and black ash have been reported, but those differences are minor and should not influence management options. All three ash species in Minnesota will likely succumb to EAB attack.

SCOPE

This document applies to:

- Forested stands classified as ash coevertype
- Forested stands with an ash component of at least 20% of stand basal area but not typed as an ash coevertype. Native plant communities where ash is and can be significant include: FDw44, MHs49, MHw36, MHc47, MHn46, FFs58, FFs59, FFn57, FFn67, WFs57, WFw54, WFn53, WFn55, WFn64.
- Forested stands with ash that are free of EAB occurrence and are greater than 25 miles from the closest known EAB infestation. This distance will allow multiple entries into a stand based on an average, "natural" movement of EAB of ~1/2 mile per year.

ASH MANAGEMENT OBJECTIVES

- Landscape perspective: Manage ash populations in the landscape to protect sensitive wetland ecotypes, reduce outbreak costs, and restrict emerald ash borer introduction and spread without eliminating ash within forest ecosystems.
- Stand perspective: Create conditions that will reduce potential impacts and increase the resiliency of forested stands by
 - Keeping forested sites forested
 - Maintaining an ash component but reducing the size and number of ash in the stand.
 - Increasing tree species diversity.
- Management objectives should focus on ecosystem health and management, not on the emerald ash borer. The intent is to limit habitat attractiveness to EAB.
- The Division of Forestry will work within its nursery program and with other partners for maintaining representative samples of genotypes but not for processing seeds for reforestation.

Division of Forestry

CAVEATS

- There is a likelihood that the vast majority of ash trees in Minnesota will be killed by EAB regardless of the type or magnitude of actions taken.
- The large extent of the ash resource, particularly black ash, will likely mean that sufficient management actions will not occur in all stands prior to EAB becoming established in Minnesota. Forested sites will be altered or lost.
- Little is known through research and experience how to maintain black ash forested sites as forested communities once the black ash is killed or removed. On-going research and knowledge gained through experience that can be passed along to all managers are critical to meeting long term ash management objectives. Therefore, this document presents interim guidance that will change as knowledge from research and experience is gained.

MANAGING FORESTED STANDS WITH ASH

1. INTERIM DIRECTIVE FOR ALL STANDS WITH ASH

The current scientific evidence does not support investments in artificial regeneration of ash species or management practices implemented to expand or regenerate ash populations. These activities could also compromise efforts to protect sensitive wetland ecosystems through canopy diversification, reduce forest vulnerability and potentially compromise EAB response efforts.

- A. Ash species should not be planted on DNR administered lands for ornamental, shade or reforestation purposes. In implementing forest management practices do not structure operations to intentionally favor the regeneration or reestablishment of ash
- Rationale: In order to avoid perpetuating habitat for EAB for future generations, the current objective is to diversify ash dominated plant communities now and into the near future.
 - Actions
 - Do NOT plant ash seedlings on state administered lands or recommend ash seedlings for reforestation on private lands.
 - Do NOT use ash seed in the mix for direct seeding on state administered lands or recommend ash seeds for direct seeding on private lands.
 - Create conditions favorable for regeneration of non-ash tree species. Ash regeneration can be aggressive, particularly from stump sprouting; chemical application may be necessary to reduce ash on some sites.
- B. Prioritize opportunities to implement management practices in stands with ash immediately irrespective of EAB outbreaks.
- Rationale: Given the magnitude of the ash resource in Minnesota today, forest managers must make ash management a higher priority. The proximity of EAB and the uncertainty of knowing where EAB is currently infesting ash necessitate taking immediate actions to ameliorate some of the negative consequences that have been documented in other states.
 - Actions
 - a. Ash stands on the annual stand exam list should be scheduled for a management action that addresses the objectives above. Do not defer stands with ash for a later action. Schedule treatment as soon as possible.

Division of Forestry

- b. Work with the department's planning groups to revise SFRMP objectives and stand selection criteria to address the objectives listed above.

2. GUIDELINES FOR ALL STANDS WITH ASH

A. Reduce the stocking and average diameter of the ash component

- Rationale: Ash phloem is the larval food source for EAB. More phloem can support greater populations of EAB within any given area. The larger the tree, the greater potential to support higher EAB populations. Reducing the ash component may reduce future impacts and may help slow the spread of EAB.
- Actions
 - a. Reduce the ash component to no more than 20% of current stand basal area.
 - b. Focus on reducing the average diameter of the residual ash component. Focusing on reducing larger trees will be more effective than removing only poles and saplings. However, if scattered larger diameter trees are left to meet leave tree guidelines or wildlife considerations, remove a larger proportion of smaller diameter ash so that the overall average diameter of the residual ash is reduced from the average ash diameter before treatment.
 - c. Leave other species as residuals during harvesting or regenerate other, non-ash species to maintain a forested cover.
 - d. Use intermediate stand treatments that focus on a dominant thinning technique where larger trees are selected to be cut to reduce the size and amount of ash.
 - e. Intermediate stand treatments are often precommercial. The cut material can be left on the forest floor if biomass opportunities are limited or non-existent. EAB will not utilize dead ash trees as host material. Leaving uninfested stems on the forest floor will not create EAB habitat.
 - f. Multiple entries may be necessary. When non-ash reproduction is at least 2 - 3 feet in height, consider another ash reduction treatment.

B. Reduce the concentration of ash

- Rationale: A dispersed ash component can lessen the impacts to the stand by reducing the likelihood of EAB killing large areas of ash which may or may not have an understory of other tree species. Work to create and maintain scattered ash throughout the stand rather than maintaining pure or nearly pure ash areas within the stand.
- Actions
 - a. In homogeneous ash areas, focus on thinning dominant and codominant trees where all ash above a prescribed diameter limit are cut resulting in a reduction in the size and number of ash in the stand. See basal area and diameter guidance above.
 - b. Use scattered ash in the stand to meet the basal area goal above rather than relying on pure ash areas to meet this goal.

C. Transition sites to a composition that favors non-ash species

- Rationale: Despite all management efforts, current experience seems to indicate that EAB will kill 99% of the ash in the stand regardless of ash tree size and spatial occurrence within the stand. The ultimate strategy must be to move stands away from ash and maintain the forest community by depending on other species.
- Actions

Division of Forestry

- a. Use the native plant community field guides to determine the growth stage and refer to *Silviculture Interpretation, Table PLS-2, Abundance of trees throughout succession* to identify favorable ingressing species. The DNR web site for ECS information is: http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html
- b. Consider the regeneration strategies (tolerance) of non-ash tree species already on the site.
- c. If non-ash species are few or nonexistent, consider artificial regeneration. Try aerial seeding non-ash species as well as underplanting non-ash species even in the absence of any other kinds of stand treatment.
- d. Consider creating canopy gaps through hand felling or girdling to provide light conditions more suitable for the establishment of underplanted or seeded non-ash species. However openings greater than 60 feet in diameter may encourage ash regeneration.
- e. Use the NPC tree table, *Silviculture Interpretation Table R-1, Suitability ratings of trees*, to select non-ash species best adapted to the site.

3. ADDITIONAL GUIDELINES FOR BLACK ASH

A. Protect the hydrologic functions of the site to maintain a tree cover

- Rationale: The guiding principle for all black ash management decisions is to protect the hydrology of the site. Black ash, because of its abundance on some sites, often controls water levels in the stand. If the black ash is cut or die off, water levels often increase and there is a chance sites will convert to wet meadows or become dominated by alder. The greatest concerns are black ash communities classified in the wet forest system (WF).
- Actions
 - a. Use the Native Plant Community information along with stand site index to help guide management decisions. The greater the site index, the more flexibility in applying a management treatment that will not cause long-term alteration of the site.
 - b. General site index guidance:
 - SI = <45: Avoid all forest management actions. Do not spend resources on these sites.
 - SI = 45-55: These sites may provide limited forest management opportunities. Extreme care must be taken on these sites when trees are harvested. These sites are appropriate candidates for understory planting or direct seeding of non-ash species.
 - SI = >55: Consider management for timber with the cautions listed below for specific NPCs. Ash reduction, salvaging, and regeneration by planting, underplanting, and direct seeding to non-ash species may be appropriate. Use the NPC tree table, *Silviculture Interpretation Table R-1, Suitability ratings of trees*, to select non-ash species best adapted to the site.
 - c. When working in black ash stands, always monitor treatment results and apply lessons learned to future black ash management opportunities.

B. Precautions for specific native plant communities at risk

The following communities are at risk for hydrologic damage if the tree cover is significantly altered. Generally, management actions should be lightly applied, and follow up monitoring is mandatory.

Division of Forestry

WFn55 – Northern Wet Ash Swamp

- a. When there is substantial aspen or balm of Gilead (bam) in the stand, use partial harvesting techniques such as 2-step shelterwood and strip clearcut, or use dominant thinning when the stand is not merchantable. Suckering aspen and bam will help avoid swamping the site.
- b. When substantial aspen or bam is lacking,
 - o Stands with a site index of 55 or greater, partial harvesting and dominant thinning are possible. However, extreme care should be taken by removing not more than 50% of the basal area at one time.
 - o Stands with a site index under 55, avoid harvesting and intermediate stand treatment but consider establishing non-ash species.
- c. Underplant or aerial seed appropriate species listed in the NPC tree tables, *Silviculture Interpretation Table R-1, Suitability ratings of trees*, to select species alternates to ash. Browse protection will be necessary.
- d. In the absence of any harvesting or intermediate stand treatments, consider hand felling or girdling to create gaps for the establishment of non-ash species.

WFn64 – Northern Very Wet Ash Swamp

- a. Avoid harvesting or intermediate stand treatments.
- b. In lieu of any harvesting, consider underplanting or aerial seeding appropriate species listed in the NPC tree tables, *Silviculture Interpretation Table R-1, Suitability ratings of trees*, to select species alternates to ash. Browse protection will be necessary.
- c. Consider creating small gaps by hand felling or girdling when underplanting and seeding.

WFs57 – Southern Wet Ash Swamp

- a. This is a rare community often found near springs, mostly in rugged topography of the Blufflands Subsection and along the tributaries of the Minnesota and St. Croix rivers.
- b. Avoid any harvesting or intermediate treatments in or immediately adjacent to these communities. Allow other tree species to naturally seed or develop in the understory.