Moving Forward Based on Management Experience and Recent Research in Black Ash Wetlands

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Timeline of black ash management

**Pre-EAB**

- Manage black ash forests for black ash (or walk past it)

**EAB arrives**

- Manage EAB (Phloem Reduction Era)

**2010* on**

- Manage for resilient black ash forests

*1st Black Ash Symposium in Bemidji*
Previous experience with clearcutting and ash decline has motivated urgency around site resilience.

- Overall goal is to maintain forested wetland post EAB.

Production. Due to a raised water table and decreased transpiration, clearcutting or strip cutting on excessively wet organic peat or muck sites may result in loss of the site to brush, grass, or even cattails. On these sites, the peat or muck may remain wet and provide a habitat for waterfowl and other wetland wildlife.

Erdmann et al. (1987)
Ecological foundations for management

- Moving beyond ash "cover type" to recognize habitat types representing variety of ash systems and associated drivers

**Soil Nutrient Regime**

- Very Rich
- Rich
- Medium
- Poor
- Very Poor

**Soil Moisture Regime**

- Very Dry
- Dry
- Dry-Mesic
- Mesic
- Wet-Mesic
- Wet
- Very Wet

**WFn55**

Northern Wet Ash Swamp

Wet hardwood forest on mucky mineral soils in shallow basins and ground-water seepage areas and on low, level terrain near rivers, lakes, or wetlands. Typically with standing water in the spring but draining by late summer.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 90 plots (revised):

- Ground-layer cover is continuous, with upland forest herbs on hummocks and decaying logs and around tree bases, and wetland forest species in pools and mucky hollows. Lady fern (Athyrium filix-femina), dwarf raspberry (Rubus pubescens), and alpine enchanter's nightshade (Circaea alpina) are common and often abundant in the ground layer. Moss cover is highly variable; brown mosses can be abundant in the ground layer where not shaded out by herbaceous plants.

- Shrub-layer cover is variable, ranging from patchy to interrupted (25–75%). Black ash is common, along with mountain maple (Acer sp.).

**WFn64**

Northern Very Wet Ash Swamp

Wet hardwood or hardwood-conifer forest on peaty soils in small closed depressions or around the edges of large peatlands. Typically with standing water present throughout spring and summer.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 90 plots (revised):

- Ground-layer cover is usually >50%. Wet forest species are common, especially dwarf raspberry (Rubus pubescens), common marsh marigold (Caltha palustris), touch-me-nots (Impatiens spp.), northern bogweed (Lycopodium annotinum), sensitive fern (Onoclea sensibilis), and naked wintergreen (Mitchella rotundifolia). Graminoids, including fowl manna grass (Glyceria striata), bluejoint (Calamagrostis canadensis), and lake sedge (Carex aquatilis), are often abundant in the ground layer. Mosses generally are sparse, except for epiphytic species on black balsam and brown mosses on tree root mounds and fallen logs.

- Shrub-layer cover ranges from sparse to...
Ecological foundations for management

- **Age structures and recruitment**

- Non-ash species largely restricted to past century
- Overstory *present* during regeneration events

**Chart:**

- (a) Kupcho (*n* = 310)
  - Fraxinus nigra
  - Fraxinus pennsylvanica
  - Ulmus americana
  - Other hardwood species
  - Conifer species

- (b) Round Lake (*n* = 237)
  - Limited longevity of non-ash species

- (c) Tuomi Creek (*n* = 396)

**WFn64**

**WFn55**
Ash has historically dominated these areas, but pure ash forests were rare-microsite heterogeneity, diversity of seed sources, and gap disturbances allowed for maintenance of minor non-ash components.
Recent experience with management
Recent experience with management

Regeneration methods: Clearcutting
- Further confirmation of Erdmann et al.'s (1987) predictions
  - Water table bounce and rapid shift to marsh-like conditions
- Bigger issue in relation to objectives around EAB resilience:
  - Loss of non-ash seed source and shift to hydrologic conditions that only ash can persist under
Recent experience with management

**Regeneration methods: Shelterwood methods**

- Strip shelterwoods (30-120 ft), although recruiting high levels of ash, also increase non-ash component and maintain hydrology (1/3-1/2 stand removed at each entry)
- Larger strips to deter browse and rapidly turn over site
- Consider retaining some non-ash reserve trees in strips, where possible to maintain seed sources and structure
Recent experience with management

Regeneration methods: Selection methods

- Single-tree selection favors ash dominance (operates like shade-tolerant species on these sites)
- Group selection (0.1-0.25 acre groups) also favors ash, but provides opportunities for natural and artificial non-ash regen
- Experience with larger groups (> 0.5 acres) on poorer habitat types (WFn64) indicates risk of within-group swamping
Recent experience with management

Artificial Regeneration: Where should you plant?

• Planting success has been generally low, so prioritizing sites (and microsites) for these efforts is critical
  • Greater success on richer habitat types (e.g., WFn55, FnArI)
    • Cues: hazel, mountain maple, non-ash advance regen
  • Planting on poorer sites (WFn64, FnAbArOn) will require greater investment due to higher mortality
    • Economic costs need to be weighed against ecological consequences of losing tree cover
Recent experience with management

Artificial Regeneration: What should you plant?

• Stock type
  • Few side-by-side comparisons, but large, bare-root stock have generally been most successful across sites
    • Solution to high levels of competition in understory
    • 90% vs. 92% survival for containerized vs. large bare-root tamarack on site with extensive competition control
  • 7% survival of tamarack plugs on site with no early competition control
Artificial Regeneration: What should you plant?

- Species evaluated with demonstrated initial success:
  1) swamp white oak, 2) tamarack, 3) balsam poplar, 4) American elm, 5) silver maple, 6) white cedar (with fortification), 7) red maple, 8) hackberry, 9) black spruce, 10) burr oak, 11) basswood, 12) river birch

- Variability in results and microsites underscores importance of trying multiple species and approaches across a site
- Little experience with direct seeding
Push for liquidation may not dissipate, but increased emphasis needs to be put on what long-term options remain for the site

– Options for EAB resilience and recovery
  • Non-ash seed sources retained
  • Non-ash species encouraged through regeneration methods or artificial regeneration

– Options for rehabilitation
  • Hydrologic function maintained to allow for establishment of range of tree species
Moving forward

- Keep using silviculture to manage forest ecosystems that are threatened by an insect *versus* just harvesting a threatened tree
- Science can only happen so fast
  - Great need for informal experimentation to build silvicultural knowledgebase (see WIDNR efforts)
  - Record keeping/sharing and use of site classification
    - Great Lakes Silviculture Prescription Library
- Urgency while markets and winters still exist for managing ash
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