

## **Background Ecology and Current Trends in Collaborative Area**

The following information provides more discussion on topics related to the Mission of the North Shore Forest Collaborative.

### **A. Species Distribution -**

Tree mixes and distributions will be subject to ecological forces and landowner management strategies. Plant community types, the Minnesota Native Plant Community Classification System, and/or Ecological Landtype Associations or similar ecological classification systems should inform the management strategies. The literature and reports should be scoured for evidence as to how trees were distributed within the Collaborative area.

Current understanding leads to a few salient concerns which include: The maple forest will likely expand with changing climate; it is even doing so under current conditions. Yellow birch and white spruce were co-inhabitants of the maple stands along the North Shore. In some areas white pine, white cedar, basswood, and red oak were also included. The maple dominated stands and predictions of areas into which they may expand could provide restoration sites for these species. White pine and white cedar stands and individuals once occurred all along the North Shore. Their recovery may be limited by cooperative land owners, and funding and oversight in a land stewardship plan.

### **B. Health and Function –**

The terms “healthy” or “functioning” forest in the mission statement must be understood in relative terms given the context of this project. With human activities past and present, the forests of this landscape cannot actually function as they did before European settlement. The very nature of this proposed collaborative would rely on imposed human management to reestablish and maintain trees and forest communities. Given the main ingredients of life – light, moisture, space, nutrients, carbon dioxide, and oxygen – are available in relatively normal amounts and proportions, we could expect native plants and animals would survive and interact. Assuring all the native organisms are in their rightful place should assure a relatively normal, balance ecosystem, i.e. a healthy and functioning forest.

### **C. Climate Change –**

The Collaborative must temper its planning with forecasting on many issues. High on the list of concerns for forest planning is future weather. Current forecasts about the climate are disturbing and profess warmer temperatures in all seasons and perhaps interspersed with more violent weather extremes producing heavier rains, floods, and storms of high wind. All these trees mentioned under Goal 1 can survive in warmer climates. If protected from depredateing factors, white pine, white cedar, yellow birch, red oak, and basswood can reproduce in warmer conditions and would be favored by warmer conditions. Tamarack and jack pine may grow in slightly warmer conditions, but conditions for them to reproduce may be absent. All these trees would probably rely on human intervention for perpetual regeneration.

#### D. Suppression Factors –

Other concerns include invasive species, naturalized species, insects and diseases. Human caused intermixing of the world's organisms is causing major, ecological dysfunction in many areas. The threats to the North Shore in some cases are decades old and in other cases are impending threats. Cumulatively the threats to the ecosystem of the North Shore are increasing. They include noxious weeds such as spotted knapweed, earthworm species, insects such as emerald ash borer (not yet present but likely) and gypsy moth, and diseases such as blister rust and Dutch elm disease. Most nonnative plants benefit from disturbed soil, and soil disturbance will be required as part of the silvicultural practices to help native trees regenerate. Insect invasion will probably pose a significant challenge to the Collaborative. Currently, the most noxious of the plant invaders can be controlled (see Objective D of Mission, Goals and Objectives). A monitoring strategy will be necessary to map noxious plant locations and follow control effects.

1. Naturalized species (non-native species thriving in an area and generally not threatening the native species) are very common in this ecosystem. They include many grasses and forbs. Some are at least moderately threatening such as hawkweed. But others are now part of the vegetative diversity such as most clovers. Attempts to control these species would be futile and typically unnecessary. They are likely, however, to affect the plant makeup of any management area.
2. The emerald ash borer – This beetle destroys the nutrient transport system of ash trees. It is likely to arrive in the area within the decade and destroy the black ash component of this ecosystem. Restoring black ash may not be possible until and unless the emerald ash borer can be controlled.
3. The gypsy moth – This insect invader is present and has been for several years. Its caterpillar stage occurs in mass eruptions that destroy tree leaves over extensive areas. Outbreaks could stress native hardwoods to the point of die-back, exacerbating the current die-back and including younger trees. Gypsy moth control nationwide only ameliorates effects. Full control is not possible under known strategies. Control strategies are now being used along the North Shore.
4. Blister rust - The North Shore once had many white pine groves, patches, and individuals. It is now one of the most difficult areas in which to grow white pine. The non-native white pine blister rust fungus has found northeast Minnesota very favorable with its cool, moist conditions. Blister rust probably arrived in Northeast Minnesota in the later part of the 1930's. Seedlings and saplings are particularly susceptible to the rust whereby very few are able to grow to a pole stage and beyond. This is compounded by depredation by deer on any seedlings and saplings on the North Shore. Natural white pine regeneration is basically nonexistent here. Research continues on finding a way to protect pines from the fungus, but now it requires planting and tending efforts to bring pines into the forest canopy.

5. Dutch elm disease – Elms were never numerous along the North Shore, but occurred as scattered individuals and in groups within moist settings. Dutch elm disease has destroyed the majority of American elms in the United States. The disease is caused by a fungus carried by a small beetle. Since the disease was first documented in Minnesota in the early 1960's in the Twin Cities area, it probably arrived on the North Shore in the 1970's. No statistics are available to show the number elms surviving in the Collaborative area. Very few if any are likely. Researchers have developed elm cultivars resistant to the disease, and they are currently available for planting in areas throughout the range of the American Elm.

The above threats, in themselves, represent reasons for collaboration among landowners to help maintain our forest legacies. The Collaborative will seek to restore and/or maintain the tree species that belong here. It will require very intensive management measures in localized areas to protect at least representative communities. The results of management activities should give the forest every chance to respond to new conditions while the ancient relationships among its plant and animal are preserved. "Healthy" forest stands function ecologically even if it requires enough human energy to help preserve them against the inadvertent, human-caused pressures that could destroy them.

#### E. Patch Management

Maintaining large blocks of contiguous forestland can satisfy many goals included in restoring and maintaining a balanced ecosystem. Recovering larger blocks would provide the most ostensible effects to forest users, and would likely be the most realistic way of planning to restore forest communities. Developing core management areas along the North Shore corridor in public and cooperating private ownership may be a logical first step to approach the mission. Large areas of private ownership may have to be left out of the effort because the landowners may not want to participate. Hopefully, much of this will eventually be included, expanding the core management areas into large sections of the landscape.

Maintaining forest canopy will also benefit the water resource of the North Shore, its streams and, ultimately, Lake Superior. A restored forest with a relatively continuous canopy can moderate water runoff, protecting soil, maintaining soil moisture for nutrient uptake by plants, and maintaining stream flows.

#### F. Sensitive Species

Any efforts to restore the forest must include provisions to protect and potentially expand rare and sensitive species occurrences. Known sensitive plant locations should be included in any planning, along with new, sensitive plant surveys. Canada yew (*Taxus canadensis*), for example, is a species listed as sensitive for the Superior NF. It was once more common on the North Shore; but deer favor this plant as food, and it is unable to withstand deer browsing. Canada yew could be reestablished, along with tree species mentioned above, in areas or methods barring deer access.