North Shore Forest Restoration: Plan, Projects, Outreach Appendices

updated June2024

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Appendix A: NSFC Plan Update Process and Meeting Summaries

In 2024, the North Shore Forest Collaborative, through Sugarloaf: The Stewardship Association, received a MN Costal Program STAR grant to update the NSFC Plan. The project summary: North Shore Forest Collaborative (NSFC) will build on our successes of the last decade by working with communities and stakeholders to update our action plan with restoration projects to improve climate and watershed resiliency in the coming decade. The action plan will bring together agencies, organizations, and individuals working on forest restoration activities on the North Shore of Lake Superior creating beneficial ecosystems effects across the landscape.

The update process included evaluation and prioritization of objectives by the Executive Committee, additional refinement of objectives, strategies and action items by a Subcommittee, revision of Ecological description,

Updated Objectives

Executive Committee members were asked to evaluate the ten objectives from the 2015 NSFC Plan and rank them as a High/Medium/Low priority. Those ranked votes were then analyzed into a Priority Rank. The objectives that received the greatest number of High priority votes combined with fewer Low priority votes were given higher Priority Ranking. The purpose of ranking the objectives was to identify areas of focus for the Subcommittee to potentially spend time considering the projects mapped out under the top ranked objectives and whether projects have been completed or new projects should be added. More than one participant stated that all listed objectives were still priorities, but for the purpose of time management, they gave the objectives a higher priority if they felt it might be time to revisit these to make sure they are still outlined effectively.

Priority Rank	NSFC Objectives	HIGH	MED	LOW
1	Increase private landowner engagement	12	3	1
1	Secure multi-year funding for core operations	12	3	1
2	Restore lost components	10	5	1
2	Offer ongoing internal and external education	10	5	1
3	Minimize the introduction and spread of invasives	8	8	0
4	Increase support from private landowners	8	6	2
5	Identify focus area for restoration	7	6	3
5	Assist landowners with finding contractors	7	6	3
6	Minimize forest fragmentation	5	6	5
6	Utilize project monitoring to measure progress	5	6	5

Additional Objectives Identified

Climate Change

- Create guidelines for landowners and public agencies/organizations to select and adopt climate change strategies.
- Provide input into discussions about forest assisted migration
- Increase forest species diversity to increase resiliency in response to climate change and forest pests (EAB)
- Modify the original objective of restoring native species, incorporate something like, “restore and maintain components of the native plant communities that may survive the changing climate, at least, into the near future.” Defining the near future.
- Should the NSFC be a lead organization in promoting the science of assisted migration and practicing migration forestry? I don’t think we can be practical and avoid it.
- Impact of climate change on the coastal forest and adaptation to this impact.
- Climate change and its impacts on these restoration initiatives.
- Finding niche microclimates to prioritize species like white cedar that would otherwise be unlikely to survive climate change.
- Establishing wild seed groves throughout region
- Invasive species management, focus on appropriate tree species for a changing climate and for the area
- Develop lists of appropriate shrubs and groundcover species recommendations and share invasive plant knowledge and locations. Seek help of Chel Anderson and others.
- Describe what we are seeking as establishing more diverse, healthy, resilient forest - take focus off of native species

Coordination and Collaboration

- Better NSFC coordination with partners
- Incorporate working with partners across the landscape area
- NSFC maintains vision, convenes meetings, communicates success and projects. But all objectives remain relevant.
- Put higher emphasis on other agencies completing work with their expertise (i.e. plant community restoration or lowering forest fragmentation) rather than NSFC trying to accomplish that on landowner property - maybe identify which partners are currently/could take on these tasks for each objective.

Specifics Related to Reforestation

- Look at effects of larger housing and recreational developments
- Fragmentation - could promote establishment of larger blocks of forest, especially older forest combined with avoiding fragmentation where possible.
- Consider efforts beyond planting. Consider mature planted trees - regeneration, protection, and maintenance

Subcommittee Discussions and Meeting Summaries

The following are items suggested by partners to consider when revising the Historical and Existing Situation Section of the NSFC Plan:

1. The detriment and cost of such a high deer population in reforestation efforts

2. Assisted migration, invasive pests
3. Result of any ecological threat/issue is not the problem, it is how we as a society prevent or mitigate threat as a whole
4. How logging changed hydrology and altered dynamics of north shore rivers, so rivers are downcutting and causing erosion even though a new forest type grew after logging. It also helps to have statistics on how much old growth we have lost.
5. Deer population dynamics and tension between hunters wanting more deer and how herbivory prevents forest regeneration.
6. Role of beavers not as ecological threats but important historical drivers of both hydrology and forest ecology.
7. Forest pests and impending loss of black ash.
8. Development - not much more space, yet big houses are going in anywhere they fit.
9. Can individuals representing member agencies accept and promote the goals and objectives of the NSFC, which are specific to address the north shore ecosystem even if/where those goals and objectives may deviate from their agencies' goals and objectives?
10. Rather than focus on stream watersheds, the scope should be Lake Superior Watershed, reducing erosion through vegetation management
11. Native land management prior to 1854 treaty and its ongoing meaning for management for the coastal forest in the NSFC focus area
12. How disease and infestation impacts our forest
13. Does climate change impact intensity and type of natural disease and infestation
14. Invasive and native forest pests
15. ELB, EAB, and spruce budworm - options for prevention and post infestation management
16. How to avoid impacts from deer browse

In addition to subcommittee meetings and notes, an online form was used to capture ideas related objectives, strategies and action.

NSFC STAR Grant Discussion Form - CLIMATE CHANGE

The North Shore Forest Collaborative seeks to revitalize and maintain a healthy and functioning ecosystem along Minnesota's North Shore of Lake Superior with emphasis on restoring and maintaining native trees and associated forest communities to improve forest health, wildlife habitat, water quality, and climate resiliency. Consider the following when drafting ideas:

- *Address the emerging or future issue listed as Objective*
- *Identify current successful measures that should continue and areas that could be improved*
- *Foster knowledge collection and sharing*

_____

OBJECTIVE: Climate change (needs specifics)
STRATEGIES:

1. Increase species diversity and resiliency
    a. Increase forest species diversity to increase resiliency in response to climate change and forest pests (EAB)
        i. Ex. Have a campaign to increase the current 2,206 trees/year planted and protected on landowner property to 3,000 trees/year planted and protected. Total trees planted after 10 years - 30,000.
    b. Invasive species management

        i. Coordinate closely with Cook and Lake invasives teams both public and private property projects
        ii. Having an ongoing list of projects for a crew (like CCMI crew) to keep busy.
        iii. What will happen to forest pests (insects, fungi, etc) in a changing climate?
    c. focus on appropriate tree species for a changing climate and for the area
        i. How are these species being selected?
        ii. How are agencies making these decisions if their agency doesn't have a list?
    d. Describe what we are seeking as establishing more diverse, healthy, resilient forest (Lake Superior coastal forest specific)
        i. Restore the historical aesthetic of the North Shore forest (pre colonization - white pine, cedar)
        ii. Restore the health/function - ecological services
        iii. Accept what can grow to keep a forest
    e. Further south seed sourcing of native species as an option
        i. Some southern genetic material will do very well immediately, some will take awhile before they take hold, some native species will adapt, at least for awhile
        ii. Ask if it is necessary to bring seed from the south - what are the objectives of the lists that have been produced?
        iii. Look to existing research on the shore SFEC webinar on seed sourcing and climate zones - serotinous vs semi-serotinous
    f. What is considered "native"? Does that change with proximity to the lake?
        i. Tribal perspective on increasing native oaks along the shore - where did existing populations originate and what would they like to see happen with oak on the landscape?
        ii. Tribal focus on maintaining birch close to the lake
        iii. Consult with tribes before making any recommendations
    g. What is the ecological niche they (species we are recommending) are filling? What species are benefitting, and which are losing when species are displaced?
2. Restore and maintain native plant communities
    a. Modify the original objective of restoring native species, incorporate something like, "restore and maintain components of the native plant communities that may survive the changing climate, at least, into the near future." Defining the near future. Consider specific site requirements during analysis.
    b. Finding niche microclimates to prioritize species like white cedar and others that would otherwise be unlikely to survive climate change with the intention of keeping a seed producing population.
    c. Establishing wild seed groves of newer species throughout the region.
    d. Consider viability and regeneration of these species (species we are recommending) into the future. (Nucleation) Establish small sites for the purpose of regeneration into the future. How do we create the conditions that will be conducive for their survival?
    e. Natural regeneration - animal movement of seed.
3. Research and evaluate restoration activities
    a. Climate change and its impacts on these restoration initiatives.
    b. Impact of climate change on the coastal forest and adaptation to this impact.
    c. Provide input into discussions about forest assisted migration
    d. Research/test plots for assisted migration, native species resiliency, blister rust research, etc
        i. More formal testing methods/procedures - agency test plots

        ii. Citizen science approach to gather information - standardize data collection - NSFC Initiative
4. Provide education about climate change
    a. Create guidelines for landowners and public agencies/organizations to select and adopt climate change strategies.
    b. Should the NSFC be a lead organization in promoting the science of assisted migration and practicing migration forestry? I don't think we can be practical and avoid it.
    c. Develop lists of appropriate shrubs and groundcover species recommendations and share invasive plant knowledge and locations. Seek help from Chel Anderson and others.
    d. Create short documents for landowners and practitioners that list species that are currently documented through NSFC website and update those lists
        i. Include whether they will adapt to a changing climate or not
        ii. What is their microclimate – what microsite is best suited for each of these trees
    e. Webinar to share species lists with the public and provide background information as to how those (assisted migration) lists were created, research based, model based, incorporates discussion.
    f. Being conscious of language and considering who the audience is so the non-expert landowner can still understand and participate. Work to attract landowners beyond those with a forestry/ecology background or interest. Utilize layperson language
        i. Appealing to water quality, watershed health
        ii. Educational material in two formats - one for landowner and one for the professional
5. Address landowner reforestation needs
    a. Tree availability, fencing, planting crews for those who aren't always on their property or physically cannot plant, invasives removal
    b. Contract with partnerships to grow specific trees for landowners
    c. Lobbying to LCCMR and other federal and state grants to get the money to fund these projects
    d. Fencing Co-op to exchange old tree cages

NSFC STAR Grant Discussion Form - IMPROVED COORDINATION AND COLLABORATION

OBJECTIVE: Improved coordination and collaboration

STRATEGIES:

1. Better NSFC coordination with partners
    a. Neighbor to neighbor program landowners telling landowners to get involved in NSFC
    b. Evaluation of collaborative framework - update and see what is working
        i. Ex. executive committee - determine who participates (chair person, additional leadership) - what's the best functioning size number of members
        ii. Which partners are committed and describe the role of the collaborative better and better describe expected involvement
2. Incorporate working with partners across the landscape area
    a. Partner involvement - consistent partnership
3. NSFC maintains vision, convenes meetings, communicates success and projects. But all objectives remain relevant.
    a. Messaging to community/society that we need to prevent and mitigate threats.
4. A more detailed stewardship plan that specifies projects and associated costs

    a. Establishing priority areas for public lands and private lands - broken down by township/watershed/lowest quality/easiest to tackle
5. Annual report
    a. Monitor projects
    b. PR for organization
    c. Highlight partnering agencies' projects
6. Put higher emphasis on other agencies completing work with their expertise (i.e. plant community restoration or lowering forest fragmentation) rather than NSFC trying to accomplish that on landowner property - maybe identify which partners are currently/could take on these tasks for each objective.
    a. Sharing the work that other partners are doing to increase knowledge of their projects, increase enthusiasm and keep the group effort up front - maybe on the website
7. Framing the perspective of many landowners working together to collectively impact the forest, and looking at the natural history to help define what that forest could or should look like.
    a. LCCMR could help provide the structure or advisement
    b. Schroeder Historical Society - commonality of forest might help coordinate effort
    c. Township/watershed associations
8. Progress of projects - who is doing what and what is the progress of these projects?
    a. Database shared among partners
    b. Location and species
    c. GIS data
    d. Priority areas designated by stream watersheds or the Lake Superior watershed as a whole. Track progress of these areas over time.
9. Coordinating with landowners - best way to reach them and advertise our message
    a. Increase email list - paper advertisements/boreal news/SWCD tree sale lists/spruce budworm project landowners (only to be shared for specific purposes)
    b. Neighbor to Neighbor program
    c. Branding documents and messaging
        i. Logo
        ii. Educational materials
        iii. Contact info
        iv. Connecting information to partnering agencies/organizations
    d. Focus beyond planting to include:
        i. regeneration, protection, and maintenance.
        ii. Educate about preventative measures and post infestation treatments.
        iii. How to avoid impacts from deer browse.
10. Ideal number of meetings
    a. Based on need
    b. Specified number based on directive of grant
    c. Every other month 1-hour executive committee meeting
    d. Whole collaborative - 2/year
11. Agencies have their own pressures and goals that may not all fall under mission. Accept that those opposing goals exist but try to bring everyone together. Somehow get around that. Reinforce the mission of the collaborative.
    a. Ask for greater detail that pertains to the specific coastal forest in plans.

Roles of partners (individuals representing partnering agencies/organizations) accept and promote the goals and objectives of the NSFC even while those goals and objectives may deviate from that of their agency/organization.

Summary of June 2024 Landowner Meeting

Landowner Survey Summary

7.±.Very.Low?8.±.Low?9.±.Moderate?0.±.High?❶±.Very.High .....**PRIORITY AVG LEVEL**

1. How helpful would it be to have information on climate adaptation strategies? (Ex. growing same species from further seed trees in a nearby region, modestly expanding a species range, moving species further beyond their range)	4.1
2. How helpful would it be to identify known and potential threats to plant communities and individual species?	4.5
3. How helpful would it be to have guidance on possible actions and responses to lessen impacts of climate change?	4
4. How helpful would it be to have lists of recommended shrubs and groundcover species associated with plant communities following North Shore restoration activities?	4.6
5. How helpful would it be to have an NSFC brochure that describes available programs?	3.8
6. How helpful would receiving information through a mass mailing be?	3
7. How likely would you be to access educational information on the NSFC website?	4
8. How likely are you to use a citizen science online form to answer questions on your tree planting successes and failures?	3.9
9. Would assistance in organizing small community groups be useful to you in accomplishing your stewardship goals? (Ex. a regionally based group like a watershed or a township)	3.7

10. Are there additional projects/priorities that you would like to see added to the list on side one?

- List of disposal sites for brush, trees, etc (Cook Co)
- Connectivity among all partners
- Invasive species ID, control, prevention
- Visiting other landowner properties to learn their stewardship techniques and results
- Managing overgrowth of natives
- Procedures for obtaining seeds for assisted migration
- Procedures for planting seeds for assisted migration

11. How do you and your neighbors/community get information about NSFC and stewardship activities? Ex¡.radio?newspapers?news.releases?social.media?email?posters.at.business?etc¡.

- Email (5)
- Landowner meeting (1)
- News release (1)
- Newspapers (2)
- Master naturalists (1)
- Work (1)
- Sugarloaf (1)
- Radio (1)
- Social media (1)

12. Who are trusted sources you can rely on to get information? Ex¡.specific.websites?local. agencies.or.organizations?neighbors?etc¡

- Specific websites (2)
- Neighbors (1)
- News Herald (1)
- Boreal site (1)
- SWCD (2)
- DNR (2)
- USFS (1)
- University of Minnesota Extension (3)
- NSFC (2)
- Radio (1)
- Sugarloaf (1)
- Library (1)
- Mike (1)
- Master Naturalist (1)

ACTIONS

Education

- What to do once dead spruce and balsam are removed (6)
- Determining in microhabitats the correct species composition to thrive (1)

Restoration

- Creating a fire-wise plan with neighbors or management (4)
- Plant and protect (such as fencing) for the future - for the next generations after we have passed on (1)
- Physically planting trees (10)
- Increase diversity while maintaining cover (4)

Collaboration

- Turn property into a protected area (ZC or SFIA) (1)
- For rental properties (condos, Airbnb, VRBO) provide “certification” of care for woodland (i.e. Tree City USA) (1)

BARRIERS

Education

- Education about the pros and cons to different management options and promoting survival of plantings (12)

Restoration

- Cost to manage and increase density of areas, hire help, create stewardship mgt plan (11)
- We do not “own” the land, we are just current occupants (1)
- Nurturing planted trees over a longer time scale than individual ownership (2)
- Clearing hazel leading to more birch or other species mortality (4)
- Age/physical ability to plant, cage, remove dead trees (8)
- Planting in the interior in a forest with poplar, birch and other trees with varying health (1)

Collaboration

- Communication of many small landowners who don’t know each other (2)

ISSUES

Education

- How to clear hazel and competitive natives and keep it clear to prepare for planting (19)
- Spruce budworm and what to do once the dead trees are removed (13)
- Knowing about the top invasives facing the North Shore (6)
- How does the power company clear cuts under powerlines (right of way) impact overall forests adjacent to these areas (2)
- What to do about black ash - cut trees, let them stand, underplant (1)

Restoration

- Human encroachment leading to habitat and forest connectivity loss due to fragmentation (10)
- Funding/project cost and time (12)
- Sustainable economics - how can we do it long-term (2)
- Erosion control of shallow and poor soil post large spruce die-off and removal (1)
- Existing trees dying faster than replacements can grow up (2)
- Deer browse and overbrowse of natives (trees and understory) and eliminate desired species (2)

Collaboration

- Connecting property owners who are often seasonal (ex. 118 fire numbers (parcels) on lake side of 61 between Caribou wayside and Temperance park = one forest) all these small parcels make up a continual forest, and how do we get them all on the same page - microsection along the shore (1)

AWARENESS

Education

- Sharing knowledge and experiences (1)
- Tree identification vs fir (1)
- Wildlife specialist could share benefits of native trees and connected forested corridors to wildlife populations (2)
- Education about early detection species, pathogens, and pests (6)
- Non-tree planting suggestions like seed lists and ground covers (2)
- Educate power company and work crews so they know what to cut and what to leave and educate landowners on power company practices (2)

Restoration

- Increasing funding per acre or per project (6)
- promote/facilitate SFI program (2)

Collaboration

- Building a local community (1)
- Email and mailing lists of funding options (6)

THANK YOU FOR TAKING THE TIME TO FILL OUT THIS NSFC SURVEY!

If.you.are.willing?please.fill.out.these.final.questions¡.The.NSFC.is.always.looking.for.new.ideas.and.willing.partners.to.help.us.accomplish.more¡

Would you be interested in helping the NSFC in assisting with any of these activities?

Y / N Identify Known and potential threats to plant communities and individual species
Y / N Draft guidance on possible actions and responses to lessen impacts on climate change
Y / N Draft lists of recommended shrubs and groundcover species associated with plant communities following North Shore restoration activities
Y / N Help with writing and designing a brochure or assisting with mass mailing materials

Would you be interested in helping the NSFC in assisting with any of these activities?

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Y / N Draft lists of recommended shrubs and groundcover species associated with plant communities following North Shore restoration activities
Y / N Help with writing and designing a brochure or assisting with mass mailing materials

Appendix B: 2015 Meetings for landowner input into the NSFC Plan

January 28 & 29, 2015
Jan. 28 Location: Gunflint Ranger District Office, Grand Marais, Cook County, MN.
Time: 6:00 PM until 7:30 PM
Attendance: 18 landowners, 5 members of NSFC

Jan. 29 Location: County Courthouse Conference Room, Two Harbors, Lake County, MN.
Time: 6:00 PM until 7:30 PM
Attendance: 20 landowners, 3 members of NSFC

Agenda (for both meetings)

- 20 minute presentation (need for action, mission, goals and objectives of NSFC, potential projects, how landowners can be involved.)
- Handouts on potential projects, types of assistance available, how landowners can be involved.
- One hour open discussion with landowners on how they can become involved, their ideas on projects, landowner-to-landowner involvement, filling out volunteer forms.
- One-on-one discussion with individuals following the meeting.

Publicity for meeting:

- News Release published in Duluth News Tribune, Lake County News Chronicle, Northland Smart Shopper, and Cook County News Herald.
- News Release also covered by WDIO TV and WTIP radio.
- Paid Ads in Lake County News Chronicle, Northland Smart Shopper & Cook County News Herald.
- Two Harbors meeting was filmed in its entirety by Two Harbors Cable Access TV and news coverage and film of the meeting ran on all Duluth TV News stations.

December 5, 2014 and January 27, 2015
Landowner Engagement Training with U of M Extension Service (Parts 1 & 2)
Location: Tettagouche State Park Visitor Center, Silver Bay, MN
Time: 10 AM until 3:30 PM
Purpose:
Session 1 - Learn how who our landowners are, and how to more effectively engage them in the collaborative, and with each other.
Session 2 – Focus on Landowner to Landowner peer learning.
Attendance:
December: 14 participants, 3 instructors/facilitators
January: 16 participants, 3 instructors/facilitators

October 24, 2014
North Shore Forest Collaborative – Fall General Meeting
Location: Recreation building, Silver Bay, MN
Purpose: Update on NSFC Activities for members, including presentation about NSFC Plan development
Attendance: 15

June 13, 2014
Landowner Workshop
Location: Wolf Ridge Environmental Learning Center, Finland, MN
Time: 12 Noon until 3:30 PM
Purpose: Instructional info for landowners. Part of the meeting was small group interaction by geographic location for landowners to talk about their needs and desires for their lands, including how NSFC can be of greater help to landowners.
Attendance: 40 landowners, 12 presenters

The following postcard was sent to over 700 north shore landowners. A news release was also sent to Duluth and North Shore news media and WTIP radio.

Additional Contacts Regarding Landowner Involvement

Summary of Discussion on Private Landowner Engagement
Chris Ewing of American Forest Foundation and Duane Lula, NSFC

On August 29th, 2014 I had an approximately 45 minute phone conversation with Chris Ewing of the American Forest Foundation. They have a private forest landowner engagement project going in the Cumberland area of Alabama. While their project is far larger than ours, it has several similarities with the NSFC projects, and they have used some interesting methods of contacting and engaging landowners.

Change in emphasis of private landowner objectives: Chris mentioned that past efforts have focused on stressing the economic aspects (primarily timber) of managing private forestlands. He says that recent studies have shown that the income objective has dropped from being the #1 priority in past years, to the 5th priority today. Nature, wildlife, and a healthy forest are far more important today.

In the past, they would send a forester out to a landowner and they delivered primarily a timber management message. They realized that this did not leave a very good impression, and they got relatively little response or call back based on that first forester contact.

Today, they ask them to accept a package of information in the mail. They have all their collaborative partners put their logo on the info package. This helps build credibility as they have a large and varied partner involvement. Next, they follow-up with an offer to send someone out to the property for a one-on-one visit with the landowner. This is often a peer, sometimes a neighbor, but it also may be a biologist or a forester.

In making contacts by mail during a campaign to grow their certified acres, they initially sent out 10 thousand mailings and they received only 100 responses. (1% response rate) Now, they do a series of repeated mailings. They only send out 4 thousand, but they follow it up with 2 or 3 additional mailings with more information. They include information about wildlife and recreation in addition to timber. They found the response rate increases and peaks after sending out the 3rd info packet. They achieved a 13% response rate with this method.

They also communicate with their contacts on a monthly basis.

For those landowners who express interest, they have two ways to approach landowners.

1. They have 20 foresters/professionals who have volunteered to make a 1st on-the-ground visit for free. After that initial visit, there would be a charge. The foresters give their notes from this first visit back to the collaborative.
2. On another project, they actually have a paid forester on their staff plus they have some consultants that do a first visit for free.

Also, there is another AFF collaborative forest project in the driftless area of Wisconsin and one along the south shore of Lake Superior.

Appendix C: Trees Species for Minnesota's Coastal Forest

This informational sheet was developed in 2024 through an LCCMR Grant to hand out at site visits for the Woods Walk Advisory Program and into the future.

Introduction

Knowing what trees should be planted in the coastal forest depends on knowledge of the forest types found in this area. This information can be found in the Native Plant Communities or Minnesota: The Laurentian Mixed Forest Province. This document is a consolidation of information from the documents, Desired future condition and Restoration Guidance for the North Shore Till Plain, and Desired future Condition and Restoration Guidance for the Split Rock Till Plain. These documents were authored by the North Shore Forest Collaborative Technical Committee. The till plains are ecological subdivisions known as Land Type Associations (LTA's). They are divided at Beaver Bay. The Split Rock Till Plain is from Beaver Bay to near Duluth and the North Shore Till Plain between Beaver Bay and Grand Portage. They form a strip of land 1 to 5 miles wide with an averaging width of 3 miles wide inland from Lake Superior.

Climate change may shift the mix of native species to different proportions than exist today. For example, some very rare species or species not present in the coastal forest today may be appropriate in the future. Rare and uncommon native plants discovered should be considered high priority for protective measures.

For ease of use the following guidance is presented for the entire shore rather than for the north and south till plain areas. A brief description of restoration efforts needed in Northern Hardwood and Mixed (hardwood and conifer) Forests is presented, followed by recommendations for tree species.

Knowing what species to plant is helpful however knowing the specific site conditions each tree needs to grow and thrive will also be required. Specifically, what site is best suited for the growth of these trees. This requires knowledge of the tree, soils, soil moisture, aspect, light requirements, ability to survive competition and other microsite factors. Matching the tree to the site will become increasingly important as the climate warms. The guidance for planting site selection can come from the North Shore Forest Collaborative Site Visit Advisor or other natural resource professionals.

Species Recommendations by Forest Type: Hardwood or Mixed Forest

Hardwood Forests

These are forests typically dominated by maple or are forests becoming maple dominated. They occur in the higher elevations of the till plain. These forests had a more diverse mix of tree species listed below. Encourage a mix of species by seedling, planting and encouraging natural regeneration. Natural regeneration can be encouraged by scarifying the soil and protecting the seedlings that sprout. Use existing canopy gaps or create canopy gaps as needed. Protect newly planted trees and wild seedlings with fencing. Restoration objectives should result in an increased frequency of desired species either as individual trees, small groups of trees, or small to medium-sized patches of trees.

High priority species to encourage in hardwood forests include the following conifer and hardwood species.

Conifer Tree Species
White pine (Pinus.strobus), white spruce (Picea.glauca), and white cedar (Thuja.occidentalis).

Hardwood Tree Species
Yellow birch (Betula.alleghaniensis) , paper birch (Betula.papyrifera), and black ash (Fraxinus.nigra). As a minor or infrequent component, encourage American elm (Ulmus.americana), ironwood (Ostrya.virginiana), basswood (Tilia.americana), bur oak (Quercus.macrocarpa) and red oak (Quercus.rubra). Maples need not be protected and other species such as black ash and paper birch may be protected where desired.

Mixed Forests

These forests occupy most of the lakeside landscape. Much of this area regenerated to aspen and birch following major fires that occurred 90 or more years ago. Fires of the scale that occurred in the early 1900's were not the norm for this forest type. Prior to the logging era and fires this area was once dominated by cedar, pine, spruce and a mix of other tree species as listed below.

Restoration objectives should result in an increased frequency of priority species as individual trees, small groups of trees, and small to medium-sized patches. Restore and maintain a mix of species by seeding, planting, and encouraging natural regeneration. Natural regeneration can be encouraged by scarifying the soil and protecting the seedlings that sprout. Fencing is needed for all species except white spruce to protect them from deer and hare. With white spruce, an increased frequency of planting and protection should not be needed.

High priority conifer and hardwood species to encourage in mixed forests include:

Conifer Tree Species
White cedar, white pine, white spruce, and tamarack (Larix.larcina) are the priority conifer species for restoration in mixed forest.

Hardwood Tree Species
Yellow birch, and American elm, black ash, red oak and bur oak are the priority hardwood species for restoration in the mixed forest. Black ash and green ash (Fraxinus.pennsylvanica) will likely need attention if, and when the emerald ash borer is controlled.

Other Tree Species for the mixed forest

The following should be considered for planting as a minor stand component in appropriate locations: basswood, ironwood, paper birch, heart-leaf birch (Betula.cordifolia) , black ash, green ash, red maple (Acer.rubrum), sugar maple (Acer.saccharum), jack pine (Pinus.banksiana), red pine (Pinus.resinosa), and Canada yew (Taxus.canadensis).

Other species will be included as we develop better knowledge of how best to maintain a diverse forest as the climate changes. We seek large patches of predominantly mature, diverse forest across the coastal forest landscape that have potential for growth and diversity of these native plant communities.

Species Recommendations for all Forest Types

• White cedar is the highest priority species north of Beaver Bay and third highest priority south of Beaver Bay. North of Beaver Bay more emphasis for planting and maintenance should be focused on white cedar, south of Silver Bay more emphasis for planting and maintenance should be focused on white pine. White cedar can be maintained as the climate warms in lowlands and on uplands with groundwater seeps and subsurface drainage. Decimating effects from herbivory can be modified by protection. It is desired to increase the amount of white cedar on most upland sites, and to restore or maintain its presence on lowland sites.

• White pine is the highest priority species to manage for increase south of Beaver Bay and 3rd highest priority north of Beaver Bay. Its numbers and distribution have decreased markedly from the 1850's. Planting will increase abundance on most sites. Protect planted and naturally regenerated seedlings with fencing. White pine should occur as individuals, small clumps, or small patches. Prune lower branches to increase air flow and to discourage blister rust. White pine habitat and growth is predicted to increase with a warming climate, although the future impact of white pine blister rust is not known. Therefore, if available, plant white pine that has been selected for resistance to blister rust.

• White spruce is the second highest priority species for occurrence, not management, in the coastal forest. Planting and protection are not typically needed where mature (20 plus year old trees) will provide a seed source. Plant white spruce in appropriate areas where it is currently lacking. Also, white spruce is less prone to damage by deer and hare. White spruce habitat and growth is predicted to decline with a warming climate. While climate change may reduce its vigor, it should survive well enough to persist in the native species mix. Its "second highest priority" status relates to desired frequency. White spruce should occur as individuals and small groups, and smaller stands. It may range between uncommon to abundant.

• Tamarack and yellow birch are the fourth highest priority species to manage for restoration. Tamarack is well suited to wetter sites. Though both do well in deeper soils. Restoration efforts will include planting and protection. Natural regeneration can be encouraged by exposing bare mineral soil in a process known as scarification. Tamarack and yellow birch should occur as clumps or small patches on suitable sites. See below for more on yellow birch.

• Balsam fir (Abies balsamea) does not need restorative management. Balsam fir is ubiquitous and will remain so even after extensive areas have been killed by spruce budworm. Balsam fir seeds survive in the soil, germinate readily, and can survive in dense shade. Balsam fir may decline in frequency as the climate warms.

• Balsam poplar (Populus balsamifera) also does not need restorative management. Balsam poplar is best adapted to wetter sites and can be an aggressive species keeping other species from regenerating. Balsam poplar may decline in frequency as the climate warms.

• Paper birch increased in area significantly after fires along the North Shore of Lake Superior during the early 1900's. Paper birch is expected to decline on most sites due to climate warming, age, drought, and insects. On most sites paper birch will stump sprout so there is little need to plant it. Plant other native species on sites where paper birch has declined. Where paper birch is desirable, for example for aesthetic or cultural reasons, establish it on moist, not wet, sites. On these sites paper birch will thrive and attain the size needed for quality birch bark. Plant it if there is an

appropriate gap in the canopy or encourage birch regeneration near mature birch trees by scarifying the soil. Paper birch should occur as individuals, clumps, and may dominate small to medium sized patches.

• Yellow birch can be found on moist and wetter inclusions in the mixed forest and hardwood forests. Either plant this species in canopy gaps on appropriate sites or scarify the soil in moderate to full sun near mature trees. This will provide a suitable site for yellow birch regeneration. Yellow birch should occur as individuals or groups on favorable sites. Protect planted and natural regeneration of this species with fencing.

• Heart-leaved birch should occur as individuals, clumps, and may dominate small to medium sized patches. Heart-leaved birch is a distinct species from paper birch. Treat heart-leaved birch as under paper birch above. Planting and protection for this species may be desired for aesthetic, and ecological purposes.

• Quaking aspen (Populus tremuloides) should be managed to reduce its dominance. Leaving single stems or small clumps of aspen to "succeed" out their existence while diverse stands are developed around them is desired. In forest stands dominated by aspen planting a diversity of species in gaps, protecting priority tree species that are regenerating will help transition aspen stands to mixed forest or hardwood forest. Aspen may occur as individuals, or in small groups. Small to medium aspen patches should be targeted for diversity planting to reduce aspen dominance.

• American elm has declined since the introduction of Dutch-elm disease to Minnesota in the 1960's. American elm was found on many sites in the coastal forests area. It does well on moist sites and wetter inclusions, but not on permanently saturated sites. American elm should occur as individuals, or small groups on favorable sites. American elm restoration efforts may include planting seedlings from survival parents that are likely to contain some tolerance to Dutch elm disease as suggested by Carrie Pike, USDA Forest Service

• Basswood should be maintained where it occurs. It may be among those species encouraged for expansion depending on its reaction to climate change. It may be planted as a minor component in better soils particularly in the Split Rock Till Plain south of Beaver Bay.

• Jack pine is a minor component of the coastal forest. It should be maintained in scattered, ecologically appropriate locations, usually on sites of drier, shallow soil, and exposed bedrock. Protection of trees in small areas is sufficient for restoration efforts.

• Red pine was a small component of the coastal forest. Red pine may be maintained where it occurs. It should not be planted in high numbers that create monotypic stands. It may be planted as a very scattered component of other conifer stands in deeper well drained sites. Existing red pine stands should be diversified with species appropriate for the site.

• Black ash and green ash should be maintained to the extent possible. Emerald ash borer has not yet been found along the North Shore. Once established, emerald ash borer is expected to kill nearly all ash. Black ash occurs as individuals or in stands. There is research into resistance breeding. Identifying lingering black ash after EAB survives will be important. Where lingering ash is found, monitor these sites to observe the growth, decline and regeneration of this species. On

black ash sites planting tamarack, bur oak, northern white cedar, and balsam poplar is recommended.

• Sugar maple is not in need of restoration. It has and is expanding its range and dominance throughout upland sites. A warming climate is predicted to further increase its occurrence and growth. Diversify sugar maple stands by fostering planting the species recommended above as suited to the site. In addition to several of the species included above, planting maple as a minor component may be recommended for restoring balsam stands killed by spruce budworm.

• Red maple is likely to increase through natural regeneration. Red maple can be aggressive (begin to dominate a site). Planting it is generally not recommended but it may be planted to increase species diversity where other options are limited or unsuccessful.

• Black spruce (Picea.mariana) is often found with white spruce. It is also typical on wet sites where tamarack and white cedar are often co-inhabitants. It is an important native conifer. On sites where it is found, monitor these sites to observe the growth, decline and regeneration of this species.

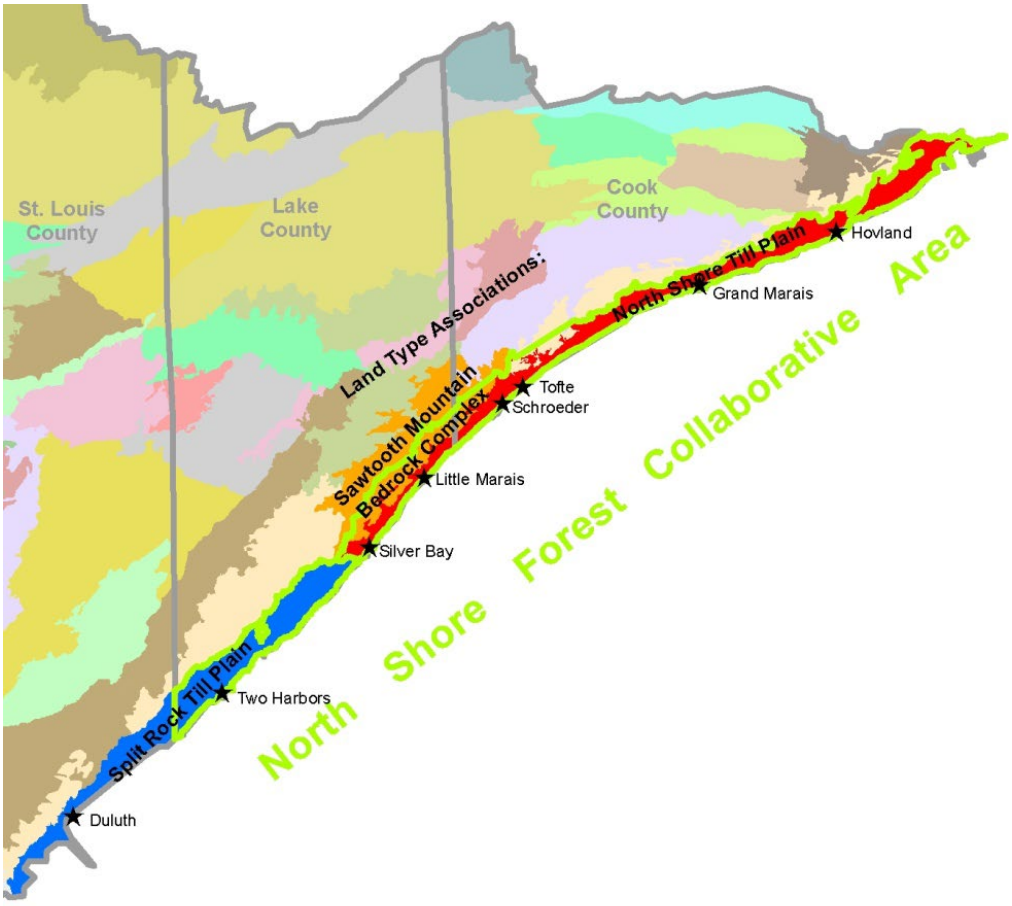
• Bur oak and ironwood may be among those species that expand along the North Shore as a result of climate warming. Bur oak has been observed to be naturally seeding on private property along the North Shore. Both species will grow in upland sites. Bur oak will also grow in mixed, hardwood and wet forests. Fence both bur oak and ironwood seedlings when they are found. As a minor component, either may be planted to diversify the hardwood or mixed forests.

The.bur.oak.found.in.Carlton?St.Louis?Lake.and.Cook.Counties.is.a.naturally.occurring.variety.of.bur.oak?known.as.Quercus.macrocarpa.var¡.oliviformis¡.This.small.seeded.variety.is.found.between.Duluth.and.Two.Harbors.as.well.as.in.scattered.sites.along.the.shore¡.Bur.oak.in.most.of.its.range.has.an.acorn.7.to.8.inches.in.diameter.as.compared.to.the.oliviformis.variety.which.is.9–4to.7.inch.in.diameter¡.Planting.the.oliviformis.variety.from.local.seed.sources.is.recommended¡.Click.to.see.Historic.context.and.the.range.of.bur.oak¡.

Appendix D: Development of Ecological Landscape Desired Future Conditions/Goals/Objectives

The Desired Future Conditions (DFCs) were developed by the Collaborative's technical working group (Chel Anderson, Lissa Grover, Dave Ingebrigtsen & Myra Theimer, 2015) in response to a need to focus our efforts on the most important components of forests and forest habitat to restore. While there are areas where much forest restoration work is needed, there are other areas where a great bounty of natural resources in functioning ecosystems need to be sustained. The Collaborative has developed DFCs and Objectives to address both needs.

More detailed Desired Future Condition information can be found in attachments: Desired Future Condition and Restoration Guidance for North Shore Till Plain LTA and Desired Future Condition and Restoration Guidance for the Split Rock Till Plain LTA



Background

The North Shore Till Plain Land Type Association (LTA) is a level to rolling landscape with a climate modified by Lake Superior. Soil parent materials are predominantly clayey sediments from Glacial Lake Duluth and lake –modified clayey till. Coarse, sandy loam Superior lobe till is

present at higher elevations. There is a considerably range in soil depth and prominent outcrops of North Shore Volcanic bedrock, typically isolated except along the Superior shore, are common in the LTA. There are 1.17 miles of streams per square mile. Inland lakes occupy less than 1% of the LTA. The zone of Lake Superior's climate influence generally corresponds with the upper extent of clayey lake sediments.

North Shore vegetation is recovering from a sequence of events following large-scale conifer logging in the early 1900s. Logged-over areas with abundant slash burned hot during a period of years with drought and excessive heat. The resulting young forest was different from the forest that had developed under a disturbance regime of stand-replacing and surface fires. Drought and excessive temperatures in the 1930's and lack of seed trees produced areas of forest with less biodiversity and dominated by birch and aspen.

According to analysis of Public Land Survey Bearing Trees compared to modern forest inventory data (see Appendix), the North Shore Till Plain's white pine (-97%), white spruce (-77%), balsam fir (-53%) and white cedar (-49%) have declined; while paper birch (+45%) and aspen (+511%) have increased. Since the early 1900s, growth stage distribution as well as size and distribution of forest patches were altered by the large fires and pulses in logging activity as the stands have matured.

Issues that affect the modern-day forest include lack of seed source, fire disturbances have been eliminated by suppression, selective browsing by a burgeoning deer population and changes in climate. These factors have affected the successional pathways of the native plant communities. Resulting forest stands may not have the capacity to sustain themselves or the wildlife dependent on their habitat. For example, some of the relatively monotypic birch stands that resulted from the slash fires are now declining. Lack of seed source and deer browsing control the amount and opportunity for other tree species to succeed the birch.

Consideration of Driving Factors

Changes in the climate will drive natural processes that determine the North Shore's vegetation and habitat. The best scientific projections have been considered when assessing the future forest and the desired future conditions were developed to encourage resilience of the forest in the Collaborative Area to potential climate change effects.

The NE Landscape Plan has considered the social and economic factors that affect the whole region. In the North Shore Collaborative Area, the Collaborative has agreed to work within the recommendations of the NE Plan but will make recommendations that emphasize the unique qualities of the North Shore. These qualities include outstanding recreational, scenic and economic opportunities as well as unique and even rare natural resources. The whole Collaborative Area is in the Lake Superior watershed and contains abundant clean water, trout streams and wetlands.

Guiding Principles for Developing DFCs for the North Shore Till Plain

- Determine plant species location and density:
    - Per system, class, and type
    - Per growth stage

- Determine appropriate plant community management options in order to:
    - Maintain and increase the composition of all native species.
    - Protect structure.
    - Provide coarse woody debris: 2-5 downed logs greater than 12 inches in diameter, per acre, if possible.
    - Maintain existing quality, maintain rare species and enhance native species diversity.
    - Control invasive species.
- Consider climate change when determining treatment options.
- Minimize and reduce fragmentation and maintain and improve landscape scale connections (Goal 1, Obj. C; North Shore Forest Collaborative 2011).
- "Any DFC statements will be based on the Range of Natural Variability (RNV)" (North Shore Forest Collaborative 2011).

Table 1. North Shore Till Plain Tree Species

Tree Species	BT %	FIA %	Comparison of BT to FIA
Balsam Fir	29.6	14	Decline, 2 to 3-fold
Paper Birch	22.6	32.7	Some increase
White Spruce	18.4	4.3	Decline, 3 to 5-fold
White Cedar	16.6	8.4	Some decline
Quaking Aspen	3.8	23.2	Increase, 5 to 10-fold
White Pine	3.1	0.1	Decline, > 10-fold
Tamarack	1.6	0	Rare as bearing tree
Yellow Birch	1.4	1	Rare as bearing tree
Black Ash	1.4	3.3	Rare as bearing tree
Basswood	0.5	0.5	Rare as bearing tree
Black Spruce	0.4	1.3	Rare as bearing tree
Sugar Maple	0.3	6.5	Rare as bearing tree
Balm Of Gilead	0.2	3.3	Rare as bearing tree
Red Maple	0	0.4	Rare as bearing tree
Red Pine	0	0.2	Rare as bearing tree
Jack Pine	0	0.8	Rare as bearing tree
Cherry	0	0.2	Rare as bearing tree
American Elm	0	0	Rare as bearing tree
Ironwood	0	0	Rare as bearing tree
Red Oak	0	0	Rare as bearing tree
Bur Oak	0	0	Rare as bearing tree
Box Elder	0	0	Rare as bearing tree

Appendix E: Explanation of Projects from 2015 NSFC Plan

This project list will be dynamic. Projects will be reviewed, added, dropped or modified as the need arises. These projects were developed over a course of time. Some are in the process of being implemented and others are listed for potential implementation in the future. Projects were developed by Collaborative members, the Executive Committee of the Collaborative, and presented for review at the public meetings held in January of 2015.

Projects are tied directly to the Goals, Objectives and Strategies identified in Chapter 2 of this plan. For example, Project 1A1 addresses Goal 1, Objective A, and Strategy 1 under that objective. Where there are multiple projects under a specific strategy a small letter is also used. (Project 1A1a, 1A1b, etc.). Although many of the projects may address more than one goal, strategy or objective, they have been grouped under the category most relevant.
Note: Most, but not all strategies have a project tied to them at this time.

In addition, each project is classified as either an Administrative, Operations, or On-the Ground project.

- Administrative – those projects needed to efficiently and effectively manage the restoration program.
- Operations – those projects that lay the groundwork for on-the-ground projects.
- On-the-Ground – As the name indicates. Those projects that involve physical restoration activities.

Each project contains the following information

- Title – descriptive name identifier of project
- Number – numbering tied to goals, objectives and strategies
- Type – Administrative, Operations, or On-the-Ground
- Summary – a short, descriptive paragraph describing the project
- Task Duration: estimate of length of project
- Who involved: agencies, groups or individuals (where known)
- Partnering Organizations: potential partners for the project
- Estimated Cost: (where known)
- Potential Funding Sources: likely funding sources (or actual, where known)
- Units: acres, items, events, etc.
- Measures of success: How will we gauge success?
- Primary Contact: Who to contact for information (where known)

Projects related to Goal 1- RESTORATION: Reestablish and Maintain a Diverse and Thriving Forest along the North Shore of Lake Superior.

Project Title: Develop and Maintain Calendar of On-going and planned Restoration Projects.
Project Number: 1A1 Project addresses:
Objective A: Restore lost components of Native Plant Communities

Strategy 1: Develop and/or support multiple restoration projects throughout the area. Facilitate multiple landowners restoring their lands in a similar timeframe to promote landscape-level treatments.
Project Type: Administrative
Project Summary: Several restoration and forest management projects are currently ongoing and planned in the NSFC area, both large governmental projects (USFS restoration projects, DNR timber sales, NNIS treatments) and small operations on private lands (planting, harvesting or treating NNIS on small acreages). With its distance to markets and many small landowners, it is often difficult to interest contractors (loggers, planting/tsi crews, etc.) in small sized project areas. With scattered, isolated, and sometimes unknown projects being implemented, landscape effectiveness is not maximized. By keeping a calendar of ongoing and planned restoration activities and their implementation schedule, better coordination can improve both operability and effectiveness of restoration treatments. This task will require regular updating to maintain useful data and timeframes of projects.
Task Duration: 1 year, but ongoing updates required
Who involved: NSFC members, NSFC Project Coordinator
Partnering Organizations: DNR, USFS, NRCS, Sugarloaf, Consulting Foresters, Private Landowners
Estimated Cost: To be determined
Potential Funding Sources: Grant Opportunities
Units: Annually updated list of planned and completed projects
Measures of success: Increased coordination among landowners, improved project operability
Primary Contact: NSFC Project Coordinator

Project Title: Superior National Forest North Shore Restoration Project.
Project Number: 1A1a Project Addresses:
Objective A: Restore lost components of Native Plant Communities
Strategy 1: Develop and/or support multiple restoration projects throughout the area. Facilitate multiple landowners restoring their lands in a similar timeframe to promote landscape-level treatments
Project Type: On-the-Ground
Project Summary: Project involves restoring native vegetation communities, improving wildlife habitat, and improving watershed health. Actions include underplanting, site preparation and exclosures.
Project is located on National Forest System lands that extend from Grand Portage Reservation to Schroeder, within North Shore Forest Collaborative Boundary.
Task Duration: 2014 to 2029
Who involved: USDA Forest Service, contract loggers, planters, tsi and invasive treatment crews.
Partnering Organizations: Estimated Cost: $1.7 million
Potential Funding Sources: Grant Opportunities. Units: XXX acres proposed to be treated
Comments: Forest Service seeks to partner with any other landowner or land manager.
Measures of success: Acres successfully treated, regenerated to desired species
Primary Contact: USFS, Becky Bartol

Project Title: Cascade River and Spruce Creek Watershed Restoration
Project Number: 1A1b Project Addresses:

Objective A: Restore lost components of Native Plant Communities
Strategy 1: Develop and/or support multiple restoration projects throughout the area. Facilitate multiple landowners restoring their lands in a similar timeframe to promote landscape-level treatments.
Project Type: On-the-Ground
Project Summary: Restore forest on USFS and DNR lands by planting trees and protecting them from deer.
Task Duration: 2014 to 2017 Who involved: MN DNR
Partnering Organizations: Sugarloaf, USFS
Estimated Cost: $400,000
Potential Funding Sources: CPL grant
Units: 997 acres proposed to be treated
Measures of success: Acres successfully treated, regenerated to desired species
Primary Contact: Sugarloaf

Project Title: Work to ensure genetically appropriate planting stockand adequate supply for restoration efforts.
Project Number: 1A2 Project Addresses:
Objective A: Restore lost components of Native Plant Communities
Strategy 2: Secure/improve planting stock available for restoration effort.
Project Type: Operations
Project Summary: Currently available species for planting may not be appropriate (wrong geno- or phenotype) and not available in enough quantity for North Shore restoration efforts. For an effective restoration effort, it is important to have good quality stock with the genetic makeup consistent with those individuals that established and thrived in the environment of the North Shore forest. Planting stock with resistance to diseases such as white pine blister rust is vital to the restoration effort. Working with the Minnesota Tree Improvement Collaborative (MITC), the U of MN Forestry Department, DNR nurseries and local landscape businesses will help ensure that planting stock acquired by either the collaborative or by individual landowners will be appropriate and best suited for restoration efforts. Providing information to local planting businesses will help them provide both an appropriate product and useful information when selling stock and providing advice to local landowners. This may be a good opportunity for a University of MN graduate student to head up this effort.
Task Duration: 2 years
Who involved: Univ. of MN grad student working with partner organizations
Partnering Organizations: MITC, U of MN Forestry, DNR
Estimated Cost: To be determined
Potential Funding Sources: Univ. of MN, DNR, Legacy Funds. Measures of success: Availability of appropriate planting stock. Primary Contact: NSFC Technical Committee

Project Title: Develop Ecological Desired Future Conditions and Objectivesfor Split Rock Land Type Association
Project Number: 1A3 Project Addresses:
Objective A: Restore lost components of Native Plant Communities

Strategy 3: Develop ecologically based, restoration desired conditions and ecological site descriptions.
Project Type: Operations
Project Summary: Area-specific Desired Future Conditions (DFCs) and Objectives are needed to guide the restoration process. Such ecological information has been developed by the NSFC technical team for the North Shore Till Plain Landtype Association (northeastern area) , but remains to be done for the Split Rock Till Plain LTA (southwestern area). Development of such direction takes knowledge of ecological principle and their feasibility of application. Without such information, efforts at restoration will be more haphazard and progress will be difficult to address. DNR Native Plant community classes and types will be used in developing DFCs and Objectives. Document will assist in developing specific guidance and checklists for resource professionals (consulting foresters, etc.) as well as more basic information and guidance for landowners.
Task Duration: 6 -12 months
Who involved: NSFC Technical Committee
Partnering Organizations: DNR, USFS, Pvt. Landowners, Grand Portage Tribe, Consulting Forester
Estimated Cost: To be determined
Units: 1 Document covering XXX acres
Measures of success: Document (approved by NSFC executive committee). Readability, understandability and usability of document for other resource professionals
Primary Contact: NSFC Technical Committee

Project Title: NRCS - Develop Ecological Site Descriptions of North Shore Highlands
Project Number: 1A3a Project Addresses:
Objective A: Restore lost components of Native Plant Communities
Strategy 3: Develop ecologically based, restoration desired conditions and ecological site descriptions.
Project Type: Operations
Project Summary: Complete a minimum of two Ecological Site Descriptions per year for the dominant soils and plant communities of the region. Starting in FY 2015, we will begin focusing on the North Shore Till Plain LTA and associated degraded FDn43 plant communities. To date, we have been working on that, but have mostly worked on the highlands above the lake. NRCS is working with the NSFC Technical Committee to help guide the development of products. They are also partners with the soils and ecology staff on the Superior National Forest as well as the USFS Region 9 office. They have also worked with various DNR County Biological Survey staff.
Task Duration: Ongoing
Who involved: NRCS Soil Science Division
Partnering Organizations: DNR, USFS, NSFC Technical Committee
Estimated Cost: to be determined
Units: 1 document
Measures of success: Document (approved by NSFC executive committee). Readability, understandability and usability of document for other resource professionals
Primary Contact: Kyle Steele, Kyle.Steele@mn.usda.gov 920-574-1772

Project Title: Map currently identified areas of high ecological integrity and areas with most impacted ecosystems (NNIS, Soil erosion, off-site species)
Project Number: 1B1 Project Addresses:
Objective B: Identify focus areas for restoration across the landscape.
Strategy 1: Identify areas to focus and prioritize restoration activities based on ecological need.
Project Type: Operations
Project summary: By identifying both the high-quality areas and negatively impacted areas (which sometimes overlap), we can begin to prioritize areas for restorative treatment. Without good geographic data, it is difficult to determine where to be most effective with restoration treatments and which should receive the highest priority. The North Shore area contains many areas of high ecological integrity and unique ecosystems. County Biological Survey has identified areas of significant natural areas and rare plants, and habitats. Scientific and Natural Areas (SNA's), State Parks, Research Natural Areas and other special ecological designations exist within the area. In addition, non-native invasive species, off-site and dying species, and soil erosion impact many areas with the north shore.
Task Duration: 6 months
Who involved: GIS specialist, NNIS specialist, silviculturist Partnering Organizations: DNR, USFS, NRCS, University Estimated Cost: To be determined
Potential Funding Sources: Primary Contact: Silviculturist

Project Title: Identify priority sites on which to plan and implement restoration activities.
Project Number: 1B2 Project Addresses:
Objective B: Identify focus areas for restoration across the landscape.
Strategy 2: Identify at least three sites and plan and implement restoration activities
Project Type: Administrative
Project Summary: This project will use the results of Project 1B1 along with other information to help determine which areas should receive the highest priority for restoration treatments. While the objective is to restore a large percentage of the north shore ecosystem, it is important to focus on those areas most in need or restoration and of sufficient size to be effectively implemented. Note: MN DNR Forest Stewardship program has identified areas where a concentration of private landowners has stewardship plans that need updating. These may be areas that factor into the prioritization equation.
Task Duration: 6 months, following completion of Task 1B1
Who involved: NSFC Executive Committee
Partnering Organizations: DNR, NRCS, USFS, Sugarloaf Cove
Estimated Cost: To be determined
Potential Funding Sources: DNR Stewardship Plans
Units: Acres, No. of Landownerships Measures of success: Restored acres
Primary Contact: NSFC Coordinator

Project Title: Develop and Maintain list of Contractors
Project Number: 1C1 Project Addresses:
Objective C: Assist landowners with finding contractors willing to conduct restoration activities on their property.

Strategy 1: Establish a network of foresters, loggers, site preparation and planting contractors willing to work across all property owners.
Project Type: Operations
Project Summary: This project will meet with contractors to determine their availability and willingness and their minimum scale of work. It will then develop a list of contractors and make that information available to private landowners. This project is tied to 1C2, which involves a NSFC Project Manager to coordinate restoration work. Due to the relative remoteness of the North Shore area, distance to markets, and small project size of many private landowner projects it is difficult to interest forest management contractors in projects north of Two Harbors, MN. To implement restoration activities, it is important to have an available team of contractors who are willing to perform the work.
Task Duration: 6 months
Who involved: Local contractors, NSFC Project Manager
Partnering Organizations: Local contractors, NRCS, DNR, MN Contract Loggers Association, University Extension
Estimated Cost: To be determined
Potential Funding Sources: Units: One list
Measures of success: List is distributed and successfully used by landowners
Primary Contact: NSFC Project Manager

Project Title: Employ North Shore Forest Collaborative Project Manager
Project Number: 1C2 Project Addresses:
Objective C: Assist landowners with finding contractors willing to conduct restoration activities on their property.
Strategy 1: Establish a network of foresters, loggers, site preparation and planting contractors willing to work across all property owners.
Project Type: Operations
Project Summary: Hire and fund an NSFC project manager to strategically utilize contractors to accomplish restoration work on a meaningful scale (i.e. coordinate between small private landowners with other small landowners, government agencies, or larger landowners to increase incentives for contractors). Due to the relative remoteness of the North Shore area, distance to markets, and small project size of many private landowner projects it is difficult to interest forest management contractors in small projects north of Two Harbors, MN. This project is tied to 1C1, developing a list of contractors.
Task Duration: 3 years
Who involved: NSFC Project Manager, local contractors, local landowners
Partnering Organizations: NRCS, Local contractors
Estimated Cost: $100,000
Potential Funding Sources: NRCS, Grants, Others
Units: 1 person
Measures of success: Implementation of coordinated projects
Primary Contact: NSFC Project Manager

Project Title: Coordinate with Cook and Lake County Invasives Team

Project Number: 1D1 Project Addresses:
Objective D: Minimize the introduction and spread of invasive species.
Strategy 1: Prioritize and implement invasive species control in the collaborative area
Project Type: Operations
Project Summary: Background: Closely coordinate with existing County teams on identification and prioritization of non-native, invasive species problem areas and treatments. In addition to restoring conifers to the North Shore ecosystem, another objective of restoration is to limit the spread and control the existence of non-native invasive species in the collaborative area. The goal of restoration of the ecosystem cannot be achieved unless we address both the reintroduction of desired species (conifers and others) and limiting the spread and controlling the existence of unwanted invasive species. Task Duration: Ongoing
Who involved: Cook and Lake County Invasives Teams
Partnering Organizations: Counties, DNR, USFS, Non-profits, private landowners
Estimated Cost: To be determined
Potential Funding Sources: Great Lakes Restoration Funds
Units: Acres treated
Measures of success: Reduction of acres impacted
Primary Contact: County Invasives Coordinator

Project Title: Provide links to Invasive Species Info on Website
Project Number: 1D3 Project Addresses:
Objective D: Minimize the introduction and spread of invasive species.
Strategy 1: Incorporate invasive species education and information in NSFC materials
Project Type: Operations
Project Summary: The NSFC will be updated and maintained to provide links to the most recent information about identification and treatment of invasive species, including links to other websites such as the Cook County Invasives Team and to treatment assistance opportunities such as the community shed at Sugarloaf Cove. Because treatment of invasive species is a vital part of ecological restoration, it is important that informational material provided by the collaborative include invasive species identification and treatment. Much information already has been developed and exists, but local landowners must be able to access that information.
Task Duration: On-going, with 3 days to locate relevant sites and provide links.
Who involved: NSFC Coordinator
Partnering Organizations: Cook and Lake County Invasives Teams
Estimated Cost: minimal
Potential Funding Sources: none
Measures of success: Info available to landowners; Reduction of acres impacted
Primary Contact: NSFC Coordinator

Project Title: Participate in County Planning with regard to forest fragmentation
Project Number: 1E1 Project Addresses:
Objective E: Minimize forest fragmentation

Strategy 1: Provide input to county land use planning activities to minimize forest parcelization and fragmentation, emphasizing consolidated development and minimizing conversion of forestland to non-forest.
Project Type: Administrative
Project Summary: NSFC Partners (representing their own organizations) will participate in county planning and zoning efforts. The role of the Collaborative is not to take specific stands in county planning, rather it is to raise the issue of forest fragmentation and provide information about the effects of fragmentation to county planners. Restoration of the forest involves returning vegetation composition and structure toward a more natural arrangement. While there may be relatively little that can be done with regard to areas already fragmented, it is desirable to try to limit any further fragmentation to the extent practicable, as a fragmented forest is more susceptible to invasive species, as well as degradation of habitat for certain species.
Task Duration: As needed, when Counties address planning and zoning
Who involved: NSFC members
Partnering Organizations: Cook and Lake County
Estimated Cost: none
Potential Funding Sources: none
Measures of success: The extent to which forest fragmentation is address in County plans
Primary Contact: NSFC Coordinator

Project Title: Develop monitoring strategies
Project Number: 1F1 Project Addresses:
Objective E: Utilize project monitoring to measure progress in restoring ecosystem health and achieving objectives.
Strategy 1: Develop monitoring strategies
Project Type: Operations
Project Summary: Develop an overall strategy for monitoring, making use of existing efforts by other agencies and organizations to the extent possible. Build off monitoring plans and efforts of Minnesota Forest Resource Council's NE landscape committee. While effective monitoring is difficult to accomplish and to fund, using monitoring that is already being conducted by partner organizations and tracking project implementation can provide some insights with reasonable efforts. A well-designed monitoring program will determine whether restoration actions were designed and implemented properly, determine whether the projects' restoration objectives were met, and provide new information on the restoration action and the ecosystem functions and processes that it was intended to affect. Without at least some base level of monitoring and tracking of project implementation, progress toward ecosystem restoration will be difficult to gauge.
Task Duration: 1 year to develop strategies, then ongoing to implement monitoring
Who involved: NSFC members
Partnering Organizations: Partners in the collaborative, Univ. of MN, MFRC landscape committee
Estimated Cost: To be determined
Potential Funding Sources:
Units: Acres treated
Measures of success: Projects implemented, Effectiveness of treatments
Primary Contact: NSFC Coordinator

Projects related to Goal 2 - COLLABORATION: Promote Cooperative Restoration Efforts on All Ownerships

Project Title: Develop a database of private forest landowners
Project Number: 2A1 Project Addresses:
Objective A: Increase private landowner engagement in the NSFC and restoration activities.
Strategy 1: Identify and contact private landowners within the NSFC area.
Project Type: Administrative
Project Summary: An accurate database of private forest landowners within the NSFC area will be developed using tax records and other data. The Collaborative area has thousands of private landowners. Some are full-time residents; others are seasonal residents and live elsewhere most of the year. Still others own undeveloped lands that they may visit often, or only during hunting season. The area also has many resort properties, some large and corporately run and others small mom and pop operations. Industry and land management companies manage some lands for commercial timber production. It is important to reach out to all of these owners to enlist them in the restoration effort.
Task Duration: 2 months, then ongoing updates
Who involved: Sugarloaf
Partnering Organizations: University of Minnesota
Estimated Cost: $1000
Potential Funding Sources: Duluth Superior Area Community Foundation, U of MN
Units: 1 database
Comments: This project is currently completed, but may be expanded with further refinements
Measures of success: A useful database
Primary Contact: Molly Thompson, Sugarloaf

Project Title: Develop a "Restoration Recognition Program" to acknowledge restoration programs on private property.
Project Number: 2A2 Project Addresses:
Objective A: Increase private landowner engagement in the NSFC and restoration activities.
Strategy 2. Provide informational materials and incentives for landowners.
Project Type: Operations
Project Summary: Develop and implement a program to formally recognize that a landowner property is participating in the North Shore Forest Restoration Program. Such a program would help recognize and incentivize landowners for their restoration work and help publicize the restoration effort. (Similar to the Tree Farm program) Restoration efforts, such as the visibility of planted conifers, can take many years to become visible and other landowners and North Shore visitors. May not be aware of restoration efforts already accomplished without a process to recognize and publicize landowner accomplishments.
Task Duration: 1 year to establish, then ongoing
Who involved:
Partnering Organizations: Extension, Sugarloaf, NRCS, SWC
Estimated Cost: To be determined
Potential Funding Sources: Coastal Program, Johnson Foundation, Other foundations
Units: Acres and number of landowners recognized

Measures of success: Numbers of private landowners participating in program
Primary Contact:

Project Title: Develop initial and follow-up contact materials for landowners
Project Number: 2A2a Project Addresses:
Objective A: Increase private landowner engagement in the NSFC and restoration activities.
Strategy 2. Provide informational materials and incentives for landowners.
Project Type: Operations
Project Summary: Engaging private landowners during initial and follow-up contacts requires well prepared materials for delivery in person, via media and mail. This project will develop materials that will inform and engage private landowners in the restoration effort, as well as address the efficient and economic delivery of such information.
Task Duration: 1 year
Who involved: NSFC Communication Committee
Partnering Organizations: Extension
Estimated Cost: to be determined
Potential Funding Sources: Johnson Foundation, Other foundations, NFWF
Units: Contact documents and materials
Measures of success: Numbers of private landowners participating in Collaborative
Primary Contact: NSFC Communication Committee

Project Title: Encourage Neighbors helping neighbors program
Project Number: 2A4 Project Addresses:
Objective A: Increase private landowner engagement in the NSFC and restoration activities.
Strategy 4. Promote peer-to-peer associations among landowners.
Project Type: On-the-Ground
Project Summary: This project will foster the development of peer-to-peer relationships and facilitate a communications and help network among landowners. Often, neighbors are most effective at getting others involved in restoration work, or in helping neighbors with techniques and activities. Neighbors often know best what the person next door needs or wants for their property, or how to best get them involved. This project would require identifying some key people in various communities and providing them with training, and contact materials.
Task Duration: Ongoing,
Who involved: Individual landowners, U of MN Extension Service, NSFC members
Partnering Organizations: U of MN Extension Service
Estimated Cost: to be determined
Potential Funding Sources: Grants, Extension Service
Measures of success: Increase in private landowner participation in program.
Primary Contact: NSFC Landowner Committee

Project Title: Cluster/Consolidate Stewardship Plans on Private lands
Project Number: 2A6 Project Addresses:
Objective A: Increase private landowner engagement in the NSFC and restoration activities.

Strategy 6. Consolidate restoration projects on private property to improve economies of scale during implementation.
Project Type: Operations
Project Summary: In the Collaborative area, there are approximately 270 participants in the stewardship program managed by the MN DNR. Many of these are small and scattered, but mapping those plans that are due for updating shows two clusters of properties. By focusing on these clusters, it may be possible to achieve some economies of scale in terms of operability of any restoration activities.
Task Duration: 1 year.
Who involved: MN DNR – Stewardship Plans
Partnering Organizations:
Estimated Cost: to be determined
Potential Funding Sources: MN DNR
Units: Number of Plans
Measures of success: Increase in implementation of Plans. Primary Contact: MN DNR

Project Title: Increase Emphasis on Stewardship Plans for private landowners
Project Number: 2A8 Project Addresses:
Objective A: Increase private landowner engagement in the NSFC and restoration activities.
Strategy 8: Promote stewardship plans for private lands
Project Type: Operations
Project Summary: Increase emphasis on reaching out to private landowners in the Collaborative Area through the DNR and NRCS programs for stewardship and management plans. Many of the private lands on the North Shore have no plans for management and owners are not aware of the programs available. A recent effort by NRCS with the objective of managing for golden winged warbler was successful in involving more landowners in getting a management plan developed for their properties.
Task Duration: On-going
Who involved: MN DNR, NRCS Partnering Organizations:
Estimated Cost: to be determined
Potential Funding Sources: MN DNR, NRCS
Units: Number of Plans
Primary Contact: Roger Nelson, MN DNR, Will Bomier, NRCS

Project Title: Develop on-going list and calendar of grant and funding opportunities
Project Number: 2B 1-4 Project Addresses:
Objective B: Secure multi-year funding for core operations of NSFC
Strategy 1-4: Secure funding for NSFC Coordinator, NSFC Project Manager, Apply for grants, and explore other funding opportunities.
Project Type: Administrative
Project Summary: Having a robust list and calendar of funding opportunities would help the collaborative apply for funding in a timely and successful manner. Identifying and obtaining a more long-term funding source is critical for an effective and efficient organization and the Collaboratives mission and getting projects implemented on the ground. Consistency and continuity in running the

collaborative has been problematic without a consistent and longer-term funding source for a coordinator position. The Coordinator position has been funded solely through grants that are project based, with the Coordinator working primarily on the project and leaving little time for actual coordination, facilitation, and administrative duties that are very necessary toward smooth operations of the collaborative.
Task Duration: 2 months
Who involved: Sugarloaf, USFS, NSFC Coordinator Partnering Organizations: Granting organizations, USFS
Estimated Cost: to be determined
Potential Funding Sources: USFS
Units: 1 list
Measures of success: Availability of relevant grants and funding; successful applications
Primary Contact: NSFC Coordinator & Molly Thompson

Projects related to Goal 3 - EDUCATION: Share expertise and knowledge about restoration

Project Title: Develop Communication Plan
Project Number: 3A1
Objective A: Increase support from private landowners, public agencies, public and political spheres for ecosystem restoration of the North Shore.
Strategy 1: Develop a communication plan and strategies to communicate the mission and goals to the public.
Project Type: Operations
Project Summary: Identify who, what, when and where for communications and public relations.
Task Duration: One month for initial plan, revisit annually.
Who involved: Communication Committee
Partnering Organizations: Estimated Cost: to be determined. Potential Funding Sources:
Measures of success: Increased information level of public, agencies, grantors, legislators, etc.
Primary Contact: Chair of Communications Committee

Project Title: Host a Day at the Capitol
Project Number: 3A3 Project Addresses:
Objective A: Increase support from private landowners, public agencies, general public and political spheres for ecosystem restoration of the North Shore.
Strategy 3: Ensure local politicians and state senators and representatives are fully informed about the Mission and Restoration goals for the North Shore Forest Collaborative.
Project Type: Operations
Project Summary: A day spent with local state legislators to provide them information about the existing situation on the North Shore, and the mission, goals and projects of the Collaborative and the participating organizations. The purpose of the Day at the Capitol is solely to provide information about NSFC and its activities Just as local landowners need to be informed about the need for and activities leading to restoration of the north shore, local legislators also need this

information, as it affects both the citizens and the land within their districts. Without the legislature being knowledgeable of the mission and efforts of the NSFC, they will not understand or appreciate the problems with the existing situation, nor the importance of the efforts at restoration.
Task Duration: One week to plan, 1 day to deliver Who involved: Communication Committee
Partnering Organizations:
Estimated Cost: to be determined.
Potential Funding Sources:
Measures of success: Informed legislators
Primary Contact: Chair of Communications Committee

Project Title: Develop Interpretive signs at demonstration projects
Project Number: 3A6 Project Addresses:
Objective A: Increase support from private landowners, public agencies, general public and political spheres for ecosystem restoration of the North Shore.
Strategy 6: Utilize restoration demonstration projects across the area suitable for interpreting ecosystem conditions and restoration techniques to many audiences.
Project Type: On-the-Ground
Project Summary: Develop and install interpretive signs located in highly visible areas to help publicize restoration projects and successes as well as educate local landowners and visitors. Because restoration efforts are often not noticeable to the casual viewer for many years, people may not be aware of restoration projects or their objectives. It is important for people to see and understand on-the-ground restoration projects that are completed or on-going.
Task Duration: Ongoing
Who involved: NSFC Exec. Committee.
Partnering Organizations: Dependent upon location of demonstration project
Estimated Cost: Should be built into each project's funding request
Potential Funding Sources:
Units: number of signs erected
Measures of success:
Primary Contact: NSFC Executive Committee

Project Title: Host Workshops
Project Number: 3B1 Project Addresses:
Objective B: Offer ongoing internal and external education.
Strategy 1: Host workshops on forest restoration
Project Type: Operations
Project Summary: Host educational and hands-on workshops of various types and to reach the various private landowners. For the past 3 years, the collaborative has hosted landowner workshop to share information and provide education on forest restoration. These have been well attended. Sugarloaf: The North Shore Stewardship Association has sponsored the Lost Forest workshops in cooperation with Univ. of MN Extension. These workshops consist of approximately 12 sessions on restoration topics, including field visits to landowner's properties.
Task Duration: 1 to several days.
Who involved: NSFC Exec. Committee

Partnering Organizations: Univ. of MN Extension, Soil and Water Conservation Districts
Estimated Cost: to be determined
Potential Funding Sources: Lake Superior Coastal Program, other grant programs
Units: number of workshops, number of attendees
Measures of success:
Primary Contact: NSFC Coordinator

Project Title: Distribute instructive materials on restoration
Project Number: 3B2 Project Addresses:
Objective B: Offer ongoing internal and external education.
Strategy 2: Develop and distribute materials (methods, procedures, techniques) for those attempting restoration.
Project Type: Operations
Project Summary: Work with partners to gather materials, determine if new or additional direction is needed specific to the North Shore, and then distribute materials to those attempting restoration on their lands. Many instructive materials already exist for restoration activities (proper planting techniques, invasive treatment, etc.)
Some landowners wish to perform restoration activities on their lands, but are not knowledgeable of the techniques to be used. Well prepared and readily available instructive material can help address this need.
Who involved: NSFC Technical and Communications Committees
Partnering Organizations: DNR, CCIT/LCIT, Sugarloaf
Estimated Cost: to be determined
Potential Funding Sources:
Measures of success: Number and types of materials distributed.
Primary Contact: NSFC Technical Committee

Project Title: Develop and distribute a yearly summary of accomplishments
Project Number: 3B3 Project Addresses:
Objective B: Offer ongoing internal and external education.
Strategy 3: Report monitoring results and collaborative accomplishments
Project Type: Operations
Project Summary: Prepare and distribute a yearly summary of accomplishments. This information is important in showing funding organizations, local partners, private landowners and local legislators that restoration of the North Shore is being accomplished. Demonstrating progress and success toward accomplishing the goal of restoration lends credibility to the program.
Task Duration: Ongoing, Annual summary.
Who involved: NSFC Coordinator, Technical and Communications Committees
Partnering Organizations: All NSFC members
Estimated Cost: to be determined
Potential Funding Sources: Units: Report document
Primary Contact: NSFC Coordinator

Project Title: Develop opportunities for youth to participate in restoration
Project Number: 3B4 Project Addresses:

Objective B: Offer ongoing internal and external education.
Strategy 4: Involve youth in restoration activities
Project Type: On-the-ground
Project Summary: Develop a toolbox of activities and opportunities that enable youth to be involved in the planning and implementation of restoration activities. This could include school programs, field days, scout activities, and restoration activities specifically geared toward youth. Youth need to be knowledgeable of and involved in forest restoration activities because in many cases, it is their generation that will see the accomplishment and benefits of the restored forest. Their stewardship of the forest is needed now and far into the future.
Task Duration: Ongoing
Who involved: Invasive Species Coordinator
Partnering Organizations: USFS, DNR, County Lands, Sugarloaf, Wolf Ridge
Estimated Cost: to be determined Potential Funding Sources: SWCD Units: Number of events
Measures of success:
Primary Contact: Invasive Species Coordinator

Appendix F: Tie to Other Planning Efforts

Because the NSFC seeks to coordinate across a broad landscape and its members are composed of a variety of organizations, agencies, governments and individuals, it is important to investigate and consider the land management plans that provide guidance applicable within the NSFC project area.

There is a great variety of land managing organizations within Northeast Minnesota and within the NSFC project area. Their management plans are equally varied. Some are broad and apply across an entire landscape. Others are quite specific and apply to specific management areas or ecological subunits. Some Plans provide guidance for all managers and are voluntary. Other plans provide guidance that only applies to a single agency or the land they manage, but the information and guidance can be valuable to other managers.

The NSFC Plan was developed to be as consistent as practicable with existing management plans of others within the landscape to coordinate as closely as possible with ongoing land management. The following excerpts from select land management plans are provided to both highlight those consistencies and similarities with other land management plans, as well as to provide additional information to be used in project planning and developing further collaborative efforts when mutually beneficial goals can be achieved.

Note that these are select excerpts from other plans and do not reflect the entire management direction provided in those plans. Web links to the entire documents are listed so that further detail can be obtained. The Collaborative will continue to seek out the management plans of other organizations and add them to this list.

Great Lakes Restoration Initiative Action Plan II (GLRI II) (2014)

http://greatlakesrestoration.us/actionplan/pdfs/glri-action-plan-2.pdf

Because the NSFC project area extends from the shore of Lake Superior to approximately 3.5 miles inland, it can play a significant role in helping with the Great Lakes Restoration and it ties to several key aspects of the GLRI Action Plan II.

Major Focus Areas

- Control established invasive species
- Develop invasive species control technologies and refine management techniques
- Protect, restore and enhance habitats to help sustain healthy populations of native species
    - Protect, restore and enhance Great Lakes coastal wetlands
    - Promoting near shore health.
- Maintain, restore and enhance populations of native species
    - Promote the recovery of priority federally-listed endangered, threatened and candidate species
    - Promote self-sustaining populations of GLRI-targeted native non-threatened and non-endangered species
- Ensure climate resiliency of GLRI-funded projects
    - Develop and incorporate climate resiliency criteria in project selection processes
- Educate the next generation about the Great Lakes ecosystem

Lake Superior Lakewide Management Plan (LaMP) (2008)

http://epa.gov/greatlakes/lamp/ls_2008/index.html

Bordering Minnesota's northern shore of Lake Superior and extending 3.5 miles inland, the NSFC Project Area can directly address several of the strategic outcomes and help implement goals of the LaMP, especially the following:

Strategic Outcome #1: Diverse, healthy and self-sustaining native plant and animal communities exist in the Lake Superior basin.
Goal 1. Identify and restore native communities where they are degraded.

- Inventory and assess impacts to degraded habitats and communities.
- Develop and distribute GIS information on ecosystem types, conditions and trends, including coastal wetlands and riparian acres, and identify where restoration can occur.
- Restore or protect 25% of riparian conifer forest acres in the Lake Superior basin.

Goal 2. Identify and protect a system of representative, high quality ecosystems.

- Complete comprehensive, systematic biological surveys in the watershed to identifu remaining high-quality natural communities.
- Engage landowners as partners in protecting important habitat.

Goal 3. Maintain existing genetic diversity and population integrity.
Goal 4. Manage the harvest of plant and animal resources to ensure diverse, healthy, and self-sustaining native plant and animal communities.

Strategic Outcome #4: No further extirpation of native species occurs in the Lake Superior basin.
Goal 4. Encourage the appropriate use of native species for all projects requiring vegetation restoration.

- Develop sources of native plants and seeds in an ecologically appropriate manner throughout the Lake Superior basin for use in vegetation restoration.
- Establish standards of native species propagation and use as well as definitions of seed zones.
- Develop a list of critical native species that are regionally / habitat specific and ecologically appropriate.
- Educate citizens in the Lake Superior basin about the importance and appropriate use of local native plants in restoration and landscaping projects.

Strategic Outcome #5: No new non-native species will be introduced into the Lake Superior basin.
Goal 2. Develop a guidance document for agencies' vegetation restoration for projects in the Lake Superior basin.

Strategic Outcome #6: Partnerships among natural resource management agencies, environmental agencies, and non-agency stakeholders are strengthened and broadened.
Goal 1. Develop information and educational material to assist local land use decision makers in implementing Binational Program goals through land use planning.

- Have an educator on staff to present material to local governments and decision makers highlighting linkages between land use and ecosystem health. C
- Support appropriate public and technical fora to provide opportunities for researchers, resource managers and the public to exchange information.
- Inform and educate senior decision makers about how their actions move the Lake Superior basin toward "A Vision for Lake Superior."

- Develop a communications plan.
- Implement the communications plan.

Strategic Outcome #7: Human activities in the Lake Superior basin mitigate the contribution of greenhouse gases to the environment. Ongoing climate change adaptive management strategies are pursued in the Lake Superior basin.
Goal 1. Understand the impacts of climate change and the limits to the ability to predict and model these impacts on specific ecosystems and local regions

- Continue to refine climate change models so as to develop specific predictions for the Lake Superior basin.
- Predict changes to terrestrial and aquatic ecosystems based on climate change
- predictions.
- Develop predictions of the impacts of climate change on keystone biota in the lake and
- the basin as a whole.

Goal 2. Review and revise Conservation and Restoration Plans in the basin as required based on the climate scenarios developed in the goal above. 1
Goal 3. Help Lake Superior basin stakeholders adapt to climate change impacts.

- Help stakeholders to adapt to climate change impacts by facilitating assessment

Strategic Outcome #9: Management in the Lake Superior basin is organized and implemented at appropriate watershed scales.
Goal 1. Support the development and implementation of ecologically based integrated watershed management plans for priority watersheds within the Lake Superior basin.

- Work with local governments/groups to develop watershed plans for 25% of the highest priority watersheds in need of a new or revised plan.

Minnesota Forest Resources Council, Northeast Landscape Plan (2014)-

http://mn.gov/frc/documents/council/landscape/NE%20Landscape/NE_Revision%202014/2nd%20Gen%20Plan%20Docs/NE-Landscape-Plan_Public-Comment-Draft.pdf

The purpose of the plan is to provide a detailed framework that allows landowners, local officials, resource managers and other stakeholders to work together to voluntarily implement landscape strategies to effectively sustain the forests of Minnesota. The MFRC NE Landscape Plan provides broad, umbrella voluntary management direction for those land managers within the NE Landscape. Several members of the NSFC participated in the development of the NE Landscape Plan to ensure a solid tie between the broader NE Plan and the more specific NSFC Plan. Key guidance relating to vegetation in the NSFC area:

Select Overall Guidance

- Maintain, Restore, and Enhance Native Biodiversity, Including Wildlife Habitat and Populations.
- Manage for a Mix of Forested Native Plant Community Growth Stages.(objective)
- Manage for Structural Within-Stand and Between-Stand Diversity (objective)
- Create, Manage, Maintain, or Increase Large Contiguous Forest Patches (objective)
- Control forest pests and invasive species that negatively affect forest health and ecology. (objective)

For FDn43

Long Term Goals:

- FDn43a: White-Red Pine Forest
    - o Increase the white and red pine component.
    - o Increase the mature and old growth stage of red and white pine.
- FDn43b: Aspen-Birch Forest
    - o Increase the white pine and white spruce component.
- Increased private land stewardship plans and cross-boundary implementation.

Strategies:

- Retain adequate conifers on harvest sites to ensure continued presence of conifers.
- Plant a mix of long-lived conifers post-harvest where sites and costs allow.
- Manage the young (0-35 yrs) and first transitional (35-55 yrs) growth stages for short-lived species for perpetuation of the aspen/birch community. Reduce aspen in the mature and old growth stages.
- Identify and manage a portion of the mature (55-95 yrs) growth stage for structural features found in the old (> 115 yrs) growth stage.
- Encourage the development of private forestland stewardship plans and plan implementation though cross-ownership forest management.
- Develop collaborative efforts to reduce hydrologic impacts in the Lake Superior North and Lake Superior South watersheds.

For MHn45

Long Term Goals:

- Increase and/or maintain the white pine, yellow birch, paper birch, white spruce, and white cedar components.
- Expand or favor mesic hardwood forest types.
- Improve maple timber health and quality.
- Maintain critical habitats such as upland cedar.
- Increased private land stewardship plans and cross-boundary implementation.

Strategies:

- Encourage the use of silviculture systems that support the range of species and structural diversity characteristic of this native plant community.
- Apply uneven-aged management in the first transitional growth stage to increase characteristics of the multi-aged mature and old growth stages.
- Apply even-age management in the first transitional growth stage to maintain younger age classes.
- Use residual cedar and old forest remnants as reserve patches.
- Encourage the development of private forestland stewardship plans and plan implementation though cross-ownership forest management.
- Utilize techniques that recognize and adjust for deer browsing issues.
- Maintain an adequate amount of canoe-quality paper birch.

Superior National Forest Plan (2004)

http://www.fs.usda.gov/detail/superior/landmanagement/planning/?cid=fsm91_049716

The Superior National Forest Plan provides management direction only for National Forest System lands managed by the USDA Forest Service. However, such information is valuable and can be utilized by other land managers within the landscape. Management guidance is provided through overall direction

and two allocation processes, Landscape Ecosystem direction (more ecologically based) and Management Area Direction (more socially based).

Select overall guidance:

- Vegetation conditions that have been degraded or greatly diminished in quality or extent on the landscape by past land use are restored to conditions more representative of native vegetation communities
- Integrated pest management approaches are used to avoid epidemics and infestations of undesirable native or nonnative invasive species.(desired condition)

Landscape Ecosystem Direction

Landscape Ecosystem management guidance is too extensive to be reprinted here, it can be found on pages 2-55 through 2-78 of the SNF Forest Plan. In summary, the main LE's contained within the NSFC area are Mesic Aspen-Birch-Spruce-Fir, and Sugar Maple. Management direction for LEs is provided in three categories: Desired percentage of forest type, desired percentage of age class and tree species diversity objectives within an LE expressed in a table showing the desired relative direction (increase, decrease or maintain) of number of specific tree species within stands in the LE.

Mesic Aspen-Birch-Spruce Fir Landscape Ecosystem,
Vegetative Composition Long Term Goal:

- increase white pine, red pine, jack pine and spruce-fir forest types
- decrease in northern hardwood, aspen and birch forest types

Within-stand Diversity Objectives

- increase white pine, white spruce, white cedar, red pine, tamarack and paper birch
- decrease balsam fir, aspen, and northern hardwoods.

For the Sugar Maple Landscape Ecosystem
Vegetative Composition Long Term Goal:

- increase northern hardwood, white pine, spruce-fir,and paper birch forest types
- decrease red pine and aspen forest types.

Within-stand Diversity Objectives

- increase white pine, white spruce, white cedar, yellow birch, balsam fir, tamarack and black spruce.
- Decrease red maple, sugar maple, aspen, and black ash

Management Area Direction

The NSFC area is entirely within the Recreation Use in a Scenic Landscape management area. The area emphasizes land and resource conditions that provide a scenic landscape for recreational activities in natural-appearing surroundings. This area also provides wildlife habitat to enhance recreational wildlife watching opportunities. Concentrated recreation use is common.

Vegetative Desired Future Conditions - Vegetation Management

- Ecosystems are managed to provide a predominantly natural-appearing landscape that may be slightly modified by forest management activities. This management area emphasizes a large tree and old forest character. Vegetation management generally maintains or enhances older vegetative growth stages.

- Management activities such as timber harvest and management-ignited fire may be used to achieve Landscape Ecosystem objectives. Recreation and scenic integrity objectives guide the appearance of timber harvest, management-ignited fire, tree planting, and other management techniques.

Lake County Forest Plan (2007)

http://www.co.lake.mn.us/document_center/2__A47E02FB_5E76_429A_BC92_4F0BEAD02C18_.PDF

Select Planning Goals and Strategies

- Manage by Native Plant Community – Forest management options will consider native plant communities. Management activities will be implemented to move the lands towards the range of natural variability (RNV) of our native plant communities. Importance will be given to increasing the quantity of absent or limited species within communities during management activities and providing a representative distribution of vegetation growth stages within each native plant community. Forest management activities will provide a variety of age classes across the landscape.
- Pest Management - Lake County's strategy for controlling plant and insect pests is to actively meet with our Region's lead agencies including the Forest Service, DNR, St. Louis County, MN Dept of Agriculture and the Nature Conservancy to identify forest pests and invasive species and to coordinate funds and management strategies to actively deal with common threats.
- The Forestry Department will continue to utilize its tax forfeit Biophysical Inventory information to manage its Northern Hardwoods, to determine off site aspen stands for possible conifer conversion and to aid in other future special projects

Mesic Aspen Birch

Long-term Goals:

- Increase the 81+ multi-aged conifer growth stage.
- Increase the white pine, white spruce, and tamarack component.

Northern Hardwoods

Long-term Goals:

- Increase the white pine, yellow birch, white spruce and white cedar components.
- Move every growth stage toward RNV over the next 150 years.

Northern White Cedar

- All cedar stands within 1 mile of Lake Superior will not be managed. Most cedar stands on tax forfeit lands will not be managed. Some cedar will be under-planted within hardwood stands.

Pine and Spruce

- There has been and will be an effort to increase pine and spruce on tax forfeit lands. Pine and spruce will be retained on most productive aspen and birch sites and may be planted on unproductive hardwood sites. Pine will be under planted on hardwood sites.

Yellow Birch

- Yellow Birch will be under planted within some hardwood sites and encouraged whenever possible.

Cook County Comprehensive Local Water Management Plan (2014)

http://www.co.cook.mn.us/images/stories/Soil_Water/Final%20Plan%202014-24.pdf

Lake County Water Management Plan (2005)

http://www.co.lake.mn.us/document_center/2005___Lake_County_Local_Water_Management_Plan_Update___Amended__Nov_2012doc.pdf

Minnesota State Forest North Shore Area Management Direction (2004)

http://files.dnr.state.mn.us/forestry/subsection/northshorearea/general_direction.pdf

While most of the designated State Forests lie outside of the NSFC project area, portions of the Grand Portage and Finland State Forests are within the area. In addition, other scattered state forest lands occur throughout the area within 5 miles of the Lake Superior Shoreline.

The MN DNR completed a management plan for these lands in 2004, with management direction extending until 2014. The DNR is currently in the process of updating the management plan, with a new plan for the entire Duluth Superior Uplands section expected to be completed around the end of calendar year 2014. The management guidance listed below is excerpted from the 2004 North Shore Subsection document and contains only a small sample of guidance relevant to the area.. The actual guidance is far more specific. View the plan at the website listed above for more complete information.

Goal, Direction, Strategy Statement 1B - Forest cover type composition on state lands moves closer to the range of cover type composition that historically occurred within the ecosystems found in these three subsections

DFFC Goal: Move toward the desired cover type acreage goals recommended in this plan.

- This plan will move these subsections toward more conifer cover type acreage in upland areas.
- Cover type increases will occur primarily in red (Norway) pine, white pine, jack pine, white spruce, and white cedar (upland). Some minor increases in oak and northern hardwoods are desired. Cover type decreases will occur primarily in the aspen, birch, and balsam fir cover types.

Strategy - Follow specific cover type management recommendations in Chapter 4 such as:

- Allow some stands to convert through natural succession to long-lived conifer cover types without harvest. Emphasize this in stands with adequate advanced regeneration of long-lived conifer species.
- Artificially convert some stands through mechanical site preparation, prescribed burning, planting, or seeding.
- Selectively harvest some stands to move toward the desired cover type and within-stand composition.

Strategy - Increase mixed forest conditions in some stands in all cover types.

- The strategy to achieve this is to favor species found in native plant communities appropriate to the site, especially tree species that have significantly declined from historic levels such as white pine, red pine, white cedar (upland), white spruce, tamarack (upland), and yellow birch

Goal, Direction, Strategy Statement 1C - Patch management in these subsections maintains existing large patches and increases the average patch size on state lands over time, with consideration of natural spatial patterns.

Minnesota State Park Management Direction

There are 8 state parks, 5 state waysides, a state multi-use trail, state water trail and many state water access sites to Lake Superior within the NSFC project area. Management guidance for State Parks and Trails is contained in several documents. Two of these are broader documents applying to all state parks and two management plans for specific state parks within the NSFC project area are completed and available on the DNR website.

The relevant vegetation management guidance from these documents is summarized below. Although the management plans for Tettegouche and Cascade River State Parks are the only two available, it can be assumed that vegetation management guidance for the other 6 state parks would be similar.

Parks and Trails Strategic Plan (2012)
http://files.dnr.state.mn.us/input/mgmtplans/parks/strategic/0212_pat_strategic_plan.pdf
Strategy 1. Accelerate DNR and citizen efforts to control the spread of harmful invasive species and work to prevent the introduction of new ones. Bring together public and non-governmental organizations and individuals with a goal of minimizing harm to native species and communities. Greatly increase funding and efforts**.**
Strategy 3: Transform non-native plant communities to native plant communities, in units with statutory mandates and selected sites in other units, excluding use areas or sites planned for development.
Strategy 4: Adapt management programs and operations to effectively respond to changes in climate and energy markets. Help plant and animal communities adapt to climate change, and support existing/emerging energy markets where doing so also promotes the conservation of natural resources and reduces our carbon footprint

Parks and Trails Directions for the Future (2011)
http://files.dnr.state.mn.us/input/issues/directions_for_future.pdf
Core Area – Natural and Cultural Resources
Goal A. Protect, perpetuate, and restore natural and cultural resources in division-managed units.
Strategies:

- Document, preserve and perpetuate rare species.
- Manage existing native plant communities to meet or exceed a high quality condition rank as defined by DNR Ecological Resources.
- Manage invasive species to prevent their introduction and spread in division-managed units.
- Transform non-native plant communities to native plant communities, in units with statutory mandates and selected sites in other units, excluding use areas or sites planned for development.

Goal D. D. Cooperate with outside groups, other state agencies, and other units of government on natural and cultural resource efforts to achieve division and department goals.

Goal E. Address impacts of climate change on the division's natural resource responsibilities.
Strategies:

- Participate in applied research concerning climate change impacts to natural resources in Minnesota
- Monitor climate change-related ecosystem impacts to native communities and species in division-managed units.

- Evaluate and implement resource management activities to minimize and mitigate impacts of climate change to natural resources in division-managed units.

Tettegouche State Park Management Plan (2007)

http://files.dnr.state.mn.us/parks_trails/mgmtplans/tettegouche_plan.pdf

Natural Resource Management

Objective 1. Sustain a variety of healthy natural communities.

- Perpetuate and increase uncommon forest types or components. White cedar, white pine, and yellow birch are examples of important forest tree species that are becoming less common on the landscape. As aspen and birch stands begin to age and decline in health, there may be opportunities to encourage less common species in these stands.
- Identify and protect old growth forest stands in accordance with DNR's Old Growth guidelines. Develop management plans for Old Growth stands.
- Implement research that will improve our abilitiy to manage natural communities.

Objective 2. Encourage the development and maintenance of older forests, late successional forests and large contiguous forest blocks so that landscape-scale diversity is maintained.

- Forests around Tettegouche are generally younger and more fragmented than those in the park. This is a trend that will become more pronounced as time goes on.

Objective 3. Sustain healthy and diverse native plant communities.

- Work with DNR's Section of Wildlife to achieve and maintain relatively low numbers of deer in the park. Observations at Tettegouche strongly suggest that deer are having a significant negative impact on forest species, including white pine and white cedar. We will work to reach deer population levels that are low enough to allow forest regeneration, including white pine and white cedar.
- Use native species and genotypes in landscaping and habitat restoration.

Cascade River State Park Management Plan (2003)

http://files.dnr.state.mn.us/parks_trails/mgmtplans/cascade_river_plan.pdf

Principles and Values

- Preservation and/or restoration of the natural and ecological integrity of forest communities found within the park and their associated plant and animal communities. As much as possible, these communities should be representative of pre-European settlement conditions

Summary of Natural Resource Recommendations

- Protect threatened, endangered, rare, and/or significant plant and animal species.
- Continue forest management activities that perpetuate and expand forest diversity to be
- representative of pre-settlement conditions, including areas of Old Growth cedar and white pine.
- Recommend general deer hunting season be allowed within a park expansion area.
- Protect and/ or restore the Cascade River Corridor natural community, and other river and stream resources within the park.
- Remove or control exotic species, monitor progress of non-native vegetation along corridors of disturbance including trails, roadways and power lines, and develop strategies for control.
- Continue to expand natural resource inventories and data.