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## Theme B: Forest Composition & Structure

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### GOAL

**IMPROVING FORESTED COMMUNITIES: Improve all forest communities and increase in quality and extent forest communities that are under-represented.**

### DESCRIPTION OF GOAL

Forest communities and forest cover types are considered synonymous for this discussion. A community is an assemblage of plants and animals living together and occupying a given area. A forest cover type is a category of forest usually defined by its vegetation, particularly its dominant vegetation as based on a percentage cover of trees. Therefore, forest cover type is a forest community defined by tree species.

To improve our forests, there are three concepts that are important to consider. First, allow succession to take place in some of Wisconsin's forests. This will allow more of our forests to develop structure and late successional stage forest. Second, encourage disturbance. This will allow our forests to maintain a patch work of early, mid, and late successional stages. A patch work of different aged forest will harbor the most biodiversity. Forests rich in biodiversity will better weather the storm of invasive species, climate change, and large scale disturbances. Prescribed fire could be used more frequently in forest communities where fire was a natural occurrence. Finally, identify where forest communities are under-represented and define what actions are needed to improve these communities. (Under-represented is defined in Strategy 12.)

### STRATEGY

11. Encourage the management of under-represented forest communities.

An under-represented community is determined by comparing the current amount to a previous time. Common comparisons use pre-European settlement, the first post-Cutover inventory or recent FIA reporting dates (e.g. 1983, 1996, and 2007). There is not one point in time that is desirable for all comparisons – values drive what are desired forest communities. For example, the aspen-birch cover type is currently the third most common forest cover type in Wisconsin, representing about one-fifth (20%) of all forest land. Based on Public Land Survey data from the mid-to-late 1800s, aspen- and white birch-dominated forests occupied about 0.4 million acres or 2% of forest land area historically. The aspen-birch type expanded dramatically after the Cutover, but today the total acreage is slowly and steadily declining. About 8% of the total acres present in the early 1980's have converted to other vegetation types.

The Statewide Forest Assessment specifically mentions five forest communities that are "under-represented". Each is considered under-represented based on certain variables described in the "Assessment":

<http://dnr.wi.gov/forestry/assessment/strategy/data.asp?d=02>.

1. Reduction in acres of the aspen-birch community.
2. Reduction in acres of the jack pine cover type.
3. Lack of regeneration of yellow birch, hemlock, and cedar in our northern forests.

4. Oak forests shifting towards more shade-tolerant species such as sugar maple, red maple, and “central hardwood” species in our southern forests.
5. A lack of older forests in general in Wisconsin.

There may not be an immediate economic benefit to manage “under-represented” forest communities. The community may be managed because it’s rare or declining and has important biological diversity value. For example, an oak savanna may not be able to enter into the MFL program because of the density of the forest, but it is valuable as a declining forest community.

Possible Actions:

- Locate under represented forest communities by ecological landscape and develop a process to define the viable level of under represented communities.
- Provide incentives to landowners who manage under represented forest communities in appropriate areas identified in the Wildlife Action Plan's Conservation Opportunity Areas.

### **STRATEGY**

12. Improve all forested communities with a landscape management approach that considers the representation of all successional stages.

A landscape management approach that accounts for all characteristic successional and developmental stages with forest stands ranging from small to large will facilitate biodiversity conservation. These characteristics will be different depending on the ecological landscape and landowner objectives and what they define as appropriate. Silvicultural systems that more closely emulate natural disturbance and stand development processes are more likely to sustain ecological complexity and biodiversity (Crow et al. 1994, Niemela 1997, Seymour and Hunter 1999, OMNR 2002, Franklin et al. 2007, MFRC 2007, National Commission on Science for Sustainable Forestry 2007).

Possible Actions:

- At the ecological landscape scale, identify, develop guidelines, and manage appropriate blend of early, mid, and late successional stages.

### **STRATEGY**

13. Increase forest structure and diversity.

Adaptive silvicultural methods that develop and maintain biological legacies in managed stands can facilitate the promotion of stand level diversity, compositional and structural complexity, and the conservation of biological diversity. Guidance on the management of coarse woody debris (CWD), large trees, and snags / cavity trees was recently added to the DNR Silviculture Handbook. The goal of increased forest structure and diversity at the landscape level may have different goals than at the stand level and require different methods. For example, a goal for a landscape may be to increase the diversity of forest types whereas at the stand level, it may be appropriate based on the site to focus on the structure of only one forest type.

Appropriate regeneration techniques for timber types that require un-even aged management result in increased forest structure. High grading is the selective cutting of the most valuable and highest quality trees that leaves the low value and poor quality trees to predominate. High grading can accelerate the shift in species composition of our forests and reduce the genetic quality of our forests. Forest structure and diversity are negatively affected.

Possible Actions:

- Encourage landowners and forest managers to include management for coarse woody debris, large trees, snags / cavity trees, and, where appropriate, the restoration and protection of ephemeral ponds.
- Develop science based guidance on forest structural components.
- Monitor the results of increased forest structure.
- Encourage landowners and forest managers to follow appropriate regeneration techniques for timber types that require un-even aged management.

### **STRATEGY**

14. Encourage the use of disturbance mechanisms to maintain diverse forest communities.

Certain forest communities depend on fire for regeneration and forest community maintenance. Fire dependent forest communities are shrinking with the lack of fire on the landscape. The lack of fire has a significant impact on stand structure and successional processes.

Possible Actions:

- Encourage a multi-agency and landowner prescribed burn team that promotes burning where appropriate across ownerships.
- Provide incentives to landowners that allow disturbance for regeneration and forest community maintenance in appropriate areas identified in the Wildlife Action Plan's Conservation Opportunity Areas.
- Promote under represented forest communities on public lands.
- Develop Natural Range of Variation models for Wisconsin forest types.
- Encourage the training and participation of local fire departments in prescribed burning.
- Where approaches are lacking to regenerate less common forest types (e.g. lowland white cedar), encourage landowners to not conduct practices that may not maintain the species/forest type on the landscape.

### **GOAL**

**LANDSCAPE SCALE PLANNING: More forest land is being managed and protected under landscape scale plans, or consistent with landscape scale considerations. Management on the ground is increasingly being made within the landscape scale context.**

Forest communities are distributed across the landscape based on many factors. Among them are soil type, climate, aspect, and elevation. A forest community is an assemblage of plants and animals living together and occupying a given area. All forest management actions will have ripple effects throughout the forest community. Therefore, forest management guidelines should be created with the “ripple” effect in mind.

Landscape scale planning is important because forest communities flow and blend together across the landscape - they don't stop at property boundaries. Landowners have varying management objectives and therefore can decide to plan at the landscape scale or not.

### **STRATEGY**

15. Maintain the appropriate forest types for the ecological landscape while protecting forest health and function.

Broad forest management guidelines at the landscape level could be the skeleton which specific recommendations are built on for application at the forest stand level. The Wildlife Action Plan and Ecological Landscapes Handbook are useful tools to help create forest management guidelines for the ecological landscapes.

A landscape management approach that accounts for all characteristic successional and developmental stages with forest stands ranging from small to large will facilitate biodiversity conservation. By working with the ecological landscape it will be easier to maintain healthy and functional forests.

To maximize the benefits provided by forests, future forest management must look beyond the trees to manage the forest. This may include management for ecosystem services, specific vegetation or animal species, or managing for specific forest communities.

Possible Actions:

- Develop forest management guidelines at the landscape level that incorporate the Wildlife Action Plan and Ecological Landscapes Handbook (and others as appropriate).
- Develop incentives for forest owners to manage based on ecological landscape goals.
- Communicate ecological landscape goals to audiences ranging from the public to professional foresters.

### **STRATEGY**

16. Encourage multi-state landscape scale planning.

The number of multi-state/region/landscape scale planning efforts has greatly increased over the last decade. Forest communities do not end at state boundaries. Therefore,

it's valuable to work with our neighboring states when creating landscape scale plans. Landscape scale planning can provide beneficial economies-of-scale.

Possible Actions:

- Establish a process that facilitates conversation and development of regional forest management guidelines between regional forest stakeholders.

## **GOAL**

**DEER: Deer populations are managed to protect and enhance forest ecosystem functions while considering the full balance of potential impacts.**

### *DESCRIPTION OF GOAL*

Deer are a valued resource in Wisconsin for their cultural, social, economic and ecological benefits. Unfortunately, deer browse can damage forest regeneration. It is important to keep in mind that deer management is only one part of the equation when managing the impacts of deer herbivory. The impact of deer herbivory on a forest ecosystem is also affected by land management practices and how society sets environmental, economic and recreation priorities. Depending on the area of the state and the amount of deer, the impacts to the forest ecosystem vary. This section looks at management broadly and includes decision-making and communication along with traditional land and species management practices.

### **STRATEGY**

17. Increase scientific knowledge needed to understand the economic, ecological and social impacts of various deer populations (and associated deer herbivory) on forests.

There are several efforts underway within the state that will result in much needed data on which to base herbivory related decisions.

Possible Actions:

- Conduct studies that determine the impacts of deer herbivory at different population levels.
- Develop readily measurable indices for determining the impact of deer in forests by utilizing existing inventory systems (e.g. FIA, CFI, etc.)
- Invest in economic analysis expertise that can study the economic impacts of deer related to forests.
- Communicate applicable science to stakeholder groups regarding the impact of deer herbivory on Wisconsin forests through laymen publications workshops, etc.

### **STRATEGY**

18. Encourage the forestry community to be engaged in deer management issues with an understanding of the long term significance of deer impacts on sustainable forestry.

There is a very large spectrum of opinions and beliefs regarding deer populations and their effects. The forestry community's voice has not been very overt. In order to

enhance forest ecosystem functions, concerns over forest regeneration must be shared more broadly.

Possible Actions:

- Identify the forest based interest groups that should be included in wider deer density discussions.
- Institute a multi-stakeholder, forestry advisory group that advises the Natural Resource Board, legislature and various publics focused on understanding and providing a forestry perspective on deer impacts to the forest.

### **STRATEGY**

19. Adapt forest management practices to sustainably manage forests with locally high deer populations.

In order to achieve short term forest management in high deer populations, applied forest management techniques and land use practices are necessary. These tend to be expensive practices or culturally important activities that can be expensive and difficult to implement. Examples include fencing and deer repellents.

Possible Actions:

- Identify applied forest management alternatives at the stand level in light of high deer populations (fencing, deer repellents, etc.).
- Decrease practices that enhance deer habitat where necessary and appropriate (e.g., edge, food plots, baiting, feeding).
- Develop practices that will tolerate or prevent damage from deer.
- Improve incentives for landowners to use deer abatement measures (e.g., fencing).

### **GOAL**

**URBAN: Urban forests are more species diverse with greater tree canopy.**

#### *DESCRIPTION OF GOAL*

Urban forests provide a wide range of ecological, economic and social benefits for 80% of Wisconsin's population that lives in an urban area. Urban forests face two main ecological issues. First, our current tree canopy cover is only 14%, well below the recommended 40% canopy cover, and second, it lacks species diversity. Urban forests are more resilient with more tree cover. Currently Wisconsin's urban forests contain a rich diversity of tree species with over 85 different identified tree species. However, tree species distribution (evenness) is very poor, with 43% of all trees being either maple or ash. This leads to a high level of instability (e.g. high susceptibility to catastrophic loss from a genus-specific pest such as Emerald Ash Borer (EAB) or Asian Long Horned Beetle (ALB)).

### **STRATEGY**

20. Characterize and assess urban and community forests.

There have been small and infrequent inventories of Wisconsin's urban forests. Without knowing the extent, type, and health of the forest, it is difficult to make appropriate

management decisions. It is expensive for communities to invest in inventory and assessment of their resource during tough economic times even though forests provide extensive savings in heating and cooling costs.

Possible Actions:

- Establish a statewide continuous urban forest inventory and assessment designed to characterize Wisconsin's urban forests (e.g. composition, structure, cover type, habitat, threatened species, invasives), quantify ecological, economic and social benefits, monitor trends and evaluate success of management strategies.
- Evaluate urban forestry inventory data to identify and prioritize management strategies to address priority outcomes.
- Establish inventory and assessment tools for local municipalities that direct and prioritize urban tree management decisions.

## **STRATEGY**

21. Expand and manage a diverse urban tree canopy cover to provide multiple public benefits.

Maintaining the health and safety of existing trees will increase their benefits. Building sustainable programs to manage forest health and longevity is critical to sustaining these benefits through time. Wisconsin could nearly triple the services provided by its urban trees if communities reached the 40% canopy goal, helping the state address greenhouse gas emissions and energy independence. Ash and maple make up over 43% of Wisconsin's urban forest. This has set communities up for catastrophic loss to exotic diseases and insects. Planting a diverse population is essential to a sustainable resource.

Possible Actions:

- Plant a wide diversity of appropriate tree species in urban areas that will increase the social, ecological, and economic benefits from urban forests by creating jobs through "green infrastructure"; promoting energy conservation; preventing storm water run-off; mitigating the effects of air pollution; sequestering carbon; improving habitat for resident and migrant wildlife; and improving the quality of life for human inhabitants.
- Develop a wide variety of age and size class structures in the urban forest.
- Protect and care for the new and existing public and private tree canopy to maintain and expand benefits as trees grow over time.
- Develop guidelines and support tools to help public and private land owner's plant and maintain their urban tree canopy.
- Approve tree planting by municipalities as a credit towards NR151 in reducing stormwater runoff.
- Include tree planting as a part of all state road projects in urban areas.
- Plant abandoned urban brownfields and establish corridors between urban tracts.
- Businesses (nurseries and retail) and agencies communicate on species composition and availability.

- Develop a template for tree preservation during road construction projects in urban areas.

## **GOAL**

**INVASIVES: The spectrum of native and exotic invasive species is being addressed to minimize loss of forested ecosystem function.**

### *DESCRIPTION OF GOAL*

Invasive species (both native and exotic) are having a catastrophic impact on our ability to tend and regenerate Wisconsin's forests. This is a problem that will only get worse unless we adopt a process for working in partnership to prevent, detect, respond, control, manage, reduce, minimize or eliminate the potential for introduction, establishment, spread, and impact of invasive species across all forested landscapes and ownerships in Wisconsin. What follows is a process for controlling invasives (native and exotic) that are already here, and preventing the introduction of those that will follow.

### **STRATEGY**

22. Strive to prevent infestations of invasive species before they arrive.

Two Wisconsin Examples:

Hemlock Woody Adelgid. To our knowledge, it is not here yet. We continue to learn from states that are dealing with it and support quarantines where it exists and monitoring movement of wood.

Japanese Stiltgrass. This weed has not yet been found in Wisconsin, but is a problem in neighboring states. It adapts readily to low light conditions and a wide variety of soil types which will make it a major forest pest should it become established in Wisconsin.

Possible Actions:

- Work in public/private partnerships to conduct species risk assessments and identify priority invasive species for regulatory action consistent with NR40. (Current examples include Emerald Ash Borer, Gypsy Moth, Beech Bark Disease)
- Partner inside and outside the state to educate and build awareness of invasive species and their threat at all levels and jurisdictions.
- Develop a statewide data base and inventory of the locations of invasive species in Wisconsin.
- Reduce susceptibility to invasive species in native and urban forests by increasing species diversity and managing to reduce other stressors to improve resilience against infestation.
- Promote utilization by land managers of the BMPs for Invasive Species.
- Enforcement of laws related to the transport and introduction of invasive species.
- Based on risk assessment, implement Best Management Practices for preventing infestation with prohibited species and protecting priority areas.

## **STRATEGY**

23. Work to detect new infestations early and respond rapidly to minimize impacts to forests.

A Wisconsin Example: Emerald Ash Borer. We discovered this devastating insect in 2008. We are working in partnership (with the federal agencies and local municipalities) to secure a funding source for control. We have established silvicultural guidelines for managing natural stands and we are assessing the spread of the insect through a trapping regimen. Government agencies can not identify all infested areas. Landowners and citizens play an important role in detecting infestations.

Possible Actions:

- Establish guidelines and criteria for responding to new introductions of invasive species and applying the best and most current information toward preventing their spread.
- Working with partners, develop rapid response incident teams that cross jurisdictional lines and respond quickly to invasive species outbreaks. (Example: Partner with Cooperative Weed Management Areas where they exist and encourage formation of CWMA's throughout the state)
- Develop citizen based monitoring opportunities.

## **STRATEGY**

24. Control and management of existing infestations.

A Wisconsin Example: Gypsy Moth. This population is well established. The initial goal was to "slow the spread" using federal dollars to spray. Once the population became established we developed an annual monitoring process and we treat stands based on the public's desire to support local spraying to minimize social impacts and tree mortality. We are living with the Gypsy moth.

Possible Actions:

- Complete the comprehensive inventory and mapping of all priority invasives in forests.
- Conduct a comprehensive risk assessment based on existing information for the purpose of identifying priority species and areas of focus.
- Focus resources on priority species control, in priority areas, as identified through risk assessments.
- Develop and implement biological, cultural, chemical and physical controls for priority species.
- Encourage development of a multi-agency and landowner invasive species control team that promotes the use of proven tools to control invasives.
- Provide technical and/or financial assistance to landowners who work to control and manage invasive species on their property and who rehabilitate and restore their forests.

- Implement forest management guidelines that minimize the impact of invasives to the ecological landscape. Management activities should focus on reducing the forest's susceptibility to mortality.
- Monitor long-term invasive species population trends and effectiveness treatments. Make this information readily available to all stakeholders.

### **STRATEGY**

25. Rehabilitate, restore, or adapt native forest habitats and ecosystems.

A Wisconsin Example: exotic bush honeysuckle. We have had honeysuckle for around two hundred years. Their vigorous growth inhibits development of native shrub and ground layer species; eventually they may entirely replace native species by shading and depleting soil moisture and nutrients. Many landowners are trying to restore woodlands to previous conditions which include spring ephemerals. Public land can offer teaching and research plots to test rehabilitation techniques.

Possible Actions:

- Learn from past success and failure: Compile, highlight and share information about existing restoration and rehabilitation successes about invasive species.
- Encourage and develop sources for native seed (based on ecological zone) for use in restoration projects.
- Tie incentive programs and cost-share to areas with the greatest threat or environmentally important areas such as Conservation Opportunity Areas identified in the Wildlife Action Plan.