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NATURAL RESOURCES BOARD

BRIEF OF ACTION

The regular meeting of the Natural Resources Board was held on Wednesday, September 23, 2015 at the Casino Events Center, North Star Mohican Casino, W12180 County Road A, Bowler, WI 54416. The meeting was called to order at 8:30 a.m. for action on items 1-3 and 6-7. The meeting adjourned at 12:58 p.m.

ORDER OF BUSINESS

1. Organizational Matters

1.A. Calling the roll

William Bruins – present	Gary Zimmer – present
Julie Anderson – present	Dr. Frederick Prehn – absent, excused
Terry Hilgenberg – present	Preston Cole – present
Greg Kazmierski – present	

Joe Miller, Stockbridge-Munsee Band of Mohican Indians Council Member, welcomed the Board, department, and public.

Chair Cole reviewed the tribal and regional tours from yesterday saying they were inspiring. He thanked Secretary's Director Jean Romback-Bartels and her assistant Alyssa Hall for the great job in guiding the Board on those tours and coordinating the logistics.

Mr. Zimmer stated it was obvious yesterday how much everyone is working together. He is always impressed by the passion of the presenters.

1.B. Approval of agenda for September 22-23, 2015

Ms. Anderson MOVED, seconded by Mr. Zimmer, approval of the September 22-23, 2015 agenda. The motion carried 6 – 0. Dr. Prehn was absent, excused.

1.C. Approval of Brief of Action from August 12, 2015

Mr. Hilgenberg MOVED, seconded by Mr. Bruins, approval of the August 12, 2015 Brief of Action. The motion carried unanimously.

2. Ratification of Acts of the Department Secretary

2.A. Real Estate Transactions

Mr. Zimmer MOVED, seconded by Mr. Kazmierski, approval of the Real Estate Transactions. The motion carried unanimously.

3. Action Items

3.A. Air, Waste, Water, and Enforcement

3.A.1. Request adoption of Board Order DG-15-13, proposed rules affecting Chapter NR 809 related to Safe Drinking Water

Discussion followed on what the fiscal note for individual users was and how the department will deal with that, what the fiscal note for the department was to provide more services, and whether the monthly testing requirement expanded to all sites is a requirement of EPA.

Mr. Zimmer MOVED, seconded by Ms. Anderson, approval of the department's recommendations. The motion carried unanimously.

3.B. Land Management, Recreation, Fisheries, and Wildlife

3.B.1. Request adoption of Board Order FH-10-12, proposed rules affecting chapter NR 25 related to commercial harvest of chubs from Lake Michigan

Public Appearances:

1. **Charlie Henriksen**, Sister Bay, representing Lake Michigan Commercial Fishing Board as member **(Handout)**

Discussion followed on how confident the department is in the estimating programs they may use.

2. **Shawn Seger**, Grafton, representing self

Discussion followed as to whether the department agrees or refutes that the shape of the bloater chub has changed [Yes, the shape has changed.], and what the purpose of this rule is if the harvest is being set at the maximum.

3. **Glenn Seger**, Sheboygan, representing self **(Handout)**

Discussion followed as to whether Mr. Seger is a member of the Lake Michigan Commercial Fishing Association [No, the association disbanded.], the impact of the invasive species Alewife and how it will be addressed [Department is managing and not trying to eradicate Alewife.], and the need for the department to be in a position to be more nimble as populations change.

Mr. Bruins MOVED, seconded by Ms. Anderson, approval of the department's recommendations. The motion carried unanimously.

Chair Cole stated the department counts on the Commercial Fishing Board to work with staff to develop rules that are appropriate. The Seeger's should continue to have dialog with the department and do a deeper dive into those biometrics.

3.B.2. Request adoption of Board Order FH-18-14, proposed rules affecting chapters NR 20 and 23 related to modifications in walleye harvest management in Ceded Territory waters

Discussion followed on what percentage of lakes fit into each length restriction.

Public Appearances:

1. **Chris McGeshick**, representing GLIFWC and Sokaogon Chippewa Community as Chair **(Handout)**

Discussion followed on the department's interactions with lake associations in monitoring and enforcement, how often the department meets with Chair McGeshick and his staff, and adaptive management and being able to make decisions on the fly.

Deputy Secretary Kurt Thiede clarified that the department is currently operating under an emergency rule. To have a rule in place for next season, the department would need to follow-up with a permanent rule. A follow-up identical emergency rule is not an option. The rule being put in place for next year will continue to be assessed which could spawn a follow-up rule.

Discussion continued on the department's analysis of lakes outside the ceded territory as it relates to the walleye population as compared to those within the ceded territory, Chair McGeshick's points brought up from the April meeting that are concerning to all, monitoring and the department's program to see if the department is doing the right thing, working with lake associations, the amount of time the department is putting in on milfoil, emergency rule and permanent rule procedures, and how the department responds to specific lakes with a problem jeopardizing the fishery.

Deputy Secretary Thiede asked staff to respond to the last two discussion points.

Tim Andryk, Legal Services Bureau Director, discussed the department's rule procedures.

Joseph Hennessy, Treaty Fisheries Biologist, discussed how the department responds to problems in the fishery.

Deputy Secretary Thiede clarified the rules process as to immediacy.

2. **Larry Bonde**, Kiel, representing WI Conservation Congress as Vice-Chair

Discussion followed on creel surveys and working with lake associations, whether the department works with lake associations at their annual meetings, and whether the Board should table this item until the Board receives more and better information on lakes within and outside of the ceded territory.

Deputy Secretary Thiede and **Attorney Andryk** reviewed the timeline for deadlines.

Discussion followed on rule timeline concerns.

Mr. Bruins MOVED, seconded by Mr. Hilgenberg, approval of the department's recommendations.

Discussion followed on the considerable effort that went into this rule, lack of public appearances and comments from the lake associations, the process in changing the bag limit [Emergency rule.] and whether the Board could include language in the rule that allows for emergency closure of lakes when it meets a threshold [No, outside the scope statement.], and the public hearing process and why the numbers were so low [The department's outreach effort almost reached the levels of the deer season.].

Mr. Hilgenberg stated that Joe Hennessy, Treaty Fisheries Biologist, identified that when things are going good or when people are supportive they do not say anything. We have to reach out again to lakes associations or our public and ask for their support. That on-going communication is important. Secondly, he would like the department to investigate how to deal with issues that have been identified here as it relates to emergency action that has to be taken to protect our resource. The process that we have in place is way too cumbersome and we need to be able to move on our feet when required.

The motion carried unanimously.

3.B.3. Request approval of the updated 2015 – 2025 Fish, Wildlife, and Habitat Management Plan and Wildlife Action Plan (WAP)

Erin Crain, Land Division Deputy Administrator, offered to the Board eleven (11) amendments as attached to the Brief of Action beginning on page 10.

Mr. Zimmer MOVED, seconded by Mr. Kazmierski, approval to amend the 2015 – 2025 Fish, Wildlife, and Habitat Management Plan and Wildlife Action Plan to include the department's eleven (11) amendments. The motion carried unanimously.

Discussion followed on what the department's return is on all the resources that were expended in putting this together in terms of the grants and monies [Between $1.2 million and $1.5 million per year over the last ten years at about

$16 million], that this will provide guidance and strategies of a better job of managing our resources, and that the department has done a good job in working with stakeholders.

Public Appearances:

1. **Larry Bonde**, Kiel, representing WI Conservation Congress as Vice-Chair

2. **Jane Severt**, Merrill, representing Wisconsin County Forests Association as Executive Director **(Handout)**

Discussion followed on whether Ms. Severt would have any concerns that this plan would be the sole guidance document of master plans and whether the species that are not documented are of any concern.

3. **Bob Welch**, Madison, representing Wisconsin Bear Hunters Association

Discussion followed on Mr. Welch's request to remove all plants from the WAP, the size of wildlife plans from other states [They are very large. The department's plan from 10 years ago was 1,600 pages.], and concerns with having plants included in this plan.

Mr. Kazmierski MOVED, seconded by Mr. Bruins, approval of the department's recommendations and to amend the Wildlife Action Plan to remove Section 3.5 – "Plant Species of Greatest Conservation Need" and engage stakeholders in how this information can be used as a stand-alone document.

Discussion followed on clarification as to whether Mr. Kazmierski's amendment is the same as the department's amendment #6 [No, amendment #6 only removes list.], whether the plant section is new to this plan [Yes.], and whether removing the plant portion would impact funding from feds [No.].

The motion to amend carried unanimously.

Discussion followed on commending staff on addressing timeline concerns.

Ms. Anderson MOVED, seconded by Mr. Zimmer, approval of the amended 2015 – 2025 Fish, Wildlife, and Habitat Management Plan and Wildlife Action Plan. The motion as amended carried unanimously.

3.B.4. ~~Request approval of a Wisconsin Beaver Management Plan for 2015 - 2025~~
(Moved to October 28, 2015 meeting agenda)

3.B.5. Land Sale, Scattered Forest Lands, Vilas County

Discussion followed as to why this sale is before the Board today [Routine management of the department's real estate portfolio and business operations.].

Chair Cole stated he was not sure if the Board made itself clear as it relates to Act 20. Act 20, in summation, required the department to look at parcels that were landlocked, outside the boundary area, etc. and create a process to open those properties up for sale. It is 10,000 acres that the legislature in Act 20 wanted the Board to look at. The Board worked diligently. He thanked Mr. Hilgenberg and Mr. Bruins for their work on this to come up with a compendium, a protocol, to be used by field staff in determining which properties would be eligible in that 10,000 acres. This one sticks out in a lot of ways. His hope is these types of properties would better be served in the context of the statute. There will be properties that come before the Board that have water bodies or streams on them, or are adjacent. He understands a lot of this will be before the Board in January or February 2016.

He stated that taking this out of context, understanding it is part of your business operations when they come up, he prefers as Chair that these items come up in the context in which they were intended. In that way the public can fully vet the properties. There will be several opportunities to look at these properties online. If people have concerns or agree, the Board can hear them loud and clear. Coming out of the pipe, we should dispense with the notion of bringing these properties before the Board that fall into the criteria of Act 20. With that said, he does not want to hear it. He recommended that this Board take action to move this item to the January or February 2016 meeting agenda when the rest of the properties come up so the public has a long opportunity to weigh in on these properties.

Ms. Anderson MOVED, seconded by Mr. Kazmierski to table this item until the February 23-24, 2016 Board meeting.

Discussion followed on whether the department has sold other lands periodically [Yes.], why would this one come before the Board during your regular type of operations, and whether there is a situation when the department sells land and does not come before the Board [Yes, when the value is less than $50,000 and less than 40 acres as listed in agenda item 2.A.].

The motion to table carried unanimously.

Chair Cole directed Board Liaison Laurie Ross to potentially split the February 2016 meeting agenda into a two day meeting depending on length of agenda.

Public Appearances:

1. **George Meyer,** Madison, representing Wisconsin Wildlife Federation as Executive Director **Mr. Meyer did not testify since this item was tabled.**

3.C. Scope Statements

None

4. Citizen Participation

Public Appearances:

1. **Bob Welch**, Madison, representing Wisconsin Bear Hunters Association
   Topic: Hunter harassment in Northwest Wisconsin **Mr. Welch declined to testify.**

2. **Glenn Seger**, Sheboygan, representing self
   Topic: Uniform regulation for use of large mesh gill nets in all three zones of Lake Michigan for the commercial harvest of Whitefish **(Handout)**

   Discussion followed on Mr. Seger's request to direct DNR staff to look at the use of large mesh gill nets for white fish in zone 3 for commercial fishing, and why gill nets are not allowed in zone 3.

   Chair Cole requested that the department report back to the Board when appropriate to look at the use of large mesh gill nets for white fish in zone 3 for commerical fishing and to make sure Mr. Seger is involved.

   Discussion followed as to why there is a disparity in fees.

   Chair Cole stated the goal here for the viewing public is that this is an opportunity. Again, there are very few agencies in state government that have citizens appear before them, make recommendations, and have staff follow-up on things that impact them. That is the reason we have public participation, to invite the public to help us and help in the guidance of things that impact them in the natural resources world. He will continue to fling those doors wide open to the public. He thanked Mr. Seger for taking the opportunity and time to appear before the Board.

   Discussion followed on making changes to zone 3 unless there are obvious reasons, and allowing staff to do their due diligence.

3. **Shawn Seger**, Grafton, representing self
   Topic: Concern over invasive species Alewife in relation to native species in Lake Michigan **Mr. Seger declined to testify.**

5. Information Items

5.A. Air, Waste, Water, and Enforcement

5.A.1. Update on the department's strategic analysis related to the industrial sand mining industry in Wisconsin

Discussion followed on the timeline with stakeholders.

INFORMATIONAL ITEM – NO ACTION WAS TAKEN

~~5.B. Land Management, Recreation, Fisheries, and Wildlife~~
~~5.B.1. Wisconsin Youth Conservation Congress Initiative update~~

6. Department Secretary's Matters
6.A. Retirement Resolutions
6.A.1. Timothy Friedrich
6.A.2. Judy Hayducsko
6.A.3. Daniel F. Kolberg
6.A.4. John (Jack) R. Sullivan
6.A.5. Debra (Deb) Weidert

Mr. Zimmer MOVED, seconded by Mr. Hilgenberg, approval of the retirement resolutions. The motion carried unanimously.

6.B. Donations
6.B.1. The Lois Harrison Trust will donate approximately $170,000 to be us to conserve and restore populations of Whooping Cranes, Trumpeter Swans, and to manage their habitats in Wisconsin

Mr. Kazmierski MOVED, seconded by Mr. Zimmer, approval and to acknowledge the donation of $179,479.04. The motion carried unanimously.

6.C. Department Secretary's Matters

Deputy Secretary Thiede stated that the Midwest Association of Fish and Wildlife Agencies offered an award at their June 2015 meeting to a group from Wisconsin, Minnesota, Ohio, and Michigan for successfully planning and leading the Northern Long-Eared Bat workshop that was held in Minneapolis last winter. Erin Crain, Fish, Wildlife, and Parks Deputy Administrator, led the effort for Wisconsin. Department staff had a main role in the workshop planning including the gathering of data from 38 states in the Northern Long-Eared Bat range. Attendees shared experiences from their states and brainstormed strategies for informing the Federal delisting process for the Northern Long-Eared Bat. This ultimately is what led to inform the Federal listing decision which turned out to be threatened status and informed the interim 4d rule that we are operating under right now. The department is anticipating a permanent rule by the end of this calendar year to replace the interim rule.

He presented the award to Ms. Crain to a round of applause.

7. Board Members' Matters

Chair Cole, in response from last nights' meeting with tribal leaders, he requested that the department, Board, and department tribal liaison Shelly Allness work with the requisite tribes on the issue of youth and their involvement in natural resources. It should be a one page document on the opportunities we could pursue in collaboration of moving natural resources management from a Native American perspective along with the North American approach to natural resource management. Those opportunities could be

television, certainly schools and education, and MacKenzie Center. He asked Shelly Allness and staff to brainstorm and report back at the December 9, 2015 Board meeting.

Chair Cole requested a motion to go into closed session under the authority of s.19.85(1)(g) Wisconsin Statutes for purposes of discussing potential litigation matters.

Ms. Anderson MOVED, seconded by Mr. Bruins that the Board convene into closed session under the authority of s.19.85(1)(g) Wisconsin Statutes for purposes of discussing litigation matters. The motion was carried by a roll call vote.

William Bruins – yes	**Gary Zimmer – yes**
Julie Anderson – yes	**Dr. Frederick Prehn – absent, excused**
Terry Hilgenberg – yes	**Preston Cole – yes**
Greg Kazmierski – yes	

Chair Cole reconvened the meeting at 12:58 p.m. He reported that during closed session, no action was taken.

Mr. Zimmer MOVED, seconded by Mr. Hilgenberg, to adjourn the meeting. The motion carried unanimously.

The meeting adjourned at 12:58 p.m.

Amendments to agenda item 3.B.3.

Amendment 1. Executive Summary, page 1, paragraph 1, last sentence. Add bold to the statement:
"Use and implementation of the information and conservation actions described in the WWAP are voluntary."

Amendment 2. Information will be added to tables titled "Species with Information Needs and Other Species that were Assessed, but are not SGCN" for each taxonomic group in Section 3 in order to indicate which species were SGCN in WWAP1 but did meet SGCN criteria in WWAP2. Lists of these species are provided in Attachment 1.

Amendment 3. Table 5.1 "Proposed Moderate Changes to the "Fuzzy" Boundaries of Existing Conservation Opportunity Areas" was removed from the plan.

Amendment 4. Add American Woodcock (*Scolopax minor*) to the list of bird SGCN in Section 3.2, Table 3.2.1, p. 16 and incorporate this species into all other relevant tables and figures in Section 3.2.

Amendment 5. Replace Section 4.4.5 Northern Forest Group with the attached (Revised) Section 4.4.5 (Attachment 2).

Amendment 6. Remove plants from the proposed SGCN list in Section 3.5, p. 1, and refer to them as "associated plant species" throughout the WWAP.

Amendment 7. The following bullets will be added to the Barrens Natural Community Group Section 4.4.2.2, page 2, paragraph 4; the Grassland Natural Community Group Section 4.4.3.2, page 4, paragraph 3; and Savanna Natural Community Group Section 4.4.4.2, page 3, paragraph 2.

- Evaluating the potential effects to invertebrates should be routinely considered in plans to use fire for restoration or management of this community type. The frequency, intensity and area burned should be planned considering the life history, habitat needs and distribution of fire-sensitive invertebrate species both on the subject property and adjacent habitat. In cases where burning is the preferred community management tool, but invertebrate species impacts are undetermined or potentially significant, the feasibility of creating refugia should be examined as should alternative methods for invasive, shrub and canopy management.
- Quantify and monitor the positive and negative impacts that prescribed burning and other management activities undertaken in grassland, barrens and savanna communities have on SCGN invertebrates to improve management decisions and techniques and improve intended outcomes.

Amendment 8. Add the following text to the Executive Summary, page 11, end of paragraph 2:

- Information to understand issues and conservation actions, monitor future trends and measure successful outcomes is an issue for all taxonomic and natural community groups. Academia, state and local agencies cannot cover this need alone. Many citizens and volunteer groups are highly interested in and capable of

contributing to these efforts through various forms of citizen-based monitoring and science. Actions that support their training and participation are beneficial to all taxonomic groups and natural communities.

Amendment 9. Add the following bullets to Section 4.4.1 Aquatic Group, page 3, paragraph 3:

- Develop lake and waterway plans that consider conservation, management and restoration of aquatic habitats as part of assuring sustainable use and enjoyment. Consider management measures, methods and tools that provide multiple benefits for mixed uses and goals that include SGCN and their habitat
- Educate, inform and guide property owners, organizations, lake and sanitary districts, businesses, interest groups and recreational users in aquatic habitat related issues
- Encourage citizens, state and local decision-makers to take voluntary actions on behalf of maintaining and restoring water quality elements of aquatic habitats.

Amendment 10. Replace the following two paragraphs with the following text:

- Section 2.5.4, page 26, paragraph 4:
  Conservation actions were assigned to the appropriate issue/threat and conservation action category in the Actions Database. The SGCN and Natural Community groups that benefited from the action were also identified in each case. The general objective of the action was considered in the summaries in Sections 3 and 4.
- Section 2.5.5, page 28, paragraph 2:
  As of the writing of this submittal, the structure and the fields in the Actions Database are generally complete; however, work will continue as part of Plan implementation to finalize content of the actions and the database fields. WWAP technical teams, partners and users will continue work to fill the fields in the database and finalize the most appropriate wording for the conservation actions during plan implementation. Even after the individual actions have all been finalized and the fields of the database are complete, periodic updates will be scheduled as part of an adaptive management approach to achieving positive conservation outcomes (see Section 6). WWAP users will have access to portions of the Actions Database and an ongoing opportunity to provide input to it. The Actions Database is intended to respond to changing conditions, new information and user input over time.

Amendment 11. Revisions will be made to section 3.6:

- Table 3.6.3, p. 41 will be amended to reflect the fact that species in the Araneae and Acari groups are not known to occur in Wisconsin.
- Section 3.6.1.9, page 4, paragraph 2 will be replaced with:
  Springtails are terrestrial invertebrates of the Subclass Collembola. Even though they have 6 legs, they are wingless, have 6 abdominal sections, and are considered to have diverged very early in the evolution of modern insects. Springtails are associated with damp conditions and organic debris and are found outdoors in soil, leaf litter, lichen, under bark, decaying plant matter, rotting wood, and other areas of high moisture. They are found in many different habitats, feeding on fungi, pollen, algae, or decaying organic matter. They will jump away quickly when disturbed. Of the 3 native springtail species in Wisconsin that were reviewed, they tend to be found in large numbers on the water surface eating decaying plant matter. None of these are considered SGCNs.

Attachment 1. Proposed Amendment 2
Addition of lists of species that were SGCN in WWAP1 but not WWAP2

Common Name	Species Group
Add to Table 3.1.2, Sec. 3.1, p. 20	
Eastern Red Bat	Mammal
Gray Wolf	Mammal
Moose	Mammal
White-tailed Jackrabbit	Mammal
Add to Table 3.2.2, Sec. 3.2, p. 18	
American Golden Plover	Bird
Bald Eagle	Bird
Barn Owl	Bird
Black-billed Cuckoo	Bird
Black-throated Blue Warbler	Bird
Blue-winged Teal	Bird
Blue-winged Warbler	Bird
Brown Thrasher	Bird
Buff-breasted Sandpiper	Bird
Canada Warbler	Bird
Canvasback	Bird
Dunlin	Bird
Field Sparrow	Bird
Horned Grebe	Bird
Hudsonian Godwit	Bird
Lesser Scaup	Bird
Louisiana Waterthrush	Bird
Marbled Godwit	Bird
Northern Harrier	Bird
Osprey	Bird
Redhead	Bird
Short-billed Dowitcher	Bird
Snowy Egret	Bird
Solitary Sandpiper	Bird
Trumpeter Swan	Bird
Veery	Bird
Whimbrel	Bird
Willow Flycatcher	Bird
Wood Thrush	Bird
Yellow-billed Cuckoo	Bird

Common Name	Species Group
Add to Table 3.3.2, Sec. 3.3, p. 13	
Banded Killifish	Fish
Greater Redhorse	Fish
Kiyi	Fish
Redside Dace	Fish
Western Sand Darter	Fish
Add to Table 3.4.2, Sec. 3.4, p. 18	
Blanchard's Cricket Frog	Herp
Boreal Chorus Frog	Herp
Gray Ratsnake	Herp
Mudpuppy	Herp
Pickerel Frog	Herp
Prairie Skink	Herp

Attachment 2. Proposed Amendment 5
Revised Section 4.4.5 Northern Forest Group

4.4.5 Northern Forest Group

4.4.5.1 Overview

Wisconsin's northern forest communities are found north of the vegetative Tension Zone, an area of climatic transition where the prairies and oak savannas that historically dominated southern Wisconsin changed to mixed deciduous-coniferous forests. Today, vegetation still changes along the Zone, but the transition is largely from agricultural uses to a more continuous forest cover. The shorter growing season and other environmental differences in northern Wisconsin makes this area less suitable for agriculture and allows forest to predominate.

Data from the Forest Inventory and Analysis Program indicate that in 2008 there were approximately 11.4 million acres of forest north of the Tension Zone, covering 64% of the area. Northern forests make up 69% of the total forested area statewide.[1] Maple-basswood is the most common cover type group among northern forests, followed by aspen-birch[2]. Lesser components included the oak-hickory, spruce-fir, pines, and lowland hardwood groups. Table 4.4.5.1 provides the number of SGCNs estimated to have a high or moderate association with this community group.

Forest ecosystems were drastically altered between the 1850s and early 1930s when nearly all of the primary forest was harvested or burned during the Cutover. Pine logging began near large rivers as early as the 1830s. Starting around 1870 and continuing into the 1920s, fires had a major effect on the northern forest, occurring with greater frequency and intensity due to slash left from logging and abundant new sources of fire that came with growing human populations. By the turn of the century, pulp mills were constructed to utilize the less-desirable wood, beginning the gradual switch to a pulp-dominated industry. Public reaction to the abuses of the Cutover resulted in legislation and government programs designed to rehabilitate the impacted forests.

The Northern Forest Group includes the following community types:

- Black spruce swamp
- Boreal forest
- Forested seep
- Mesic cedar forest
- Mesic floodplain terrace

[1] U.S. Forest Service (USFS). 2010. Forest inventory and analysis national program. Website available online at http://www.fia.fs.fed.us/toolsdata/default.asp . Accessed July 2010.

[2] See Chapter 2 of the Ecological Landscapes of Wisconsin report http://dnr.wi.gov/topic/Landscapes/Handbook.html (Search Terms: Ecological Landscapes of Wisconsin)

- Northern dry forest
- Northern dry-mesic forest
- Hardwood swamp
- Northern mesic forest
- Northern wet forest
- Northern wet-mesic forest
- Tamarack swamp (poor)

Sustainable management of northern forests remains an extremely important industry in Wisconsin, and provides both wood products as well as wildlife habitat. In an effort to provide more meaningful conservation actions to forest managers interested in wildlife SGCN, select northern forest communities have been further divided into seral stages based on typical managed forest conditions, and two additional managed forest types have been added. These include:

- Northern dry forest (young seral, mid seral and late seral forest)
- Northern dry-mesic (young seral, mid seral, and late seral forest)
- Northern mesic (young seral, early seral, mid seral, and late seral forest)
- Aspen
- Conifer plantations

Descriptions for these northern forest community types added to the WWAP can be found in Section Appendix 4.4.5.1; the remainder can be found online.[3]

Table 4.4.5.2 at the end of this Section provides the Natural Community – Ecological Landscape Opportunity scores for the Northern Forest Community Group. The key to these scores is provided below.

Level of Opportunity	Description
High	A major opportunity for sustaining the natural community in the Ecological Landscape exists, either because many significant occurrences of the natural community have been recorded in the landscape or restoration activities in areas of historical occurrence are likely to be successful maintaining the community's composition, structure, and ecological function over a long period of time.
Moderate	Although the natural community does not occur extensively or commonly in the Ecological Landscape, one to several significant occurrences do occur and are important in sustaining the community in the state. In some cases, important opportunities may exist because the natural community may be restricted to just one or a few Ecological Landscapes within the state and should be considered for management there

[3] http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=group&Type=Aquatic (Search Terms: Aquatic Communities of Wisconsin DNR)

	because of limited geographic distribution and a lack of better opportunities elsewhere.
Low	The natural community occurs in the Ecological Landscape, but better management opportunities appear to exist in other parts of the state.
None	The natural community is not known to occur in this Ecological Landscape.

4.4.5.2 Issues and Associated Conservation Actions for the Northern Forest Community Group

This Section summarizes issues and voluntary conservation actions that are common to all or most of the community types in this group. As much as possible, the source of the threat is described as well as the stresses or effects that occur directly or indirectly as a result of the threat. Stresses are generally thought of as loss, conversion and/or degradation of the natural community.

Issue. Most northern forest communities historically occurred within a large forested matrix. Many forest-dwelling species similarly depend on large blocks of forested habitat. Habitat fragmentation, either through conversion to developed or other non-forest land, or converting one type of forest to other, such as a natural forest to a pine plantation, reduces habitat for species needing large blocks of mature forest, such as forest interior birds. In addition, forested wetlands can be inadvertently converted to non-forested wetlands through unsustainable practices that cause swamping, takeover by reed canary grass, or regeneration failure from deer browse. Some species require young forest, and a lack of disturbance can be detrimental. A balanced approach that takes into account the need for large blocks of older forest as well as areas of mid-seral and young-seral forest would benefit the most SGCN.

Conservation Actions. Depending on your overall objectives, the following conservation actions can be considered to address habitat fragmentation and the effects that it has on northern forest natural communities:

- Develop clear goals for Desired Future Condition at a regional scale, considering forest type and age class, as well as the spatial arrangement of different types of forest on the landscape.
- Research ways to enhance landscape connectivity (e.g. through forest patch size, arrangement, corridors, etc.) between patches of young, mid-seral, and old forest for species that require large blocks of forested habitat.
- When managing land surrounding a high quality forest site, manage in a way that does not isolate the site and that minimizes the negative effects of fragmentation.
- Avoid rapid and dramatic reductions in canopy cover or basal area in forested wetlands to reduce risk of swamping or takeover by reed canary grass.

Issue. Much of Wisconsin's northern forests have become simplified and lack much of the species and structural diversity needed to support sustainable populations of some wildlife SGCN. In addition, ecological simplification renders forests more vulnerable to

pests and diseases and less resilient to drought, wind storms, long-term changes in climate, and other environmental stresses. Ecological simplification can result from:

- Invasive plants such as garlic mustard, buckthorn, and reed canary grass, which outcompete native plants and inhibit tree regeneration.
- Forest management practices that do not recruit snags and coarse woody debris or that limit tree species, age class, or structural diversity, depending on the forest type.
- Regeneration problems for oak, cedar, hemlock, and other species in areas with heavy white-tailed deer browse.
- Lack of controlled fire in northern dry forest and northern dry-mesic forest

Conservation Actions. Depending on your overall objectives, the following conservation actions can be considered to address ecological simplification and the effects that it has on northern forest natural communities:

- Underplant or use other techniques to establish, promote and release understory trees of under-represented species such as white pine, hemlock, oak, yellow birch, etc., based on local site conditions.
- Practice Green Tree Retention during forest management to promote species, structural and size class diversity within stands.
- Enhance structural complexity of forests by retaining and promoting features important for wildlife such as large cavity trees and snags.
- Survey for and control invasive species prior to forest management; follow terrestrial invasive species BMPs during forest management activities.
- Implement methods to limit negative impacts of locally abundant deer on regeneration of dominant trees as well as on ground layer species, particularly for browse-sensitive species (i.e. white cedar, hemlock, oak, etc.).
- Conduct silvicultural trials for utilizing prescribed fire as a tool to promote natural regeneration of red and white pine.

Issue. Though not as yet widespread in comparison to southern forests, invasive species are a growing threat to northern forest communities. From pests like Emerald Ash Borer to plants such as garlic mustard and reed canary grass, invasive species can cause a host of problems ranging from difficulties in tree regeneration to direct tree mortality. Non-native earthworms greatly reduce the duff layer and alter soil structure in a way that disfavors native tree seedlings and many wildflowers and promotes Pennsylvania sedge and invasive plants. Invasive species are expected to increase over time due to their ability to respond quickly to soil disturbance and changes in growing season. Some species which are not yet present on the landscape, such as the Mountain Pine Beetle which feeds on Jack Pine, could arrive in the near future and have devastating impacts.

Conservation Actions. *Depending* on your overall objectives, the following conservation actions can be considered to address invasive species and the effects that they has on northern forest natural communities:

- Survey for and control invasive species prior to forest management and recreational development projects; follow existing terrestrial invasive species BMPs for these activities.
- Develop management techniques, demonstration sites, and management plans that retain forest cover following loss of ash from emerald ash borer in ash-dominated hardwood

swamps and floodplain forests, and minimize risk of conversion to non-forestland (reed canary grass, etc.).
- Research methods to reduce risk of arrival and spread of new invasive species.

Issue. Soil disturbance and hydrologic alterations are a major concern in forested wetlands, as well as a local concern on sensitive soils (especially on clay and in low wet areas, such as ephemeral ponds) in mesic forests, boreal forests, and other northern forest types. Operation of vehicles or heavy equipment in forested wetlands can cause soil compaction and rutting, and poorly designed roads and stream crossings can cause erosion and sedimentation. Following water quality BMPs and seasonal harvest restrictions on sensitive soils greatly reduces the risk from these activities; however, environmental changes may add complexity to this issue if severe precipitation events increase and the season of frozen ground conditions grows shorter in some areas. Direct hydrologic alteration of forested wetlands through dams, ditching, and filling (through road building, waste rock disposal, etc.), is local in scale, but causes severe habitat alteration where it does occur.

Conservation Actions. Depending on your overall objectives, the following conservation actions can be considered to address soil disturbance and hydrologic alteration and the effects that it has on northern forest natural communities:

- Follow Forestry BMPs for water quality, especially near riparian areas. Where feasible, consider adding buffers around sensitive northern wetland habitats (e.g., fens, bogs, springs, sedge meadows, etc.).
- Develop habitat management recommendations for Ephemeral Ponds to protect water quality, pond hydrology, and habitat for herptiles and invertebrates.
- Work with partners to refine and implement the strategy to "Slow the Flow" of runoff and sedimentation.
- Preserve and restore habitat corridors along river systems, including both wetland and uplands, to provide for both linear movement of species along the river corridor and lateral movement to and from upland and wetland to river.
- Limit hydrological alteration to wetlands as an unintentional consequence of development/road building.

Issue. In general, climate change adaptation is best approached from a risk management perspective that acknowledges uncertainty while increasing resistance and resiliency. Northern forests may experience direct and indirect impacts from a changing climate (Janowiak et al., 2014). Many species at the southern end of their range, including jack pine, white spruce, black spruce, and paper birch may suffer significant declines by the end of the 21st century, while southern species (e.g, oaks, red maple, basswood) may experience more suitable climate conditions (Janowiak et al., 2014). Extreme storms that cause windthrow and severe flooding are already on the rise and are projected to increase further (WICCI 2010). Climate change may also increase the risk of invasive species, which are often able to respond to disturbance and rapid environmental change, as well as increase the potential damage to vegetation and forest regeneration from deer due to shorter and less severe winters.

Conservation Actions. Depending on your overall objectives, the following conservation actions can be considered to address climate change and the effects that it may have on northern forest natural communities:

- Increase structural diversity within forest stands to confer resistance to wind and ice storms.
- Develop silvicultural trials for innovative forest management techniques that increase forest resilience (e.g., increased tree species and structural diversity, natural regeneration of red pine, consistently successful regeneration of oak, etc.).
- In oak-dominated natural communities, maintain or increase diversity of oak species as appropriate for site conditions through various silvicultural techniques such as planting, etc., to improve resilience to pests, disease and environmental change.

Estimated Vulnerability of Northern Forest Communities to Climate Change (Adapted from Janowiak et al. 2014).

Community type	Vulnerability across a range of low to high change scenarios
Aspen	Moderately high
Black Spruce Swamp	High
Boreal Forest	High
Conifer Plantation (Red pine)	Moderately high
Dry Northern Forest	Moderate
Hardwood Swamp	Moderately High
Northern Dry-mesic Forest	Moderately low
Northern Mesic Forest	Moderate
Northern Wet Forest	High
Northern Wet-mesic Forest	High
Tamarack (poor) Swamp	High

References

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Table 4.4.5.1 Number of Plant and Animal Species of Greatest Conservation Need Highly or Moderately Associated with Northern Forest Communities

SGCN Species Group	Northern Forest Community Group
Birds	16
Fish	
Herps	5
Mammals	8
Plants	66
Insects - Aquatic	7
Insects - Terrestrial	18
Invertebrates - Crustacea	
Invertebrates - Mussels	
Invertebrates - Terrestrial Snails	12
Total SGCN (High/Moderate Association)	**132**

Table 4.4.5.2 Natural Community – Ecological Landscape Opportunity Scores for the Northern Forest Community Group

Community	Central Lake Michigan Coastal	Central Sand Hills	Central Sand Plains	Forest Transition	North Central Forest	Northeast Sands	Northern Highland	Northern Lake Michigan Coastal	Northwest Lowlands	Northwest Sands	Southeast Glacial Plains	Southern Lake Michigan Coastal	Southwest Savanna	Superior Coastal Plain	Western Coulee and Ridges	Western Prairie
Aspen-Birch	L	L	M	M	H	H	H	L	H	H	L		L	H	L	L
Black Spruce Swamp	L	M	M	H	H	M	H	L	M	M				M		
Boreal Forest					M	L	L	M	M					H		
Conifer Plantation	L	L	H	M	M	H	H	L	M	H	L	L	L	L	L	L
Forested Seep	L	L	L	L	M	L		L	H	L	L			L	H	
Mesic Cedar Forest					M											
Mesic Floodplain Terrace														M		
Northern Dry Forest--late seral		L	M		L	H	M	M	L	H				M		
Northern Dry Forest--mid-seral		L	M		L	H	M	M	L	H				M		
Northern Dry Forest--young seral		L	M		L	H	M	M	L	H				M		
Northern Dry Mesic--late seral	M	L	M	M	M	H	H	M	M	H	L			M	L	
Northern Dry Mesic--mid-seral	M	L	M	M	M	H	H	M	M	H	L			M	L	
Northern Dry Mesic--young seral	M	L	M	M	M	H	H	M	M	H	L			M	L	
Northern Hardwood Swamp	M	M	M	M	H	M	L	M	L	M	M			M	L	
Northern Mesic Forest--early seral	M	L	M	H	H	M	M	H	M	L				M	L	L

Community	Central Lake Michigan Coastal	Central Sand Hills	Central Sand Plains	Forest Transition	North Central Forest	Northeast Sands	Northern Highland	Northern Lake Michigan Coastal	Northwest Lowlands	Northwest Sands	Southeast Glacial Plains	Southern Lake Michigan Coastal	Southwest Savanna	Superior Coastal Plain	Western Coulee and Ridges	Western Prairie
Northern Mesic Forest--late seral	M	L	M	H	H	M	M	H	M	L				M	L	L
Northern Mesic Forest--mid seral	M	L	M	H	H	M	M	H	M	L				M	L	L
Northern Mesic Forest--young seral	M	L	M	H	H	M	M	H	M	L				M	L	L
Northern Wet Forest	M	H	H	H	H	M	H	L	H	H				M		L
Northern Wet-mesic Forest	M	L		H	H	H	M	H	M	M	M			M	L	
Tamarack Swamp (poor)	L	H	H	H	H	M	H	L	H	H				M		L

Appendix 4.4.5.1

Northern Forest Community Descriptions New to the WWAP and Currently Not Presented Online

Northern Mesic Forest (seral stages)
Northern Dry Mesic Forest (seral stages)
Northern Dry Forest (seral stages)
Aspen/Birch
Conifer Plantation

Appendix 4.4.5.1

Northern Forest Community Descriptions New to the WWAP and Currently Not Presented Online

Northern Mesic Forest (seral stages)
Northern Dry Mesic Forest (seral stages)
Northern Dry Forest (seral stages)
Aspen/Birch
Conifer Plantation

4.4.5.1Northern Mesic Forest

General Description

The Northern Mesic Forest once covered the largest acreage of any Wisconsin vegetation type. This community type remains extensive today but with a different character than observed during the late 19th and early 20th centuries. Scattered small pockets of older Northern Mesic Forest persist, and some second-growth examples are beginning to develop old forest attributes that support wildlife SGCN. Large acreages are also managed for pulp and sawtimber contributing greatly to the state's economy. Collectively, Northern Mesic Forests provide important habitat for SGCN across large portions of Wisconsin.

Northern Mesic Forest is still the most common community type in northern Wisconsin, and it forms the "matrix" for most of the other community types found there. It is found primarily north of the Tension Zone on loamy soils of glacial till plains and moraines deposited by the Wisconsin glaciation. Sugar maple is dominant or co-dominant in most stands, regardless of their age or origin. Historically, eastern hemlock was the second most important species, sometimes occurring in nearly pure stands with eastern white pine; both of these conifer species are greatly reduced in abundance in today's northern forests. American beech can be a co-dominant with sugar maple in the counties near Lake Michigan. Other important tree species are yellow birch, basswood, and white ash, although yellow birch reproduction has become scarce in many stands.

Characteristic subcanopy trees include balsam fir, ironwood, and American elm. The shrub layer includes species such as alternate-leaved dogwood, beaked hazelnut, leatherwood, American fly honeysuckle, prickly gooseberry, red elderberry, and maple-leaved arrow-wood. Historically, Canada yew was an important shrub, but it is now absent from nearly all of its previous range, mostly due to deer browse. The groundlayer varies from sparse and species poor (especially in hemlock stands) with woodferns, blue-bead lily, club-mosses, and Canada mayflower, to lush and species-rich with fine spring ephemeral displays of species such as large-flowered trillium, Dutchman's-breeches, spring beauty,

and trout lilies. Other characteristic species include white baneberry, downy Solomon's-seal, wild sarsaparilla, rose twisted stalk, starflower, maidenhair fern, and lady fern.

The predominant historic disturbance regimes consisted of windthrow that semi-regularly created small forest gaps and, less frequently, large areas of downed trees. Windthrow still occurs today and is an important source of coarse woody debris, which is crucial as a seed bed or nurse log for species like hemlock and yellow birch; it is also important in nutrient cycling and for wildlife habitat. After stands were harvested during the Cutover (late 1800's to 1932), slash fires affected many areas, resulting in a shift towards species such as aspen, white birch, and red maple. These tree species are still commonly found in many second-growth northern mesic forests today. Traditional hardwood management has favored the extremely shade-tolerant sugar maple, but many foresters have attempted to utilize gaps in recent years to add tree species diversity to managed stands.

Seral Stages

The following section describes the progressive stages of forest development following harvesting or a major natural disturbance. Stands with more than 50 percent aspen by basal area fall into the Aspen habitat type. For stands dominated by planted conifers, refer to the Conifer Plantation type.

Young Northern Mesic Forest. Young northern mesic forests are dominated by trees ranging from 0-5 inches in diameter at breast height (DBH). They typically originate from stand-replacing events such as clear-cutting, coppicing, or a catastrophic blow-down, creating an even-aged stand through what foresters term the stand initiation phase of forest development. Typically, tree species diversity is low and dominated by sugar maple, sometimes with an aspen or birch component. Other northern hardwoods tree species may be present as well, including red oak, red maple, basswood, and white ash, depending on the site. Coarse woody debris is typically sparse except for old, highly decayed legacy logs on the forest floor. However, fresh coarse wood may be abundant in stands originating from blow-down, provided the stands have not been salvage logged. Although unusual, such unsalvaged blow-down stands may have hemlock and yellow birch reproduction where seed source is abundant (e.g., Kemp Natural Resources Station in Oneida County). However, factors such as local deer abundance and weather conditions may limit natural regeneration of these species. Important site-level characteristics that benefit the most wildlife SGCN at this seral stage include proximity to more mature forest for foraging, dense groundcover and abundance decaying coarse wood (e.g., for woodland jumping mouse) and a thick duff layer with minimal damage from non-native earthworms (e.g., for snails and rare ferns).

Early-seral Northern Mesic Forest. Early-seral Northern Mesic Forests are dominated by trees 5-11 inches DBH and may be even aged or two-aged, fitting

into what foresters term the stem exclusion phase as competition inhibits new saplings and shrubs. Stands may provide relatively high, consistent canopy cover, but lack the larger trees as well as the species and structural complexity of older forests. Snags and coarse woody debris are typically sparse except for legacy trees. Sugar maple is often dominant, while red oak, red maple, basswood, and white ash may also present. Aspen and birch may be present in small patches as well, especially in forests specifically managed to promote them. Important site-level characteristics that benefit SGCN at this seral stage include coarse woody debris and mossy logs around ephemeral ponds and seeps (e.g., for four-toed salamander) and closed canopy forest (e.g., for least flycatcher), and a thick duff layer with minimal damage from non-native earthworms (e.g., for snails and rare ferns).

Mid-seral Northern Mesic Forest. Mid-seral Northern Mesic Forests are dominated by trees 11-15+ inches DBH, though occasional older, larger trees may also be present. Young saplings may be present as stands transition into what foresters term the understory reinitiation phase, and the forest takes on uneven-aged characteristics, though forests will still lack the complex structural and species diversity found in older stands. While most sites are dominated by sugar maple, other species such as basswood, red oak, elm, white ash, and yellow birch may also be present. Groves of old hemlocks may be embedded within mid-seral forests as well. If trees are allowed to age beyond typical rotation age, stands will mature and may "break apart," creating snags, coarse woody debris and multi-aged structure that benefit SGCN that prefer mature forests. Techniques can be applied to managed stands to try to achieve these results, as well. Important site-level characteristics that benefit SGCN at this seral stage include large trees that serve as nest sites (e.g. for forest raptors), trees with cavities or cracks that serve as roost sites (e.g., for several species of bats), and rich soils with thick duff layer (e.g., that support rich-site rare plants and host plants such as the two-leaved toothwort (Cardamine diphylla), the host plant for the West Virginia white butterfly).

Late-seral (may also be referred to as Old or Old Growth). Old Growth and Old Northern Mesic Forests have older trees, high structural diversity, and higher species diversity, and may have scattered, long-lived conifers. Trees of all sizes and age classes are present, including scattered individuals 18-24 inches in DBH or more. Old growth canopy trees can range in age from 75-300 years, with the average age between 115 and 175 years. Old Growth and Old Forests often have a complex, multi-layered canopy with natural gaps present. Other important structural attributes include abundant snags and cavity trees and significant coarse woody debris in various stages of decomposition, which contribute significant habitat for animal SGCN and sites for seedling establishment of hemlock and yellow birch. Sugar maple dominates most sites, but large basswood and red oak may also be present, along with scattered yellow birch and white ash. Hemlock and white pine may occur as scattered individuals; other stands may be dominated by hemlock, and small groves of older hemlock can be dotted throughout older hardwood stands. Conifers are

an important component for many animal SGCN, providing thermal cover, nest and den sites, nesting material, as well as decay-resistant snags and coarse woody debris. Old Growth and Old Forests includes older passively managed stands, stands actively managed for old growth conditions and virgin "reference condition" forests. Although the latter is exceptionally rare on the Wisconsin landscape, it provides a glimpse of the range of structural diversity possible in this forest type, particularly the size and density of cavity trees, snags, and coarse woody debris. Important site-level characteristics that benefit SGCN at this seral stage include large trees that serve as nest sites (e.g. for forest raptors), standing live and dead trees, an abundance of decaying coarse woody debris, and a diverse understory (e.g., for northern flying squirrel), coniferous trees in the understory and overstory (e.g. for Swainson's thrush and evening grosbeak), and soils with thick duff layer and minimal damage from non-native earthworms (e.g., that support a wide variety of snails and rare plants).

4.4.5.2 Northern Dry-Mesic Forest

General Description

Northern Dry-mesic Forests are typically found on irregular glacial topography (e.g., heads-of-outwash, tunnel channel deposits), or in areas with mixed glacial features (e.g., pitted outwash interspersed with remnant moraines). Soils are loamy sands or sands, and less commonly, sandy loams. Some occurrences are in areas where bedrock is close to the surface.

Eastern white pine and red pine are typically dominant, sometimes mixed with northern red oak, red maple, and occasionally, sugar maple. Paper birch, trembling aspen, and big-toothed aspen can also be present. Common understory shrubs include hazelnuts and blueberries, as well as low-growing species such as wintergreen and partridge-berry. Among the dominant herbs are wild sarsaparilla, Canada mayflower, and cow-wheat.

Areas of Northern Dry-mesic Forest that were historically dominated by red and white pines were considered the great "pineries" before the Cutover. Today, the extent of red and white pine is greatly decreased, while red maple, sugar maple, aspen, and oaks have increased. Historically, fire disturbance of low to moderate intensity and frequency was key to maintaining Northern Dry-mesic Forests.

Seral Stages

The following section describes the progressive stages of forest regeneration following harvesting or a major natural disturbance from young forest to the attainment of reference conditions as seen in a mature stand. Stands with more than 50 percent aspen by basal area fall into the Aspen habitat type. For stands dominated by planted conifers, refer to the Conifer Plantation type.

Young Northern Dry-Mesic Forest. Young Northern Dry-mesic Forests are dominated by trees ranging from 0-5 inches in diameter at breast height (DBH). They typically originate from stand-replacing events such as clear-cutting, catastrophic blow-down, or fire. Species can include red maple, red oak, white pine. Red pine is characteristic and locally important, but its presence and abundance is dependent on seed source and landscape factors. In addition, aspen and birch can be a significant component. Structural diversity is typically low, as stands are young and usually even-aged. Snags and coarse woody debris may or may not be present depending on stand origin and recent management history. However, widely scattered large trees remaining from natural disturbance or left as reserves in managed forests may be present, and significantly add to the habitat value for SGCN. Important site-level characteristics that benefit SCGN include widely spaced mature trees over a low but dense layer of shrubs or small trees (e.g., for whip-poor-will), young forest adjacent to patches of older forest for foraging, and pockets of open sandy habitat utilized for basking and nesting (e.g., for wood turtle, slender glass lizard, and several rare plants).

Mid-seral Northern Dry-mesic Forest. Mid-seral Northern Dry-mesic Forests are dominated by trees 5-11 inches DBH. Red maple, red oak, or white pine may be dominant, while aspen and birch may be present in small patches as well, especially in forests specifically managed to promote them. Red pine may be present on certain landscapes. Structural complexity is slightly higher than in young forests with multiple age classes starting to develop, but not as complex as older stands. Snags and coarse woody debris are typically sparse unless intentionally retained by previous management; nonetheless they are important for wildlife habitat. Important site-level characteristics that benefit SCGN include conifer-dominated woodlands adjacent to aquatic habitats like ponds, lakes and streams (e.g., for silver-haired bat), and pockets of open sandy habitat utilized for basking and nesting (e.g., for wood turtle, slender glass lizard, and several rare plants).

Late-seral (may also be referred to as Old, Old Growth or Reference Condition) Northern Dry-mesic Forest. Late-seral and reference condition Northern Dry-mesic Forests are dominated by trees 12 inches DBH or more and are usually characterized by a two-staged or uneven age structure. Mature trees include white pine and red oak, and red pine, especially on certain landscapes. Mature red maple, paper birch, and aspen may be present as well. A subcanopy of shade-tolerant saplings is often present, including white pine, red maple, and occasionally balsam fir. The forest is maintained by fire of low to moderate intensity and frequency, or by various silvicultural thinning techniques [e.g. see Landscape Considerations sections of the red pine and oak WDNR Silvicultural Handbook]. Structural diversity is higher with more snags and cavity trees, contributing significant habitat for animal SGCN. Coarse woody debris may also be present if not consumed by periodic fire. Large conifers are an important component for many SGCN, providing thermal cover, nest and den sites, nesting material, as well as snags and coarse woody debris.

Even if recognized as late-seral, most trees in managed timber stands won't reach their maximum size and age. Size and age variability are strong contributors to the value of late-seral state forests as habitat for SGCN. Multiple age structures, as well as the snags and coarse woody debris that develop as forests grow older are key for many forest-dependent SGCN. Where managed for ecological values, green tree retention as well as planning for and retaining snags and coarse woody debris is crucial for maintaining and promoting SGCN habitat. Important site-level characteristics that benefit SCGN include large conifers for use as nest trees (e.g. for northern goshawk and Red-shouldered hawk), and standing live and dead trees, an abundance of decaying coarse woody debris, and a diverse understory (e.g., northern flying squirrel).

4.4.5.3 Northern Dry Forest

General Description

Northern Dry Forest occurs on nutrient-poor sites with excessively drained sandy or rocky soils. The primary historic disturbance regime was catastrophic fire at intervals of ten to one hundred years. Dominant trees of mature stands include jack pine, red pine, and northern pin oak. Large acreages of this forest type were cut and burned during the Cutover in the late 19th and early 20th century. Much of this land was then colonized by white birch and/or trembling aspen, or converted to pine plantations starting in the 1920s.

Today's forests have a greatly reduced component of pines, and a greater extent of aspen, red maple, and oaks as compared to historic conditions. Common understory shrubs are hazelnuts, early blueberry, and brambles (*Rubus* spp.); common herbs include bracken fern, starflower, barren-strawberry, cow-wheat, trailing arbutus, and members of the shinleaf family (*Chimaphila umbellata*, *Pyrola* spp.). Vast acreages of cutover land were also planted to pine, or naturally succeeded to densely stocked dry forests.

Factors affecting the current abundance and condition of Northern Dry Forest include fire suppression and the spread of invasive species. On some sites (e.g., on richer sites where better growth is expected) silvicultural practices may maintain or even increase certain cover types such as red pine. Retaining gaps and providing large patches of jack pine will provide habitat for more SGCN.

Northern Dry Forest community types most commonly occur on large, continuous glacial outwash or lake plain landforms. On these extensive dry plains, historic fires were large and intense, and were less likely to be halted by wetlands, hills or mesic soils, creating ideal conditions for establishment of Northern Dry Forest.

Seral Stages

The following section describes the progressive stages of forest regeneration following harvesting or a major natural disturbance, from young forest to the attainment of reference conditions as seen in a mature stand. Stands with more than 50 percent aspen by basal area fall into the Aspen habitat type. For stands dominated by planted conifers, refer to the Conifer Plantation type.

Young-seral Northern Dry Forest. Young Northern Dry Forests are dominated by trees 16 feet tall or less (approximately 0-3 inches dbh). Species are primarily jack pine, red pine and northern pin oak, but can also include red maple, aspen and birch. Stands typically originate from stand-replacing events such as clear-cutting or fire, but can also arise from mechanical soil scarification. They are mostly even-aged stands with few or no snags and little coarse woody debris. Structurally, young Northern Dry Forests may have similarities to Pine Barrens, with scattered openings with native grasses, scattered wildflowers, and patches of hazelnuts, dewberry, and blueberry providing habitat for SGCN and other wildlife. However, tree density is higher and openings smaller than in true barrens, and ground flora is highly variable depending on how the forest was established.

Some of the important site characteristics that may determine how SGCN utilize this seral stage include:

- pocket barrens, frost pockets, or other non-forested openings that provide important habitat for SGCN
- the landscape mosaic of barrens and forest across landscape
- structural attributes and diversity of other woody species and herbaceous plants

Mid-seral Northern Dry-mesic Forest. Mid-seral Northern Dry Forests are dominated by trees 16 to 40 feet in height (approximately 3 to 5 inches dbh). Like other seral stages, species are primarily jack pine, red pine and northern pin oak, but can also include components of white pine, red maple, aspen and birch. Depending on stand origin, scattered grassy or shrubby openings may be present, providing important habitat components for SGCN such as whip-poor-will and common nighthawk. However, in this stage, herbaceous vegetation shifts significantly away from barrens associates and toward forest grasses, sedges, and forbs. Structural complexity is slightly higher than in younger forests, with multiple size classes of trees developing (particularly where both oaks and pines are present, despite still being even aged).

Late-seral (may also be referred to as Old or Old-Growth) Northern Dry Forest. Old Northern Dry Forests are dominated by trees 40 feet tall (approximately 5 to 10 inches dbh) or more and are dominated by jack pine, red pine, white and northern pin oak, as well as pockets of trembling aspen. Tall shrub (e.g. hazelnut and serviceberry) density is variable, ranging from sparse to dense thickets, but is typically greater in more mature stands, which provides important habitat for some SGCN. In addition, forest grasses, sedges, forbs, and mosses predominate in the groundlayer. Snag density is at its highest, providing habitat for

woodpeckers and cavity-nesting birds. Stands may include those on the older end of those managed as part of a shifting barrens mosaic as well as those managed for old-growth characteristics.

4.4.5.4 Aspen and Birch

Although not a natural community as defined in John Curtis's Vegetation of Wisconsin or the Natural Heritage Inventory (NHI) community classification, aspen and birch-dominated forests make up a significant part of the forested landscape in northern Wisconsin. Although this type occupied 3.5-4.3% of northern Wisconsin (by relative dominance and relative importance, respectively) when the General Land Office surveys were conducted from 1832-1866 (Schulte et al. 2002), it is now the second most common forest cover type in that region after maple[4]. These forest types receive a high degree of management emphasis on both public and private lands, primarily due to their economic significance and importance to several wildlife species.

Aspen and birch-dominated forests can occur on a wide variety of landforms and soil conditions from outwash sand to lacustrine clay and from dry to wet moisture regimes. Stands with 50% or more of their basal area in trembling aspen, big-toothed aspen, or paper birch are included here; for stands with a smaller component of aspen and birch, see the relevant NHI community type. Aspen is a "pioneer" tree species generally growing in even-aged stands regenerated following a major disturbance such as catastrophic fire, blow down, clearcut, or coppice harvest. Aspen often outgrows other associated species and can form nearly pure stands. In undisturbed or unmanaged stands, more tolerant associates replace aspen over time through natural succession.

Other tree species associated with aspen and birch are variable and depend greatly on the soil type and moisture regime, but may include red maple, balsam fir, red oak, white pine, and on mesic sites, sugar maple. Most other major tree species occurring in Wisconsin can also be found as occasional associates in aspen stands. Shrubs are also variable depending on the age of the stand and moisture regime, but are typically absent to sparse when stands are young, dog-hair thickets, gradually increasing in density over time. Exceptions to this trend are clonal species that persist under moderate shade and resprout aggressively when cut, such as hazelnut. The groundlayer is also extremely variable, depending greatly on soil type, moisture regime, and past disturbance.

Several bird SGCN (e.g. Golden-winged Warbler and American Woodcock) utilize young stands of aspen at various life history stages. Other SGCN utilize conifers embedded within aspen stands, such as Swainson's Thrush, which requires a dense understory of spruce and fir. Maintaining or increasing the conifer component is necessary for most SGCN to utilize these forests. In

[4] See Chapter 2 of the Ecological Landscapes of Wisconsin report http://dnr.wi.gov/topic/Landscapes/Handbook.html (Search Terms: Ecological Landscapes of Wisconsin)

addition, landscape context is critical for most SGCN that utilize aspen and birch forests for part of their life cycle.

4.4.5.5 Conifer Plantation

Although not a natural community as defined by John Curtis's Vegetation of Wisconsin or the Natural Heritage Inventory (NHI) community classification, conifer plantations make up a significant part of the forested landscape and receive a high degree of management emphasis. Conifer plantations encompass a variety of conifer species, primarily red pine and white pine, but also may include jack pine, white spruce and tamarack/larch.

Conifer plantations generally are associated with few SGCN, though they can be used by some species, depending on tree size, density, and landscape context. Plantations differ significantly in the composition of secondary species (other non-target trees, shrubs, and herbaceous plants) depending on site history, site preparation, and management regime, and may range from very low to moderate diversity. In general, high floristic and structural diversity is associated with higher animal diversity.

On dry sites, very young jack pine or red pine plantations may resemble Pine Barrens structurally. However practices such as the use of herbicide on competing vegetation reduces floristic diversity and limits usage by SGCN otherwise associated with Pine Barrens. Occasionally, conifer plantations on dry sites may fail (in part or completely), producing longer-term barrens-like structure with potential to provide habitat to barrens-associated species (e.g. Kirtland's Warbler).

Landscape context is important for many SGCN that use conifer plantations for at least part of their life cycle, with some preferring stands in close proximity to other forest or savanna habitats (e.g., Northern Dry Forest, Pine Barrens, or Oak Barrens). As conifer plantations mature past normal rotation age they may develop habitat attributes similar to late-seral Northern Dry-mesic Forest or Northern Dry Forest and support SGCN more typically found in those forest types. Examples include nest trees for goshawk or winter habitat for spruce grouse. Management on conifer plantations is a potential source of impact to SGCN and their habitat, but the nature and intensity of management in turn determines the nature and extent of the effect. Herbicide use when establishing plantations can be detrimental to plant and animal species. In addition, furrow and trench planting at least temporarily disturbs groundlayer grasses, forbs, and associated SGCN. Use of established best management practices and integrated approaches increases the role of conifer plantations as potentially suitable habitat for SGCN, and additional research and monitoring will continue to improve habitat over the long term.

The Natural Resources Board and Department of Natural Resources are committed to serving people with disabilities. If you need Board information in an alternative format, please contact:

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