4 Revisions to the Strategic Direction Document

A number of changes have been made to the North Shore Highlands, Toimi Uplands, and Laurentian Uplands SFRMP Strategic Direction Document (December 2004). The changes resulted from responses to public comments, further discussions by the planning team, new information, and internal DNR departmental reviews. The revised document will be posted at http://www.dnr.state.mn.us/forestry/subsection/northshorearea and paper copies will be available upon request. This chapter identifies all substantive changes that have been made to the Strategic Direction Document. Changes are listed in the order they appear in the document. Page numbers refer to the page in the December 2004 Strategic Direction Document, unless otherwise stated. *Italics* show added text, and ~~strikethrough~~ shows deleted text. The following edits have been made to the Strategic Direction Document:

4.1 Revisions to Introduction Chapter

Page 1.3: Added sentence to end of first paragraph to clarify planning activities not included in the SFRMP process.

Examples of forest resource management planning activities that are beyond the scope of SFRMP planning are: OHV trail system planning, comprehensive road access plans, state park land management planning, old growth forest designation, SNA establishment, wilderness designation, wildlife population goals, cumulative effects analysis at the watershed-level, fire management, and recreation facilities/systems planning.

Page 1.5: Added *new* in Table 1.1c, Step 4, prior to access needs to better define that the access needs included in this plan will be limited to *new* access needs for forest management activities.

4.2 Revisions to SFRMP Issues Chapter

Page 2.2: In response to Comment Topic 3, added additional information to Issue A2, second paragraph, to further clarify values of older forest and list species whose populations may be negatively affected by an inadequate amount of old forest.

The likely consequences of managing a forest without age classes beyond the normal rotation age are 1) the loss of *individuals or populations of* a species with old forest-specific habitat requirements such as *wood ducks, fisher, boreal owls, scarlet tanagers, gray jay, wood thrush, and black-throated blue warblers*; 2) loss of diversity; 3) *reduced recreational and economic opportunities associated with the loss of old forest values such as rare bird watching, fall color viewing, mushroom gathering, and camping; 4) reduced ecological services associated with old forest values such as maintaining water quality, natural disturbance regimes, and biodiversity*; *and 5)*…

Page 2.8: In response to Comment Topic 76, revised last paragraph of Issue E3 to better explain the reasoning for not including cumulative impacts of forest management at the watershed level as an issue in the plan.

This SFRMP plan will not address this issue for the following reasons: 1) the issue cannot be addressed in whole or a substantial part by vegetation management decisions on DNR-administered lands. State-administered timberlands comprise only 9 percent of the land ownership in these subsections. To fully evaluate cumulative impacts within watersheds, timber harvest, forest development, and forest land-use changes (current conditions and planned) need to be evaluated across all ownerships. 2) A standard definition for young forest and a critical threshold for the percent of young forest and open forest within a watershed need to be established to evaluate cumulative impacts uniformly in watersheds in Minnesota.

Future SFRMP plans may include a current assessment of young forest on DNR ownerships in watersheds where DNR forest lands contain a significant portion (e.g., >50%) of the land ownership. This would be done to identify watersheds of particular concern that could serve as subject areas of a focused study such as the one mentioned above. If a process is developed to monitor cumulative impacts of forest management at the watershed level across all ownerships, the DNR will be a participant/cooperator.

Page 2.9: In response to Comment Topic 5, revised the last sentence under Issue F1 to make the statement regarding sustainable forests and timber industry more consistent with the terminology used in Governor's Advisory Task Force on the Competitiveness of Minnesota's Primary Forest Products Industry (July 2003).

Sustainable forests can: support a healthy and competitive timber industry; provide the diversity of habitats needed by plant and animal species; maintain water quality; and provide a wide array of recreational opportunities.

Page 2.13: In response to Comment Topic 70, in the last sentence of the second paragraph, updated the release date for the proposed changes to the ETS list. Previous estimate was 2004.

Proposed changes to the ETS List are currently being reviewed. *The ETS list revision is still in progress with a release date yet to be determined.*

4.3 Revisions to General Direction Statements (GDSs) and Strategies Chapter

Page 3.4: In paragraph 2, the second sentence, added *forest health, and timber quality* as additional factors that were considered in determining the desired amount of old forest.

Determining the amount of old forest to be sustained in these subsections required balancing many factors: timber productivity, economic impacts, historical forest conditions, habitat requirements, *forest health, and timber quality*.

Page 3.5: Table 3.1a, for the birch cover type, added estimated data for decades 3–6 and a revised explanation in Footnote 2 below the table. This revision provides an estimate of old forest based on one of the stand treatment modeling options. In this plan, the team only approved the treatment level for birch for the first decade.

[2]Birch estimates are based on modeling Option 1. Further analysis of the maximum rotation age will be done prior to the next plan to determine treatment levels in Decades 2 – 6. If treatment levels are adjusted, this will change the old forest percentage for these decades.

Page 3.6: Table 3.1b, added Footnote 2 below the table to define maximum rotation age.

[2]Maximum rotation age is the maximum age at which a forest type will retain its biological ability to regenerate to the same forest type and remain commercially viable as a marketable timber sale.

Page 3.8: Table 3.1d, for the birch cover type, added the estimated effective ERF percent for Year 2014 to Year 2054. This revision provides an estimate of effective ERF based on one of the treatment modeling options. In this plan, the team only approved the treatment level for birch for the first decade.

[3]Birch estimates are based on modeling Option 1. Further analysis of the maximum rotation age will be done prior to the next plan to determine treatment levels in Decades 2 – 6. If treatment levels are adjusted, this will change the effective ERF percentages for 2024 – 2054.

Page 3.9: In response to Comment Topic 116, in Strategy e., revised the sentence order and provided additional text to clarify the type of stands in which natural succession may be allowed to occur.

In stands that *have low merchantable timber volume (e.g., <7 cords per acre)* where natural succession from a short-lived cover type (e.g., aspen or balsam fir) is well on its way toward the stand composition becoming a long-lived forest type (e.g., *adequate* white pine or northern hardwoods *regeneration*), the stand should be left untreated and allowed to succeed naturally.

Page 3.9: Strategy g., Sentence 5, added the average age of EILC stands.

The designated EILC stands will be reserved from treatment during this 10-year planning period. These stands range in age from 2 to 213 years old *with an average age of 100 years*.

Page 3.10: Edited Table 3.1e (renamed to Table 3.1e2): Ecologically Important Lowland Conifer Designation Summary to show the revised EILC acres by cover type after further review and adjustments to stands designated by DNR staff. Added Table 3.1e1 to show the breakdown of EILC acres by subsection. Acres are based on the most recent database (nltfim1i_feb2006).

Table 3.1e1: Acres Designated as EILC by Subsection

	Black Spruce	Tamarack	Cedar	Sx	Tx	Cx	Total
North Shore Highlands	2,397	378	4,847	1,176	343	904	10,045
Toimi Uplands	130	76	61	236	0	46	550
Laurentian Uplands	2,656	215	279	5,301	1,835	1,053	11,338
Total	**5,183**	**669**	**5,187**	**6,713**	**2,178**	**2,003**	**21,933**

Table 3.1e2: Ecologically Important Lowland Conifer Designation Summary by Cover Type

	Cover Type Total Acres	EILC Acres	% of Cover Type
Black Spruce	29,308	5,183	18%
Tamarack	5,659	669	12%
Lowland Cedar	16,780	5,187	31%
Sx	16,276	6,713	41%
Tx	2,657	2,178	82%
Cx	4,422	2,003	45%
Total	**75,102**	**21,933**	**29%**

Page 3.11: In response to Comment Topic 28, removed costs of implementation from the considerations used in developing the cover type change goals. It was erroneously included in the DFFC goals, but will be a key factor in the actual implementation of the on-the-ground forest management activities.

Deleted the following bullet from the considerations used in developing cover type change goals for these subsections:

- ~~Costs of implementation~~

Page 3.11: Based on a department-level review in November 2005, added a paragraph to clarify the use of range of natural variation (RNV) information by the DNR.

RNV is used by the DNR as a tool or benchmark to help identify characteristics of forest communities that appear to be significantly less prevalent now compared to what RNV suggests would be the case under natural processes. Teams use this (and other) information to establish desired goals for forest communities, including the degree to which DNR will attempt to restore certain forest community characteristics.

Page 3.15: Added a paragraph prior to Table 3.1j: Conversion Goals by Forestry Area for the First Decade to explain how the goals were allocated to the areas.

Conversion goals were assigned to forestry areas in proportion to the cover type conversion goals by LTA. See Appendix I, Page A.18. This was accomplished by multiplying the total conversion goals by cover type for each LTA by the portion of the forestry area within each LTA. The conversion goals determined for each forestry area within each LTA were summarized to establish each Areas total conversion goals by species. Table 3.1j shows the increase in cover type acreage goals by Forestry area.

Page 3.15: Based on field staff review, in Table 3.1j, Oak column, edited conversion acre goals for oak from 2 to 0 for Hibbing and Tower Areas. Added these acres to the other two areas.

Page 3.15: Added a paragraph to clarify the estimated treatment of HRLV stands.

It is estimated that the high-risk, low-volume (HRLV) acreage will provide the best opportunities for conversion to other cover types. In the cover type treatment modeling calculations, it was estimated that approximately one-half of the HRLV acres would be converted. These are preliminary estimates, the actual percentage may vary based on what the current stand composition and conditions are when the stand examinations are completed. Staff will use the Field Visit Decision Tree (Appendix E), Cover Type Management Recommendations (Chapter 4), and other plan direction, including GDS strategies (Chapter 3) and preliminary stand-level direction (e.g., preliminary stand prescriptions, preliminary management objectives, and the associated stand management recommendations and considerations) along with guides such as the NPC Field Guide to determine the actual stand treatment.

Page 3.16: In response to Comment Topic 55, deleted the last sentence in the 2nd paragraph under Mixed Forests.

~~Mixed forests are preferred because they offer social, economic, and ecological benefits not found in single species forests.~~

Page 3.18: In response to Comment Topic 119, added to the paragraph under Strategy c. to explain where there may be inconsistencies between this SFRMP and the MFRC Northeast Landscape Region Plan. Also replaced the bulleted list of examples of the consistencies between the plans with a table, Table 3.lk.

Department staff have been involved in the MFRC Northeast Landscape Region (Northern Superior Uplands Section) landscape planning efforts for northeastern Minnesota. Goals and strategies in this plan are generally consistent with those recommended in the Northeast Landscape Region Plan. *DNR manages state-administered forest lands by cover types with goals by 10-year age classes while the MFRC NE Landscape Region Plan recommendations are based on ecosystem types and growth stages. There may be inconsistencies between the plans because there is no direct comparison between age-class distributions for cover types and RNV growth stages for ecosystem types. But, there are similarities in goals of both plans to increase white pine, red pine, jack pine, white spruce, upland tamarack, yellow birch, and upland white cedar. Older growth stage goals are being addressed through conversions to long-lived conifers, ERF, and retaining older forest components during thinning and final harvest of some stands. There were no specific acreage goals recommended in the NE Landscape Region Plan for state-administered lands. The DNR will provide MFRC staff and/or the Northeast Region Landscape Committee Coordination Work Group with information regarding state land management, when requested, to assist them in monitoring accomplishments in the NE Landscape region. Chapter 5 – Monitoring includes the SFRMP implementation-monitoring plan for state lands in these subsections. Table **3.1k** provides examples of how SFRMP goals and strategies are consistent with the Northeast Landscape Region long-term goals for ecosystem types.*

Page 3.25: After Table 3.1r, added the following paragraph regarding interdisciplinary review of significant changes to designated patches during the 10-year planning period. The SFRMP team recommended this addition.

If a significant change to an identified patch is recommended [e.g., significant boundary change or management is different than the patch designation (e.g., even-aged instead of uneven-aged)], the standard review by the appropriate representatives from all three divisions (Forestry, Wildlife, and Ecological Services) at the forestry area level will be completed. If needed, follow the established process for resolving conflicts. If a significant change to a patch is made, the SFRMP patch shape file will be updated.

Page 3.27: Based on department review, edited "relatively undisturbed" to "intact" native plant communities in the definition of MCBS sites. Also, edited in Glossary, Page 7.12.

MCBS sites are areas of land, ranging from tens to thousands of acres in size, selected for survey because they are likely to contain ~~relatively undisturbed~~ *intact* native plant communities, large populations and/or concentrations of rare species, and/or critical animal habitat.

Page 3.34: Edited Table 3.1u based on further review of EILC stand designations by the SFRMP Team. EILC acres located within SNAs were removed from the acreages because they are already reserved from timber harvest in the SNA. Other adjustments were based on removing some isolated stands from consideration as EILC and adding some stands within or adjacent to a group of stands that were previously designated as EILC. A column was added to the table to show the acreage goals for EILC designation.

Table 3.1u: Ecologically Important Lowland Conifer (EILC) Designation Summary

Cover Type	State Forest Land Acres	EILC Acres Goal	EILC Acres[1] Designated	Percent Designated as EILC	Percent of EILC In MCBS O, H, and Hp[2] Sites
Black Spruce Lowland	29,308	4,351	5,183	18%	65%
Tamarack	5,659	649	669	12%	71%
Cedar	16,780	4,195	5,187	31%	64%
Stagnant Spruce	16,276	6,921	6,713	41%	77%
Stagnant Tamarack	2,657	2,307	2,178	82%	98%
Stagnant Cedar	4,422	2,628	2,003	45%	71%
	75,102	**21,051**	**21,933**	**29%**	**73%**

[1]Managed acres. [2]O – Outstanding, H – High, Hp – High priority for MCBS survey

Page 3.37: Added a sentence at the end of the first paragraph in Strategy b. to highlight the white cedar-yellow birch NPC type as a NPC that should receive special consideration for protection because of its global ranking as imperiled.

In particular, stands or portions of stands that key out to the white cedar-yellow birch NPC type should be protected because of its global ranking (imperiled). Treatment may occur if it protects, maintains, or enhances the ecological integrity of this NPC.

Page 3.37: Added a sentence at the end of Strategy c. to include additional methods of identifying and documenting rare NPCs.

c. During the development of the 10-year stand examination list and during annual stand review, known locations of critically imperiled (S1) or imperiled (S2) NPCs and those NPCs with S-Ranks of S3 to S5 that are rare or otherwise unique in these subsections will be identified by Ecological Services staff *(as per Strategy a). Also, locations of rare NPCs may be identified and documented by Ecological Services staff or other divisions' staff during forest inventories, stand examinations, joint site visits, and other site evaluation activities.*

Page 3.37: In response to Comment Topic 70, added additional information at the end of the first paragraph under GDS-1G about the ETS list and that the list is currently being revised.

Minnesota's List of Endangered, Threatened, and Special Concern Species (ETS List) was created in 1984 and was last revised in 1996. Created under Minnesota's Endangered and Threatened Species Statute, the ETS List draws attention to species that are at greatest risk of extinction within the state; special regulations are applied to those listed as endangered or threatened. By alerting resource managers and the public to species in jeopardy, activities can be reviewed and prioritized to help preserve the diversity and abundance of Minnesota's flora and fauna. *Because of the importance of the ETS List in influencing resource use and management activities in Minnesota, it is critical that it reflect the most current information regarding the distribution, abundance, and security of species within the state. Consequently, Minnesota law requires the ETS List to be periodically revised. Proposed changes to the ETS List are currently being reviewed. The ETS list revision is still in progress with a release date yet to be determined.*

Page 3.41: In response to Comment Topic 48, added information at the end of the first paragraph under GDS-2C to state that this plan will not establish acreage goals for growth stages or native plant communities.

Growth stages incorporate both developmental stages (stand structure changes over time) and successional stages (species composition changes over time) that occur after a disturbance. For example, in the northern mesic mixed forest (FDn43) NPC, there are three growth stages separated by two transition periods. In the past, growth stages developed through natural disturbances such as wind and fire. Now, growth stages additionally are emulated through forest management activities such as timber harvest, prescribed burns, and forest development activities. *The plan will not establish acreage goals for growth stages by ecosystem type or native plant community. The strategies in the plan will provide representation of components of older growth stages. These strategies can provide some structural components of older growth stages in much younger stands by leaving coarse woody debris, snags, super canopy trees, and legacy patches.*

Page 3.43: In response to Comment Topic 50, revised text and added tables under GDS-2D to better explain the general direction planned for young, early successional forest over the next 60 years.

The 0-30 age group of aspen, balm of gilead, birch, and jack pine cover types represents young, early successional forest in the context of this GDS. The desired long-term cover type acres and balanced age-class distribution for these cover types will determine the amount of young forest planned to be sustained over time.

- *Currently, these four cover types comprise 48 percent (98,063 acres) of the timberland acres in these subsections. Because of the goal to increase the acres of long-lived conifers in these subsections, the long-term DFFC is that these early successional cover types will comprise 40 percent (82,952 acres) of the timberland acres. See Table 1.*

- *Currently, the 0-30 age group of aspen, balm of gilead, birch, and jack pine cover types comprise 47% percent (46,310 acres) of the 98,060 acres in these four cover types. The long-term DFFC is that the 0-30 age group comprises 48 percent (39,921 acres) of the acres retained in these cover types (82,952 acres). Although the 0-30 age group remains about the same percentage-wise, there will be a decrease of approximately 6,000 acres of young forest in these four cover types. See Tables 2 and 3. Note: The 0-30 age group for all timberland cover types is currently 27% of the total timberland acres.*

Table 1. Early-Successional Forest Cover Types Acres by Decade

Cover Type	Early-Successional Forest Cover Type Acres						
	Current	2nd Decade	3rd Decade	4th Decade	5th Decade	6th Decade	DFFC
Aspen/BG	66,180	61,367	61,367	61,312	60,442	55,442	52,613
Birch*	26,705	23,239	23,005	22,771	22,537	22,303	22,291
Jack Pine	5,178	6,293	6,711	7,129	7,548	7,966	8,048
	98,063	90,899	91,083	91,212	90,527	85,711	**82,952**

*Decades 2 – 6 for birch are estimates based on modeling Option 1 (8-15-2003).

Table 2. Acres of Young Forest in Early-Successional Cover Types by Decade

Cover Type	Young Forest – Acres of Cover Type Under 30 Years Old						
	Current	2nd Decade	3rd Decade	4th Decade	5th Decade	6th Decade	DFFC
Aspen/BG	37,681	40,285	31,194	23,753	23,436	26,489	25,902
Birch*	5,338	10,372	16,793	15,512	11,903	6,746	10,356
Jack Pine	3,291	4,004	4,576	3,876	3,384	3,436	3,663
Total	**46,310**	54,661	52,563	43,141	38,723	36,671	**39,921**

*Decades 2 – 6 for birch are estimates based on modeling Option 1 (8-15-2003).

Table 3. Percent of Young Forest in Early-Successional Cover Types by Decade

Cover Type	Young Forest - Percentage of Cover Type Under 30 Years Old						
	Current	2nd Decade	3rd Decade	4th Decade	5th Decade	6th Decade	DFFC
Aspen/BG	57%	66%	51%	39%	49%	49%	49%
Birch*	20%	45%	73%	68%	53%	30%	46%
Jack Pine	64%	64%	68%	54%	45%	43%	46%
	47%	60%	58%	47%	43%	43%	**48%**

*Decades 2 – 6 for birch are estimates based on modeling Option 1 (8-15-2003).

Young early successional forest will be adequately represented over time using a regulated amount of harvesting in the aspen, balm of gilead, birch, and jack pine cover types. *Stands retained in these cover types will be managed to move towards a more balanced age-class structure than the current unbalanced condition, which will provide a more uniform amount of young forest over time.* Most of the harvest in these cover types will occur through clearcutting methods. Harvest prescriptions will attempt to mimic the intense wildfires and wind events that occurred naturally to initiate fully stocked, early successional forest. A variety of harvest sizes will be used while maintaining existing large patches and creating opportunities for large patches in the future by grouping of harvest activities. For aspen, balm of gilead, and jack pine, the emphasis will be on maintaining an adequate amount of young age classes on the landscape through a regulated harvest level. For paper birch, the focus will be on increasing regeneration of birch stands back to birch, especially during this 10-year planning period.

Young, early successional tree species will also be present in other cover types. Many of the aspen and birch stands that are converted to other cover types will still have a significant component of aspen and birch within the stands (See GDS-1B, Strategy a. and Figure 3.1d). Many of these cover type conversions will occur in aspen and birch stands that are already in decline due to old age, insect or disease problems, or other damage agents.

Page 3.46: In response to Comment Topic 54, added Strategy b. to GDS-3B so that retention of components of various growth stages is also considered in managing within-stand composition and structure.

b. Follow strategies in GDS-2C relating to retaining components of various growth stages in stands.

Page 3.48: In response to Comment Topic 60, replaced woodchuck with mourning warbler as an example of a species associated with young forest.

Examples of species are chestnut-sided warbler, red-tailed hawk, ~~woodchuck~~ *mourning warbler*, and gray wolf.

Page 3.51: In response to Comment Topic 73, added Strategy k. to provide a strategy relating to short-distance and long-distance (neotropical) migratory birds.

k. Provide a range of habitats for short-distance and long-distance (neo-tropical) migratory birds.

According to breeding bird monitoring work in Northeastern Minnesota (NRRI Technical Report: NRRI/TR-2005/04[1]), there have been significant declines in populations for some neo-tropical birds. Widespread declines have been reported for ground nesting birds and species found mainly in mature forest habitats. Birds with lowland coniferous, deciduous, mixed forest, and early-successional vegetation-type preferences also showed widespread declines in these subsections. Strategies have been developed throughout this plan that address the need to maintain or enhance habitat for both short-distance and long-distance (neo-tropical) migratory birds, especially those with declining trends in these subsections. For example, see GDS-1A, Old Forest; GDS-1C, Patch Management; GDS-1E, MCBS Sites; GDS-3A, Within Stand Diversity; and strategies in this GDS-4A, Habitat for Non-game species. Using a coarse filter approach, patch management, ERF, providing a range of age-classes from young to old, within-stand diversity, etc., provide a range a habitats for a variety of species, including neo-tropical songbirds. At a finer scale, some stands have been identified where management recommendations and objectives for forest birds (e.g., black-throated blue warbler) should be considered.

Page 3.52: In response to Comment Topic 60, added snowshoe hare to the examples of game species associated with young forest or young forest conditions.

Some examples of these species are moose, white-tailed deer, black bear, *snowshoe hare*, ruffed grouse, and woodcock.

Page 3.54: In response to Comment Topic 60, under Strategy g. 1), added text to the fourth bullet recommending that conifer planting be limited to small clumps within ruffed grouse management areas rather than converting entire aspen stands to conifers or planting conifers scattered throughout aspen stands.

1) Select and manage ruffed grouse management areas (*GMAR*) to:
   - Maximize diversity of age classes in the upland deciduous cover types.
   - Maximize the age difference between adjacent stands.
   - Harvest stands near normal rotation ages and in 10 - 30 acre blocks.
     - Minimize conversion to conifers *and limit planting of conifers to small clumps*.

Page 3.54: In response to Comment Topics 57 and 66, at the end of Strategy g., added a summary table for special management areas (SMAs) and added a paragraph stating that these areas are managed for a variety of both game and nongame species.

[1] Lind, J., Danz, N., Hanowski, J, and Niemi, G. *Breeding Bird Monitoring in Great Lakes National Forests 1991-2004; 2004 Annual Update Report*. NRRI/TR-2005/04. Natural Resources Research Institute, Duluth, MN. 27p. PDF document at: www.nrri.umn.edu/mnbirds/

Table 3.4a: Special Management Areas Summary

Type of Special Management Area	North Shore Highlands	Laurentian Uplands	Toimi Uplands	Subsections Total
AE	7,473	703	0	8,176
CONE	1,613	17,582	11,336	30,531
CONE50	1,559	0	41	1,600
CONE51	6,636	2,016	0	8,652
CONE53	1,264	3,642	0	4,906
DMA	4,210	0	0	4,210
DMAY	7,897	0	0	7,897
GMAR	2,710	0	630	3,340
MMA	20,176	1,458	0	21,634
OLMA	6,744	0	0	6,744
Total	**60,282**	**25,401**	**12,007**	**97,690**
Percent of State Forest Land Acres in SMAs	**34%**	**33%**	**40%**	**34%**

AE: aspen emphasis area
CONE: Conifer emphasis area – conifer species
CONE50: Conifer emphasis area – pine species
CONE51: Conifer emphasis area – white pine
CONE53: Conifer emphasis area – jack pine
DMA: Deer management area emphasis
DMAY: Deer yard management area emphasis
GMAR: Ruffed grouse management area emphasis
MMA: Moose management area emphasis
OLMA: Open landscape management area emphasis
Note: Some acres are identified with multiple management emphasis area codes, e.g., AE and DMA. In these cases, the acres were recorded in each of the emphasis area types.

Although special management areas for specific game species (e.g., ruffed grouse, deer, and moose) were identified in the planning process, these areas and other special management areas (e.g., CONEs and OLMA) are managed for a variety of game and non-game species. In addition, there are site-specific management guidelines or considerations for known occurrences for a number of nongame species such as guidelines for wood turtles, bald eagles nests, heron rookeries, and management considerations for goshawks, four-toed salamanders, and other species.

Page 3.54: In GDS-5A, first paragraph, last sentence, added water quality as a reason for well-managed riparian areas.

Well-managed riparian areas are critical to protect, maintain, or enhance aquatic and wildlife habitats, aesthetics, recreation, *water quality,* and forest products.

Page 3.55: In GDS-5A, middle of second paragraph, revised sentences to include the names of the migratory fish species and included the year-round trout species in the streams.

Migratory species include the native "coaster" brook trout and the introduced and now naturalized species including rainbow trout (steelhead and Kamloops), coho salmon, and Chinook salmon. Brook trout and brown trout inhabit the streams year-round. These cold-water streams are some of the most unique and sensitive habitats in Minnesota.

Page 3.55: In response to Comment Topic 61, added a third paragraph under GDS-5A to clarify the emphasis for forest stand management along trout streams in the subsections.

The emphasis for riparian areas along all trout streams in the three subsections will be to manage for longer-lived, uneven-aged, mixed-species stands to better maintain cold-water temperatures in these streams. For other riparian areas, manage for the appropriate species for the site, which may include a range of age classes and forest types within and adjacent to these riparian areas.

Page 3.56: In response to Comment Topic 61, added two sentences to Strategy d. to include information regarding when it may be appropriate to manage for deciduous species in riparian management zones.

In other riparian areas, it may be appropriate to manage for aspen, birch, and brush cover types and a range of age classes within some riparian areas. Retaining some deciduous species in RMZs is important for organic matter and nutrient inputs from leaf fall (allochthonus inputs).

Pages 3.57-58: GDS-5B, Strategy a., bullets 3 and 4, replaced "wetland inclusions" with *small non-open water wetlands* to use the same terminology included in the revised (June 2005) Voluntary Site-level Forest Management Guidelines.

Page 3.59: In response to Comment Topic 88, added information to GDS-6, Strategy d, regarding the operational standards for pesticide use that must be followed on state lands.

If pesticides (herbicides, insecticides, etc.) are needed to control competing vegetation or forest insects and diseases on state lands, the following operational standards will be used:

- *DNR Operational Order No. 59 - Pesticides and Pest Control*
- *Division of Forestry - Pesticide Use Guidelines*
- *Pesticide Labels*
- *Material Safety and Data Sheets (MSDS) for each pesticide and adjuvant being used or recommended.*
- *Forest Resources Council Site Level Forest Management Guidelines relating to pesticide use.*

Page 3.61: In response to Comment Topic 88, added the same text to GDS-7A, Strategy b., as the previous edit on Page 3.59.

Page 3.68: GDS-9A, added the following bullet as another consideration used in developing treatment levels in this plan.

- *Effective ERF goals and the amount of available effective ERF by decade*

Page 3.70: GDS-9A, Strategy b., second paragraph, added text to further explain the estimated treatment of HRLV stands through harvest and/or conversion.

It is estimated that approximately one-half of the HRLV acreage will be treated through timber harvest. It is estimated the remainder will be treated through inventory alterations to the current stand composition (e.g., alter to the understory type). *Also, it is estimated that one-half of the HRLV will be converted to other cover types. This may be accomplished through harvest or non-harvest treatments.*

Pages 3.73-76: Tables 3.9d, e, f, and h, added data for the birch cover type based on one of the modeling options considered by the SFRMP team. In this plan, only the birch treatment level for the first decade was included because further analysis is needed to determine the most appropriate treatment level for the second through sixth decades. Further analysis of the birch cover type will be completed based on data collected during stand examinations during this 10-year planning period. Analysis will include whether birch stands can be held during the next decade beyond the recommended maximum rotation age of 85 without losing significant volume or regeneration capacity.

Page 3.76: Table 3.9h: Added a note stating why white pine and red pine data were not included in the table. Added for the birch cover type estimates of treatment acres by decade (2015–2064) so that a total by decade could be provided in the table. Added Total row to the table. Added Note 4 below the table regarding the estimated harvest acreage for HRLV stands.

Table 3.9h: Treatment Levels for the Even-Aged Cover Types

Note: White pine and red pine cover types even-aged acres are not included because they were not modeled due to the current age-class distribution. See Note 3.

Cover Type	10-Year Treatment Acres by Decade						
	2005-2014[4]	**2015-2024**	**2025-2034**	**2035-2044**	**2045-2054**	**2055-2064**	**DFFC[3]**
Aspen/BG	13176	6158	9287	8916	14211	15672	**8630**
Birch[1]	8543	*6716*	*4187*	*1702*	*1289*	*3410*	**3450**
Jack Pine	468	766	691	673	818	1135	**1220**
White Spruce[2]	203	215	824	1223	1391	1515	**1390**
Balsam Fir	3800	1367	1479	1908	2126	1811	**1955**
BSL High SI	799	691	702	658	528	537	**575**
BSL Medium SI	1720	1752	1536	1486	1480	1294	**1365**
BSL Low SI	1130	589	671	523	507	529	**630**
Tam High SI	447	310	311	346	246	278	**305**
Tam Low SI	330	260	259	259	259	234	**235**
BSU	564	529	406	361	406	506	**530**
Total	*31180*	*19353*	*20353*	*18055*	*23261*	*26921*	***20285***

[1]Birch estimates are based on modeling Option 1. Further analysis of the maximum rotation age will be done prior to the next plan to determine treatment levels in Decades 2 – 6.

[2]Non-ERF White Spruce
[3]Treatment level when desired future forest composition (DFFC) goals are reached, i.e., cover type conversions and even-aged class distribution goals are achieved. Large decreases from current to DFFC treatment acres in aspen/BG, birch, and balsam fir cover types result in increases in DFFC treatment levels in the white pine, red pine, jack pine, and white spruce cover types. White pine and red pine cover types were not modeled because of the current age-class distribution.
[4]*First decade includes 18,000 acres of high-risk, low-volume (HRLV) acres. Estimate that 50 percent of these acres will be suitable for harvest. Therefore, estimate approximately 22,000 acres of actual timber harvest out of the 31,180 acres of treatment acres in the first decade.*

Page 3.77: In response to Comment Topic 100, added a sentence after the first sentence under Section 3 to explain that evaluation procedures for EILC and stands adjacent to Candidate Research Natural Areas (CRNAs) will be completed outside of the SFRMP process.

Stands that have been identified to be reserved or deferred during the 10-year planning period (e.g., EILC stands, additional old-growth candidate recommendations, and those stands associated with *CRNAs*) will become available for active management after evaluations are completed if they are released from the reserved or deferred status. *Evaluation procedures for EILC stands and stands adjacent to CRNAs will be developed at a later date outside the SFRMP process.*

Page 3.80: In response to Comment Topic 102, added *Average Annual* to the title of Figure 3.9e to clarify that the volume in cords are annual averages for the specified time periods.

Figure 3.9e: *Average Annual* Volume Comparison: Past Area Plans vs. SFRMP Treatment Level

Page 3.85: In response to Comment Topic 114, added a paragraph to GDS-12, Strategy a., to explain that DNR will cooperate with other landowners to address large-scale disturbance events and will inform the public about the disturbance and planned management activities.

When large-scale disturbance events involve multiple ownerships, the DNR will cooperate in assessment and implementation of management actions with other agencies and landowners, when possible. To better inform the public of planned large-scale salvage harvest, a press release will be completed that includes information on the disturbance and the planned management actions.

4.4 Revisions to Cover Type Management Recommendations Chapter

Pages 4.1 – 4.97: Under each cover type, edited the first sentence in 4._A.1. to clarify that the acres included in this chapter are state timberland managed acres. For example, under 4.3A.1., for the birch cover type, the sentence was edited from state timberlands managed to state *timberland managed acres* as follows:

In 2004, the paper birch (Bi) cover type comprised 14 percent (27,864 acres) of state *timberland managed acres* in the NTL subsections. Page 3.2 includes the definition for “managed acres”.

Also, edited the title for Table 4._a under each cover type to include “managed.” For example:

Table 4.3a: Birch Cover Type *Managed* Acres by Subsection

Pages 4.8, 4.16, 4.47, 4.53, 4.59, and 4.68: In response to Comment Topic 140, deleted clearcut (*without reserves*) from the lists of most common prescriptions that will be used for final harvest prescriptions in even-aged managed cover types. The clearcut (*without reserves*) prescription was retained for the black spruce lowland cover type.

Page 4.13: In response to Comment Topic 131, edited the acres in 4.3 Paper Birch, first sentence, to match the correct acreage in Table 4.3a:

In 2004, the paper birch (Bi) cover type comprise*d* 14 percent (~~29,930~~ *27,864* acres) of state *timberland managed acres* in the NTL subsections.

Page 4.15: Table 4.3b, 2004 column, edited acres to match those in Table 4.3a. Similar corrections were made for tables in other cover types when there were discrepancies.

Page 4.27: In response to Comment Topic 136, and based on information from a draft version of the revised Northern Hardwoods Managers' Handbook, edited the recommended crown closure to retain when applying individual or group selection harvest methods in Section 3. Unregulated Stands.

a. i. Use individual tree and group selection to create gaps of various sizes ranging from 30 to 100-feet in diameter (depending on hardwood species) while retaining an average of ~~60 – 80~~ *70–90* percent crown closure across the stand.

Page 4.28: In response to Comment Topic 136, and based on information from a draft version of the revised Northern Hardwoods Managers' Handbook, edited the recommended crown closure to retain when applying individual or group selection harvest methods in the last paragraph under Section 3. Unregulated Stands.

Depending on the hardwood species, ~~60 – 80~~ *70–90* percent crown closure is recommended after selective harvest. Because basal area is not a good indicator of crown closure for different species with different crown shapes and sizes, when marking trees, stand densities to be left should be based on crown closure. For both regulated and unregulated stands, as a general guide, average stand basal area of trees greater than 5-inch DBH should be reduced to ~~60~~ *70*–80 square feet per acre. For stands with a larger average diameter of co-dominant trees, higher basal areas should be maintained.

Page 4.29: In response to Comment Topic 134, added sentence at the end of the second paragraph in 2. Group Selection to consider management of small pockets of aspen within northern hardwood stands to provide stand diversity and wildlife habitat (e.g., for ruffed grouse).

Group selection harvest of aspen inclusions within northern hardwood stands should be considered to manage and retain these aspen pockets within these stands to provide within stand diversity and wildlife habitat.

Page 4.29: In response to Comment Topic 133, added a sentence to 4.5E to include information on additional considerations to include when evaluating a northern hardwood stand for even-aged management. Also, for monitoring purposes, added a sentence to clarify when a stand treatment will be considered in the acreage estimation that a maximum of 20 percent of the northern hardwoods cover type may be harvested using even-aged methods.

This evaluation may include considerations such as the native plant community classification and if the stand is located within a designated patch, the type of patch. In this plan, if a northern hardwoods stand's basal area is reduced to a level (i.e., significantly below the recommended residual basal area for uneven-aged management or thinning, e.g., 40 square feet) where the intent is not to return within 15-20 years for the next periodic selective harvest or thinning, then the stand treatment should be included in the estimated maximum of 20 percent of the acres that will be treated through even-aged methods.

Page 4.31: Section 4.5F, based on new information regarding northern hardwood management in the draft version of the revised Northern Hardwoods Managers' Guidebook, added a table:

Table 4.5c. Even-age stocking levels for northern hardwoods by mean stand diameter, basal area, and number of trees per care for specified crown covers after thinning.

Page 4.62: Edited the first sentence following Table 4.11d to clarify that some white spruce ERF stands will be treated through thinning, but none was selected for *final harvest* treatment.

Due to the current age of ERF stands, no stands were selected for *final harvest* treatment during this 10-year planning period. Some ERF designated stands were selected for treatment under the thinning criteria.

Page 4.93: Section 4.15D, edited 2.b., for cedar cover type management, added the global ranking of the white cedar-yellow birch native plant community (NPC) because its rarity extends beyond the state.

b. Do not ~~treat~~ *select* white cedar stands that key out to the white cedar-yellow birch NPC type because of its ~~rarity in the state~~ *global ranking (imperiled).*

4.5 Revisions to Monitoring Chapter

Page 5.3: In response to Comment Topic 43, in Table 5.1a, deleted the 16th listed objective:

~~Protect, sustain, or enhance existing statewide biodiversity significance~~

It was deleted because it cannot be monitored on a stand-by-stand basis. Currently, there is no program or process in place to monitor the sustainability or loss of biodiversity of sites of statewide biodiversity significance as a whole (across ownerships). Although MCBS procedures result in the identification of areas of biodiversity significance, MCBS is not funded to monitor changes to the biodiversity significance of the sites within these subsections over time.

4.6 Revisions to Glossary

Page 7.6: In response to Comment Topic 86, added definitions for *endemic* and *epidemic*.

Page 7.11: Edited definition of management pool to more accurately define this pool of stands in this plan.

Management pool: In this plan, ~~the acres available for timber management purposes~~ *managed acres minus the inoperable acres that are not high-risk, low-volume (HRLV).*

Page 7.12: Edited definition of MCBS sites. Changed "relatively undisturbed" native plant communities to *intact* native plant communities. Sites identified as MCBS sites may have had past disturbance such as timber harvest, but the group of native plants may not have been greatly altered by modern human activity and the NPC is relatively stable (*intact*) because of infrequent disturbance.

MCBS Sites: Areas of land identified by Minnesota County Biological Survey (MCBS) staff, ranging from tens to thousands of acres in size, selected for survey because they are likely to contain ~~relatively undisturbed~~ *intact* native plant communities, large populations and/or concentrations of rare species, and/or critical animal habitat. The MCBS site provides a geographic framework for recording and storing data and compiling descriptive summaries.

4.7 Revisions to Appendix

Page A.12: In response to Comment Topics 44 and 45, edited Appendix F, Ecologically Important Lowland Conifers (EILC): Acreage Goals and Rationale, to more accurately explain the acreage goals and rationale and to include the revised acreage based on some adjustments to stands designated as EILC.

APPENDIX F (Revised)

Ecologically Important Lowland Conifers (EILC): Acreage Goals and Rationale

The SFRMP Guidebook provides direction for subsection planning teams regarding determining the appropriate amount of EILC acres that should be identified in a subsection. The designated EILC stands are to be reserved from harvest for up to the 10-year planning period to provide time for further assessment and to provide a pool from which potential lowland conifer old growth stands (or other designation) might be identified once the DNR Old Growth Forest Guidelines (1994) are amended to include lowland conifers. Teams use old growth goals for the other forest types in the subsection that were addressed in the Old Growth Forest Guidelines to help establish a *starting point* for team discussions about the appropriate amount of EILC in the subsection. In these subsections, cover types that have designated old growth forest are ash, lowland hardwoods, northern hardwoods, oak, red pine, white pine, white spruce, and white cedar (upland). Total subsection old growth goals for these forest types were summed and divided by the total DNR forest land acres in the respective forest types in the subsection. In the

North Shore Highlands Subsection, the goal for these cover types was to designate 8 percent of the acres as old growth forest. In both the Toimi Uplands and Laurentian Uplands subsections (subsection boundaries were revised in 1999), the estimated old growth forest designation goal was 5 percent of the acres. Based on the guidelines, these percentages were doubled (2X goal for candidate acres) and applied to acres of lowland conifers[2] in the subsection. Based on the calculations, the starting point for team discussions regarding EILC acres was 16 percent of the lowland conifer acres in the North Shore Highlands Subsection and 10 percent of the lowland conifer acres in the Toimi Uplands and Laurentian Uplands subsections. Table F.1 shows the total acres in the lowland conifer cover types. Table F.2 shows the initial EILC acreage goals based on the above percentages. The SFRMP Guidebook states that the starting point acres may be adjusted up or down if there are reasons to suspect that the old growth goals for other forest types do not reflect a reasonable or realistic pool for old growth lowland conifers on state-administered land.

Table F.1: Lowland Conifer Acres (based on *nltcsa2* shapefile data – June 2003)

	Black Spruce	Tamarack	Cedar	Sx	Tx	Cx	Total
North Shore Highlands	10,869	3,257	14,298	5,775	576	2,028	36,803
Toimi Uplands	2,463	534	628	906	183	325	5,039
Laurentian Uplands	15,720	1,729	1,904	11,208	3,766	2,395	36,722
Total	**29,052**	**5,520**	**16,830**	**17,889**	**4,525**	**4,748**	**78,564**

Table F.2: EILC Acreage Goals by Subsection – Starting Point

	Black Spruce	Tamarack	Cedar	Sx	Tx	Cx	Total
North Shore Highlands	1,739	521	2,288	924	92	324	5,888
Toimi Uplands	246	53	63	91	18	33	504
Laurentian Uplands	1,572	173	190	1,121	377	240	3,673
Total	**3,557**	**747**	**2,541**	**2,136**	**487**	**597**	**10,065**

According to the SFRMP Guidebook, EILC acres should not be removed from the commercial timberland base for the purposes of identifying desired treatment levels. Therefore, EILC acres were included in treatment calculations for this 10-year plan, which avoids a reduction in the 10-year treatment level of lowland black spruce, tamarack, and white cedar cover types. This was done to address concerns regarding the availability of lowland conifers for timber sales. Because EILC stands are reserved from harvest for the 10-year period, the desired level of harvesting during this planning period will be shifted to other lowland conifer stands.

Preliminary assessment information provided by MCBS staff identified 30,455 acres of lowland conifers within MCBS Sites with a high rank for EILC designation (this included MCBS sites with a ranking of Outstanding, High, and High Survey Priority). These stands were considered the most likely pool of stands to evaluate for lowland conifer old growth in the future. In

[2] Lowland conifers on DNR lands (not including state parks) from CSA database. Cover types: 71 (black spruce lowland - BSL), 72 (tamarack - T), 73 (white cedar - C), 75 (stagnant spruce - Sx), 76 (stagnant tamarack - Tx), and 77 (stagnant cedar - Sx)

consideration of this acreage, a North Shore SFRMP work group recommended that the EILC acre goals should be increased above the *starting point* goal.

The following tables from June 2003 summarize the results for the MCBS evaluation and "*preliminary* identification of ecologically important lowland conifer sites" by ECS subsection.

North Shore Highlands Subsection (NSH)
North Shore Highlands: Total = 1,481,891 acres (all ownerships)
Lowland Conifers on State Lands: Total = 36,803 acres (2130 stands)

Table F.3: Preliminary Identification of EILC by MCBS Staff – North Shore Highlands Subsection

Rank[3]	**# Stands**	**Acres**
HIGH	582	10,600
MODERATE	668	11,762
LOW	318	5,112
Total	**1,568**	**27,474**

118 upland cedar stands (3,100 acres), within the areas evaluated, were given a "No Rank" designation.

Toimi Uplands Subsection (TU)
Toimi Uplands: Total = 339,285 acres (all ownerships)
Lowland Conifers on State Lands (TU): Total = 5039 acres (321 stands)

Table F.4 Preliminary Identification of EILC by MCBS Staff – Toimi Uplands Subsection

Rank[5]	**# Stands**	**Acres**
HIGH	37	784
MODERATE	23	466
LOW	0	0
Total	**60**	**1,250**

Laurentian Uplands Subsection (LU)
Laurentian Uplands: Total = 567,281 acres (all ownerships)
Lowland Conifers on State Lands (LU): Total = 36,722 acres (1615 stands)

Table F.5: Preliminary Identification of EILC by MCBS Staff – Laurentian Uplands Subsection

Rank[5]	**# Stands**	**Acres**
HIGH	654	19,061
MODERATE	29	718
LOW	1	24
Total	**684**	**19,803**

[3] EILC Rank of "High" is not the same as MCBS site rankings.

Using the Ecological Services staff's preliminary assessment ranking of stands with a rank of HIGH in Tables F.3 – F.5 as the EILC pool (30,455 acres), the following criteria were used to develop the EILC acre targets. The stand designation process did not limit EILC selection to the ranked EILC stands.

Black Spruce Lowland: Current Age ≥ 85 and EILC Rank = High[4]
Tamarack: Current Age ≥ 85 and EILC Rank = High
Cedar[5]: Current Age ≥ 75 and Physiographic Class ≥ 4 and EILC Rank = High
Stagnant spruce (Sx): EILC Rank = High
Stagnant tamarack (Tx): EILC Rank = High
Stagnant Cedar (Cx): EILC Rank = High

By adding an age criteria to target stand selection to the older stands, the EILC goal was adjusted to 21,051 acres (See Table F.6). Since designating a stand as EILC only serves to defer it from consideration for harvest for the 10-year planning period, the work group did not see the need to consider commercial lowland conifer stands that would not be old enough to harvest within the planning period. These stands are deferred from harvest by default and due to their younger age would not be likely candidates for old-growth forest consideration. Some younger stands were selected because they were part of a block of older stands that were selected as EILC.

Table F.6: EILC Acreage Goals

	Black Spruce	Tamarack	Cedar	Sx	Tx	Cx	Total
North Shore Highlands	1,967	513	3,893	650	44	1,476	8,543
Toimi Uplands	151	70	44	264	17	0	546
Laurentian Uplands	2,233	66	258	6,007	2,246	1,152	11,962
Total	**4351**	**649**	**4,195**	**6,921**	**2,307**	**2,628**	**21,051**

The work group agreed that this EILC goal should not be used in the future as a basis for acreage goal setting for lowland conifer old-growth forest. The principle reason being that selecting EILC goals by this method includes far more than the "2X goal" for the potential old-growth pool. The SFRMP Team acceptance of the increased EILC acre goals was (1) that this temporary deferral would not affect the lowland conifer cover types treatment acres calculations for this 10-year plan, and (2) that the number of acres designated now as EILC is not meant to infer an acre goal for the lowland conifer old growth for these subsections.

[4] EILC Rank of "High" is not the same as MCBS site rankings.
[5] Upland cedar old growth has already been addressed, so physiographic classes of 4 and 5 (hydromesic and hydric sites) were only considered.

Table F.7: Acres Designated as EILC[6]

	Black Spruce	Tamarack	Cedar	Sx	Tx	Cx	Total
North Shore Highlands	2,397	378	4,847	1,176	343	904	10,045
Toimi Uplands	130	76	61	236	0	46	550
Laurentian Uplands	2,656	215	279	5,301	1,835	1,053	11,338
Total	**5,183**	**669**	**5,187**	**6,713**	**2,178**	**2,003**	**21,933**

Table F.8: EILC Percent of Cover Type Acres[7]

	Cover Type Total Acres	EILC Acres	% of Cover Type
Black Spruce	29,308	5,183	18%
Tamarack	5,659	669	12%
Lowland Cedar	16,780	5,187	31%
Sx	16,276	6,713	41%
Tx	2,657	2,178	82%
Cx	4,422	2,003	45%
Total	**75,102**	**21,933**	**29%**

Note: EILC goals were based on a version of the forest inventory database from June 2003 (nltcsa2). Acres showing the designated EILC in Tables F.7 and F.8 are based on a February 2006 database.

Page A.23: Based on team member review of the draft plan, in Table L.2, added FDn43a, White Pine – Red Pine Forest, as an NPC with an S-Rank of 2.

Type Code	Subtype Code	Type Name	Subtype Name	State Rank
FDn43a		*White Pine - Red Pine Forest*		*2*

[6] Acres based on nltfim1i_feb2006 shapefile data (does not include state park acres).

Page A.33 – A.40: Edited Appendix N, SFRMP Codes, to reflect the updates to fields and codes used in the ArcView shapefile for the subsection plan.

A P P E N D I X N (Revised)

SFRMP Codes

Table N.1: Codes used for Tagging Stands in the North Shore Subsections ArcView NLTCSA Shapefile

Field Name and Codes	Description
AD	**Land Administrator**
1	Division of Forestry
2	Division of Fish and Wildlife
3	Division of Parks
4	Other State administrator (most in this plan are Division of Trails & Waterways)
CRITERIA	**Identifies the stands that meet the stand selection criteria. It provides the pool of stands to choose from for stand treatments in the 10-year plan.**
HIGH RISK LOW VOLUME	Stand meets the criteria established for HRLV stands.
HARVEST	Stand that meets the harvest criteria
UNEVEN AGED HARVEST	Stand that meets the uneven-aged harvest criteria
THIN	Stand that meets the thinning criteria
FIELD VISIT	Stand that requires a field visit to determine a prescription.
UNDER MGMT,TBR=9	Stand is currently a timber sale or on a FY harvest plan.
DISPUTES	Field staff used to tag stands where there were disagreements on stand selections or prescriptions by field staff during the stand selection process. SFRMP Team reviews and determines preliminary management recommendations.
EILC	**Ecologically important lowland conifers – Reserve during this 10-year plan.**
1	EILC designated stand
ERF	**Extended Rotation Forest (ERF)**
1	ERF designated stand

ERF_OBJ	Extended Rotation Forest Objective Codes
C	Corridors. Connectivity-linking other old forest areas.
D	Deer yard
O	Old-growth location center (outside of SMZ)
P	Plant community protection
R	Riparian zone
S	Soil erosion/compaction concerns
T	Timber management
V	Visual or recreation concerns
W	Wildlife habitat
CRW	Example of multiple ERF coding for corridor, riparian, and wildlife. List in alphabetical order.
INOPERABLE	**Inoperable stands identified by field staff.**
1	Stand is inoperable due to steep slope, inaccessible, etc. Stand acres were removed from the base acres for the cover type. These stands were designated before harvest pool acres were determined.
JT_VISIT	**If coded, joint field visit desired by staff from other divisions. Stands may be tagged during the 10-year stand selection process or during annual harvest plan reviews.**
FSH	Contact Area Fisheries staff prior to the field visit. All stands on fisheries lands will receive a field visit designation of FSH, other stands that fisheries staff want to field visit with the appraiser will be tagged during the 10-year selection or annual reviews.
WLD	Contact Area Wildlife staff prior to the field visit. Wildlife staff will tag stands with WLD that they want to do a joint site visit.
ECO	Contact Ecological Services representative prior to the field visit. Eco Services staff will tag stands with ECO that they want to do a joint site visit.
MGMT_CT	Cover type to manage for in the future (Cover type code) – *Preliminary estimate*. Same as current stand cover type unless edited during the stand selection process.
NEW ACCESS NEEDS	**Coding for new access needs in SFRMP. Only assigned to stands where new access is needed.**
NA_MILE	**New access miles only (estimate to nearest 0.1 mile)**
NA_SW	**New access season of use. S = summer; W = winter**

NA_TYPE	**Type of new access.**
System Road	**System Roads** are the major roads in the forest that provide forest management access, recreational access and may be connected to the state, county, or township public road systems.
Min. Maintenance Road	**Minimum Maintenance Roads** are used for forest management access on an intermittent, as-need basis. These roads are not promoted or maintained for recreation. The roads will be open to all motorized vehicles but not maintained to the level where low clearance licensed highway vehicles can travel routinely on them.
Res. Mgmt. Access Route	**Resource Management Access Routes** are not immediately needed after the cessation of the management activity, but may be needed in the future for management activity and the corridor needs to be preserved. These routes will be closed to all motorized recreation use (For hunting, trapping, etc. exceptions, see *Minnesota Statute 84.926*).
Temporary Access Route	If the access route does not fit into one of the first three options, the **temporary access route** will be abandoned and the site reclaimed so that evidence of a travel route is minimized. Used only during on-going management activity. These routes will be closed to all motorized recreation use (For hunting, trapping, etc. exceptions, see *Minnesota Statute 84.926*).
NA_POST	**Post management activity road treatment.**
M	Maintain open.
L	Leave open/minimal maintenance.
C	Close with barrier; open only for management.
A	Abandon (applies to all new temporary access routes).
RD_PERMIT	**New access requires a USFS permit or crosses a peatland SNA.**
F	USFS Road Use Permit (i.e., use of NF System Road)
G	USFS Special Use Permit (i.e., crossing USFS land via a NF non-system road or new access route)
S	SNA Winter Road (notification)
Z	Access information assigned to another near-by stand
NEW_AGE	Age in 2004.
OBJECTIVE	**See Appendix J. Coding used to assign preliminary objectives to stands (e.g., D5D7D9G1). Multiple codes may be assigned. FORIST-SRM will include a drop down menu for assigning objectives to stands after the appraisal is completed.**

PAT_NAM	**Provide a name to identify each patch in the ArcView shapefile. Tag all stands within a patch with the same name.**
PAT_NOM	**Identify the patch with the coding that best represents the current age, size class, etc. (Use PATCHDFC Field to define the desired patch type). All codes used may not be included in this table.** **Patch Codes** – **P**atch; Age Class (**O**-old, **I**-intermediate, **Y**-young, **V**-uneven-aged managed stand); Size Category Class (**1**-large to **5**-small); **U**pland/**L**owland; Cover Type Group (**D**eciduous, **C**onifers, **M**ixed Deciduous and Conifers **M** - Mixed Ownership Patches: Add "M" in front of any patch code when the patch would involve other ownership than state land. Use only when fairly certain adjacent landowners would support development and retention of the patch over time. **F** - Add "F" in front of patch code for future patch. Use where you desire a patch to be located, but the group of stands currently do not meet the definition of a patch.
Patch nomenclature used in the North Shore Subsections SFRMP:	
Patches – Large (1)	**Greater than 640 acres**
PI1LC	Patch, Intermediate age, Large size, Lowland, Conifers
PI1LUC	Patch, Intermediate age, Large size, Lowland and Upland, Conifers
PI1UC	Patch, Intermediate age, Large size, Upland, Conifers
PO1UD	Patch, Old age, Large size, Upland, Deciduous
PO1ULM	Patch, Old age, Large size, Upland and Lowland, Mixed Deciduous and Conifers
PV1UD	Patch, Uneven-aged, Large size, Upland, Deciduous
PV1ULM	Patch, Uneven-aged, Large size, Upland and Lowland, Mixed Deciduous and Conifers
PV1UM	Patch, Uneven-aged, Large size, Upland, Mixed Deciduous and Conifers
PY1ULM	Patch, Young age, Large size, Upland and Lowland, Mixed Deciduous and Conifers
PY1UM	Patch, Young age, Large size, Upland, Mixed Deciduous and Conifers
MPO1SLC	Mixed Ownership, Patch, Old age, Large size, Stagnant Lowland Conifers
MPO1UD	Mixed Ownership, Patch, Old age, Large size, Upland, Deciduous

MPO1ULM	Mixed Ownership, Patch, Old age, Large size, Upland and Lowland, Mixed Deciduous and Conifers
MPV1UC	Mixed Ownership, Patch, Uneven-aged, Large size, Upland, Conifers
MPV1UD	Mixed Ownership, Patch, Uneven-aged, Large size, Upland, Deciduous
MPV1ULM	Mixed Ownership, Patch, Uneven-aged, Large size, Upland and Lowland, Mixed Deciduous and Conifers
MPY1UD	Mixed Ownership, Patch, Young age, Large size, Upland, Deciduous
FMPV1ULM	Future, Mixed Ownership, Patch, Uneven-aged, Large size, Upland and Lowland, Mixed Deciduous and Conifers
FMPV1UM	Future, Mixed Ownership, Patch, Uneven-aged, Large size, Upland, Mixed Deciduous and Conifers
FMPY1UD	Future, Mixed Ownership, Patch, Young age, Large size, Upland, Deciduous
FMPY1UM	Future, Mixed Ownership, Patch, Young age, Large size, Upland, Mixed Deciduous and Conifers
FPY1UD	Future, Patch, Young age, Large size, Upland, Deciduous
FPY1ULM	Future, Patch, Young age, Large size, Upland and Lowland, Mixed Deciduous and Conifers
Patches - Med Large (2)	**251 – 640 acres**
PO2LC	Patch, Old age, Med-large size, Lowland, Conifers
PO2LM	Patch, Old age, Med-large size, Lowland, Mixed Deciduous and Conifers
PO2UC	Patch, Old age, Med-large size, Upland, Conifers
PO2UD	Patch, Old age, Med-large size, Upland, Deciduous
PO2ULM	Patch, Old age, Med-large size, Upland and Lowland, Mixed Deciduous and Conifers
PO2UM	Patch, Old age, Med-large size, Upland, Mixed Deciduous and Conifers
PV2UD	Patch, Uneven-aged, Med-large size, Upland, Deciduous
PY2LC	Patch, Young age, Med-large size, Lowland, Conifers
PY2UC	Patch, Young age, Med-large size, Upland, Conifers
PY2UD	Patch, Young age, Med-large size, Upland, Deciduous
PY2ULC	Patch, Young age, Med-large size, Upland and Lowland, Conifers

PY2ULM	Patch, Young age, Med-large size, Upland and Lowland, Mixed Deciduous and Conifers
PY2UM	Patch, Young age, Med-large size, Upland, Mixed Deciduous and Conifers
MPV2UD	Mixed ownership, Patch, Uneven-aged, Med-large size, Upland, Deciduous
MPV2ULM	Mixed ownership, Patch, Uneven-aged, Med-large size, Upland and Lowland, Mixed Deciduous and Conifers
MPY2UD	Mixed ownership, Patch, Young age, Med-large size, Upland, Deciduous
MPY2UM	Mixed ownership, Patch, Young age, Med-large size, Upland, Mixed Deciduous and Conifers
FPY2UC	Future, Patch, Young age, Med-large size, Upland, Conifers
FPY2UD	Future, Patch, Young age, Med-large size, Upland, Deciduous
FPY2UM	Future, Patch, Young age, Med-large size, Upland, Mixed Deciduous and Conifers
Patches - Other	Patches - Nontimberland and Nonforest land patches *(not used in this SFRMP plan)*
P1SLC	Patch, Large (>640 Acres), Stagnant Lowland Conifers
P1UX	Patch, Large (>640 Acres), Upland, Non-Forest
P1LX	Patch, Large (>640 Acres), Lowland, Non-Forest
P1LBM	Patch, Large (>640 Acres), Lowland, Brush and Muskeg
P1LGM	Patch, Large (>640 Acres), Lowland, Grass and Marsh
P2SLC	Patch, Medium Large (251-640 Acres), Stagnant Lowland Conifers
P2UX	Patch, Medium Large (251-640 Acres), Upland, Non-Forest
P2LX	Patch, Medium Large (251-640 Acres), Lowland, Non-Forest
P2LBM	Patch, Medium Large (251-640 Acres), Lowland, Brush and Muskeg
P2LGM	Patch, Medium Large (251-640 Acres), Lowland, Grass and Marsh
	For smaller patch sizes 3 - 5, use similar coding scheme.
PATCHDFC	**Use the same coding method as listed under PAT_NOM Field. Use to identify patches where you want to change the age, size, even-aged vs. uneven-aged, or cover type group from what currently exists in the short term (10 years) or move toward in the longer term (50 years). Stands identified as future patches (F-prefix) in the PAT_NOM Field should have the desired patch**

	nomenclature identified here.
PRESCRIP	**Preliminary Prescription Code for Stand Treatment.**
1111	Clearcut with Reserves
1116	Clearcut – Natural seeding
1120	Seed Tree
1131	Shelterwood with Reserves
1300	Uneven-aged Harvest
1310	Group Selection
1810	Thinning
1952	Decorative Trees
9100	On-site Evaluation
9101	High-Risk, Low-Volume: Prescription determined after on-site visit.
PRNA	**Potential Research Natural Area (PRNA) - USFS**
1	Stand adjacent to CRNA (Candidate Research Natural Area). In 2005, revised the designations from the PRNAs to the final CNRAs included in the USFS Superior National Forest Plan. Refer to Region memo for direction.
SE_YEAR	**Planned year (FY) to complete the stand examination/appraisal.** The estimated year the appraised timber from the stand will be offered for sale (if the stand conditions are suitable and the management action recommended is timber harvest).
SMA	**Special Management Area**
AE	**Aspen Emphasis Area.** Identifies areas where habitat and timber management emphasis should be the maintenance and promotion of the aspen cover type. Recommendation is to maintain or increase aspen/BG cover types in these areas.
CONE	**Conifer Emphasis Area (Upland).** Identifies areas where habitat and timber management emphasis is managing toward extensive areas of predominantly upland conifer cover types. Recommendations: 1. Maintain current conifer stands as conifer cover types. 2. Conversion of aspen to upland conifer (where site appropriate) is the preferred alternative when planning for regeneration on harvested stands. 3. Use strategies and prescriptions to maximize the within-stand conifer component.

FML	This code tags DNR **Fisheries administered lands**. These lands will be included in the pool of acres considered for management during the 10-year planning period. These lands are primarily riparian, and will be managed primarily for enhancement of water quality and riparian values. Opportunities for conversion to conifers, ERF, and old growth will be emphasized. Final field approval of sale design rests with the Area Fisheries Supervisor.
DMA	**Deer Management Area.** Identifies areas where the management emphasis should be to maintain or increase white-tailed deer habitat. Recommendations: 1. Maintain a diversity of age classes in the upland deciduous cover types. 2. Preferred size of harvest area is 10-40 acre blocks. 3. Maintain or increase within stand diversity. 4. Maintain forest openings
DMAY	**Deer Management Area - Yard.** Identifies areas where the management emphasis is to optimize thermal (conifer) cover for deer. Recommendations: 1. Maintain or increase white cedar cover type and/or component. 2. Maintain or increase the conifer component in aspen, birch, and balm of gilead cover types. 3. Put some emphasis on browse production within selected conifer and mixed species stands. 4. Some deciduous stands within a yard will be managed for browse production.
GMAR	**Ruffed Grouse Management Area**. Identifies areas where the management emphasis is to maintain or increase ruffed grouse habitat. Not limited to officially designated ruffed grouse management areas. Recommendations: 1. Maximize diversity of age classes in the upland deciduous cover types. 2. Maximize the age difference between adjacent stands to create more edge. 3. Manage stands under normal rotation versus ERF. 4. Minimize conversion to conifer. 5. Reserve snags in islands. 6. Harvest in 10-30 acre blocks (10-15 acres preferred).
GMAS	**Sharp-tail Grouse Management Area**
MMA	**Moose Management Area.** Identifies areas where the management emphasis is to maintain or increase moose habitat. Recommendations: 1. Harvest in patch classes 3-4 (41-250 acres). 2. Maintain a diversity of age classes. 3. Promote mixed coniferous/deciduous stands.

	4. Promote development of coniferous stands near riparian areas or in proximity to browse areas.
OLMA	**Open landscape management area.**
SMZ	**Special management zone (SMZ) and other stands tagged relating to old-growth forest management complexes (OFMC).**
all	Entire stand is in the SMZ
partial	Only a portion of the stand is in the SMZ
Smz	All or part of the stand is in the SMZ
og	Old-growth stand
ofmc	Stands in the OFMC that are not in the SMZ or old-growth stands
COMMENT	General comments assigned to a stand during the planning process.
TEAMCOM	Team comment relating to preliminary objective, agreed upon team comments relating to stand management, etc.
ECO_COM	Ecological Services staff comments regarding the stand management.
FOR_COM	Forestry staff comments regarding the stand management.
FSH_COM	Fisheries staff comments regarding the stand management.
WLD_COM	Wildlife staff comments regarding the stand management.
ZONE	Forestry Field Station Work Area (only used by the Two Harbors Area) – used to identify stands in the various work areas.
FIN	Finland Field Station
GM	Grand Marais Field Station
TH	Two Harbors Field Station

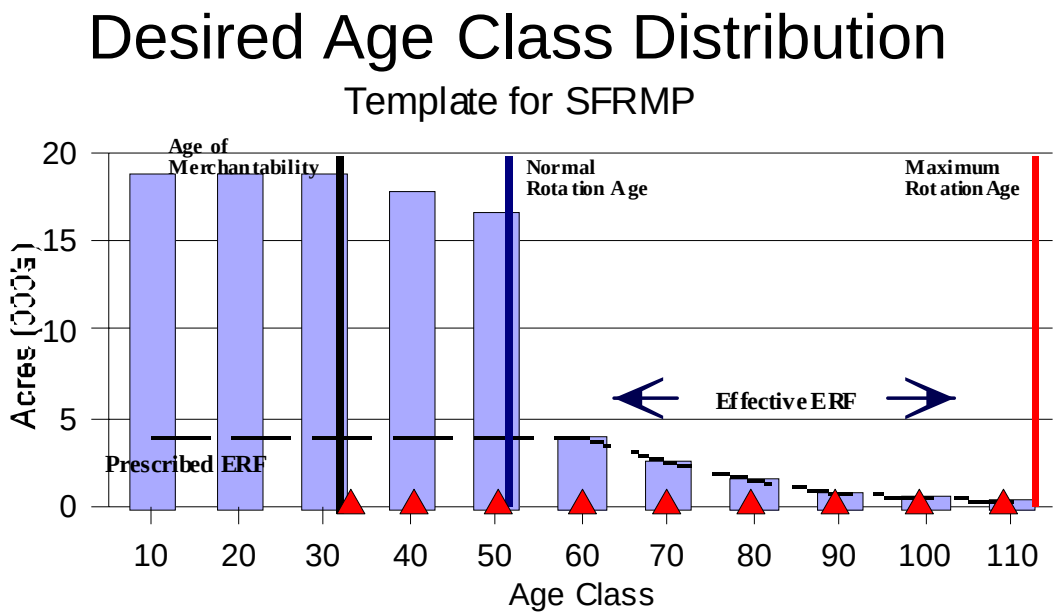
Page A.41: Appendix O. Based on Comment Topic 143, edited the title of the appendix:

~~Terrestrial, Vertebrate Species List~~ *Species List of Birds, Mammals, Amphibians and Reptiles for the* North Shore Highlands, Toimi Uplands, and Laurentian Uplands Subsections.

Added Appendix Q: In response to Comment Topics 2, 8, 9, and 81, added *Appendix Q, Rotation Ages,* to provide information on the current process for determining rotation ages for even-aged managed cover types in the SFRMP planning process. This procedure has been revised somewhat in that now a statewide work group rather than the SFRMP team determines the recommended rotation ages.

Appendix Q: Rotation Ages

Subsection teams should use the following chart as their template for the long-term desired future age-class distribution for forest types managed primarily under even-aged systems (e.g., aspen, birch, jack pine, black spruce upland/lowland, tamarack, etc.) that have substantial acres within the subsection. Note that the acres, age-classes, and rotation ages used in the chart below are hypothetical examples.



▲ Harvest Points

There are three important "rotation" ages needed for the SFRMP process:

- **Age of Merchantability**: when most trees within stands of this forest type normally become large enough (e.g., diameter, height) to be commercially marketable. This does not necessarily mean that stands will be "operable" from a logger's perspective.
- **Normal Rotation Age**: For even-aged managed cover types, the rotation age set for non-ERF timberland acres. It is based on the culmination of mean annual increment (MAI), other available data related to forest productivity that also considers wood quality, and local knowledge.
- **Maximum Rotation Age**: The maximum age at which a forest type will retain its biological ability to regenerate to the same forest type and remain commercially viable as a marketable timber sale.

The "desired age-class" template above shows where these three ages come into play in achieving the desired age-class distribution for forest types managed under even-aged systems.

It is important that the above definitions are followed in setting rotation ages. Management objectives, concerns or issues (e.g., the desire to harvest more timber, the desire for more old forest habitat) should not form the basis for proposing/supporting higher or lower rotation ages

outside those supported by these definitions. Management objectives/issues will be more appropriately addressed by decisions the SFRMP team and others will make relative to extended rotation forests, cover type conversions, proposed treatment levels, stand selection criteria, etc.

"**Maximum" vs. "Extended" Rotation Age** - It is very important to understand the definition and use of "maximum rotation ages" as contrasted to past use of "extended rotation ages." There are notable differences in their definitions and applications in managing extended rotation forests. The overall goal is the same: to manage some portion of even-aged forest types beyond normal rotation age to provide old forest characteristics. However, under the previous use of an "extended rotation age," all stands designated as ERF were assumed to be held to and harvested at the "extended rotation age." This approach created essentially two harvest points for each even-aged forest type: one at normal rotation age and one at the extended rotation age. Under the new "maximum rotation age" approach, stands designated as ERF may be harvested at multiple points between the normal rotation age and the maximum rotation age to create a tapered age-class distribution over time (see chart above). This means that only a portion of the prescribed ERF stands will actually be held to the maximum rotation age (with the assumption that these will be the ERF stands most suited to being held to that maximum age).

Data/Information Used
FRIT and division directors/commissioner's office have directed staff to develop normal rotation ages based on timber productivity data/information. More specifically, this has included Mean Annual Increment (MAI, see definition below) from FIA where there are enough plots; supplemented by MAI with Periodic Annual Increment (PAI, see definition below) from FIM (formerly known as CSA) where FIA data is inconclusive, insufficient, or questionable.

Definitions and Use of MAI and PAI
Mean Annual Increment (in its purest form) is the average annual growth of a stand up to a particular age. It is calculated by dividing yield at that age by the age itself (e.g., the mean annual increment for a stand at age 50 with 25 cords per acre total volume: 25) 50 years = 0.5 cords per year). Theoretically, wood fiber production is optimal where MAI peaks (i.e., culminates).

Periodic Annual Increment (again, in its purest form) is the growth of a stand over a specific time period divided by the length of the period. In our case, this is the change in average stand volumes by 10-year age-class intervals divided by 10 years. PAI is used to affirm or fine tune where MAI peaks. Conceptually, this is where PAI first crosses MAI in the charts. In some cases, the PAI line goes up and down, and crosses the MAI curve more than once. The appropriate point of intersection is usually the first one and is usually relatively close to where MAI peaks.

Establish Normal Rotation ages by forest type using MAI from FIA

- Site index breakdowns can be used if appropriate.
- Use FIA plots from subsection.
- If there are not enough plots in subsection, use FIA plots from combined adjacent subsections or the FIA survey unit containing the majority of DNR lands within the subsection.
- If there are not enough plots in FIA survey unit, then use statewide FIA.

- The use of these three options will vary from forest type to forest type.
- FIA is the preferred data set to use. However, subsection teams can use their judgment in doubting the accuracy of MAI estimates from FIA. Problems would most likely occur when using survey unit or statewide FIA for smaller forest types or for subsections at the fringe of FIA survey units. In these cases, MAI/PAI based on FIM data for the subsection or staff's best estimates can be used with documented reasons.
- See Appendix XX for more information on the use of MAI in SFRMP.

Establish maximum rotation age for each forest type.

- This will not necessarily be 1.5 times the normal rotation age based on culmination of MAI (e.g., MAI may establish normal rotation ages that are older than the standard rotation ages used in the ERF Guideline as a basis for the 1.5 x normal rotation age benchmark).
- Site index breakdowns should be used if appropriate.

Additional Direction

Rotation ages should only vary across a subsection based on differences in site capabilities relative to timber characteristics (i.e., age of merchantability, culmination of MAI, oldest age to regenerate type thru commercial timber sale).

Variations in rotation ages (again, based on site capabilities) should only be recognized if they vary by at least 5 years (or perhaps even 10 years). Variations of less than 5 years will not make a significant difference in implementation since timber sale permits can last up to 5 years.

The merchantable, normal, and maximum rotation ages that are established via this process should not vary based on varying objectives across the landscape or in specific locations. These objectives can be met by assigning varying prescriptions or combinations of prescription (e.g., ERF, non-commercial treatments, conversion prescription).

The declining age class structure (from merchantable age through maximum rotation age) allows a variety of "harvest" ages across the landscape.

Who develops rotation ages:

Draft rotation ages are to be developed by Forestry St. Paul/Region/Area Rotation Age work group. These draft rotation ages are then circulated for review and comment to Forestry, Wildlife and Ecological Services staff within the subsection. This input is needed to gather broader input, verify rotation ages, and identify any local variances.

Disputes regarding the draft rotation ages are first addressed by the Forestry RA work group, then by the SFRMPs "Core 4." If unresolved, resolution is bumped to the Region managers from Forestry and Wildlife (with Eco-Services designee). If still unresolved, then bumped to St. Paul for resolution by the affected directors.

Added Appendix R and S: In response to Comment Topics 8, 12, and 81, added *Appendix R, Extended Rotation Forests, and Appendix S, Extended Rotation Forest Procedure for SFRMPs,*

to provide information on the current statewide process for determining the amount and application of ERF for even-aged managed cover types in the SFRMP planning process. This procedure has been revised somewhat in that now a statewide work group rather than the SFRMP team determines the amount of ERF.

Appendix R: Extended Rotation Forests

DNR ERF Guideline Goal:
To maintain designated areas of forest or stands beyond traditional harvest ages on DNR administered timberlands.

Definition of ERF
Extended rotation forests are areas or specific sites that have been assigned a management prescription to lengthen the time to the final harvest of the stand.

Why manage for ERF?

- Important contribution to the conservation of biological diversity in Minnesota:
  - Insures that an adequate acreage of forest older than rotation age are maintained on a continuing basis (i.e., maintaining portions of forest communities in each successional stage)
- Provides a management tool to help address visual concerns and opportunities along major travel corridors, recreation areas, and vistas.
- Provides a management tool to help maintain the integrity of forested riparian areas.
- Provides a management option to complement or connect old growth stands and complexes.
- Provides a management tool that supports the growing of larger trees that are important to the state's sawmill industry.

Application of ERF

- A **minimum of 10%** of the timberlands administered by the DNR within each landscape region (i.e., ECS subsection) should be managed under an ERF prescription.
- There is no maximum amount of ERF identified in the ERF Guideline. The Guideline notes that in some landscape regions, it may be appropriate to manage more than 50% of DNR timberlands as ERF.
- The ERF prescription should be applied to specific locations to achieve specific objectives (e.g., along travel corridors to maintain visual quality, adjacent to old growth stands to complement old growth objectives).
- ERF stands can receive intermediate treatments (i.e., intermediate and improvement thinning, selective harvesting) if consistent with the objectives of a particular ERF location.
- An ERF prescription remains with a stand throughout its life cycles (i.e. a stand with an ERF prescription is an ERF stand regardless of its age, from harvest to regeneration to harvest and so on)

How much ERF is enough?
This has been the single most difficult question to for local DNR managers to resolve, regardless of the planning process being used. It has the greatest bearing on whether or not the resulting plans are viewed as acceptable by managers and stakeholders on all sides of the issue.

DNR Subsection plans have served as the latest vehicle for the ERF issue. The biggest difficulty is that the DNR ERF Guideline does not provide any sideboards to the appropriate amount of ERF on the landscape: anything from 10% to 100% is possible.

	What ERF Guideline Says	**Past** ERF Application	**New** ERF Application
Rotation Ages (RA)			
Normal RA	Identifies average recommended rotation ages as points were older forest conditions normally develop[1]	Set by DNR staff based on local conditions.	Same
ERF RA	Provides suggested, minimum extended rotation ages[1]	Set by DNR staff based on local conditions and DFFC	Would no longer be used. See maximum rotation age.
Maximum RA	N/A[2]	N/A	Set by DNR staff based on risk of losing type or merchantability
Merchantable Age	N/A	N/A	Set by DNR staff based on local conditions/knowledge when forest types generally become large enough for commercial harvest.
How ERF is placed on landscape	Specific sites on DNR land to be managed as ERF will be identified in timber management plans	Same	Same
How much ERF	▪ Amount of ERF will vary by landscape. ▪ 10% of DNR timberlands managed under ERF prescription (i.e., prescribed ERF). ▪ In some subsections, 50% or more prescribed ERF may be appropriate.	Same: ▪ Minimum 10% Prescribed ▪ Max. – Unlimited (up to 100%)	▪ Suggested "starting point" is 10% **Effective** (or 25-30% prescribed) ▪ Minimum 10% Prescribed
Harvest Points	Two are implicit in the recommended use of a normal and extended rotation age.	Same: there are two harvest points – one at normal rotation age and at extended rotation age	Multiple – every age-class beyond merchantable age.
Department Decisions	▪ Normal Rotation Age ▪ Extended Rotation Age ▪ How much to prescribe between 10% - 100% ▪ Where best to locate ERF	Same	▪ Merchantable Age ▪ Normal Rotation Age ▪ Maximum Rotation Age ▪ How much effective ERF above/below 10% ▪ Where best to locate ERF

[1] The glossary of terms in the DNR ERF Guidelines states that rotation age, "*is an administrative decision based on economics, site condition, growth, or other factors."*

[2] While the DNR ERF Guideline does not specifically use the term "*maximum rotation age,"* is does specifically state that the "harvests of these (ERF) stands will be accomplished with the appropriate silvicultural considerations . . . to assure that regeneration to the desired forest cover types is not jeopardized."

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Appendix S: ERF Procedure for SFRMPs

ERF Amounts Determined by a Statewide Work Group
As a way to decrease the amount of time to complete SFRMPs, increase consistency in the application of ERF on DNR timberlands, and narrow the debate within SFRMP teams, the Forest Resources Issues Team (FRIT) determined that ERF levels for future SFRMPs be determined by a statewide, interdisciplinary work group.

This statewide group would be charged with identifying effective and prescribed ERF levels for all even-aged cover types, including the slope of decline between NRA and MRA. The work group should be small with no more than two representatives for each of the three divisions (Forestry, Fish & Wildlife, Ecological Services).

The statewide ERF work group should use 10% effective ERF as the initial starting point for each forest type managed primarily under even-aged systems that have substantial acres within the subsection. The final amount of effective ERF may be higher or lower than 10% based on rationale provided by the statewide ERF work group, such as:

- Amount of old forest likely to be provided in the future on surrounding ownerships and in reserved areas (i.e., if more provided on other ownerships/reserved areas, less may be needed on DNR timberlands; if less is provided on other ownerships/reserved areas, more may be needed on DNR timberlands).
- Direction provided by the MFRC regional landscape committees if available.
- ERF direction established in adjacent DNR SFRMPs.
- Estimates of the historic age class and cover type distributions; and historic disturbance regimes developed from bearing tree data for the subsection (or for grouped LTAs or ecological community types, see LTA analyses). ERF management on DNR timberlands is most important where site and climatic conditions resulted in high levels of old forest historically and where there is and will be little old forest in reserved areas. Conversely, ERF management is least important where site and climatic conditions resulted in low level of old forest and there is and will be considerable old forest in reserved areas.
- Analysis of the economic effects of ERF for aspen and jack pine (see memo from Brad Moore dated 8-8-01).

The statewide ERF work group will use the ERF calculator (i.e., Excel worksheet, ERF Calculator v4.2) to help determine the long-term (i.e., when desired age-class distribution is achieved) desired amount of effective ERF for the various forest types, and the desired amount of taper in the age-classes between normal rotation age and the maximum rotation age. The combination these two factors will determine how much prescribed ERF is needed. Average volume per acre figures from FIM will help assess the effects on projected annual timber volumes available for harvest.

FRIT recommended that that statewide ERF work group would need the following information and analysis in determining ERF levels for each subsection/grouped subsections:

- Final rotation ages (merchantable, normal and maximum) from the rotation age process described above.

- Current acreage of cover types from FIM (for the forest types managed primarily with even-aged silvicultural systems). Ideally, this would be from the adjusted subsection boundaries, but not essential. The statewide work group is working with rough acreage numbers, understanding that the actual acreage to which the decided ERF amounts (expressed as percentages effective and prescribed) will not be determined until after the SFRMP team has addressed desired amounts of cover type conversion.
- Average volumes per acre for the various forest types from FIM (and site index breakdowns if any) for age classes at and beyond merchantable age.
- Analysis of effects of ERF on harvest volumes. This is provided by the ERF calculator that will be used by the statewide work group.
- Amount of old forest in parks, SNAs , other ownerships (e.g., from National Forest plans)
- Insect and Disease information relevant to ERF discussions
- Historic disturbance regime information (use what is available)
- Open landscape assessment

Placement of ERF on the Landscape

With the statewide ERF work group establishing the desired effective and prescribed ERF levels, the role of the SFRMP Team and local staff is to place ERF on DNR timberlands in the subsection(s).

SFRMP Teams should use the percent prescribed ERF amounts from the statewide ERF work group and apply them to the acres of timberland for each type for which the intent is to maintain the type (i.e., net of desired cover type conversion goals). To accomplish this, teams should determine the amount of each type that the team intends to allow to succeed or convert to other forest types (i.e., based on long-term DFFCs). This acreage should be removed from the consideration in determining the acres of ERF for the cover type in question.

Once the acreage of prescribed ERF is determined, the SFRMP team will work with local staff to identify geographic areas where DNR timberland should be managed as ERF for specific reasons or objectives (e.g., production of saw timber, complement management with adjacent land owners, riparian areas, old growth locational centers, corridors connecting old forest areas/patches, old forest patches, white pine type, visually sensitive corridors, LTAs where there is evidence of historically higher levels of older forests, avoiding non-wind firm soil types). An example of specific instructions to field staff to accomplish this is provided from the North Shore SFRMP, Strategic Direction Document, Appendix M. The specific reason or objective for designating an area as ERF should be documented and linked to the stands that fall within it. Where there are multiple reasons and objectives, a primary objective/reason should be identified. The reasons/objectives for designating an area as ERF should be considered in proposing management prescriptions for individual stands.

All stands on DNR timberlands within identified ERF areas should be assigned an ERF prescription, regardless of age or cover type, and linked to the reasons/objectives noted above. This includes stands belonging to cover types that are to be managed through uneven-aged systems (e.g., northern hardwoods, ash, lowland hardwoods, cedar) since uneven-aged management prescriptions may also be affected by ERF designation (e.g., frequency of treatments, intensity of treatments, etc).

Compare results from identified areas with desired amount of prescribed ERF. Expand the variable ERF areas (e.g., riparian areas, old forest patches, connecting and visually sensitive corridors, old growth locational centers) as necessary to reach the desired prescribed ERF amounts.

Teams should remember that ecological systems are inherently messy. As such, while our best intentions are to achieve desired age-class distributions through the application of a specific ERF approach, the reality is that some stands will be harvested above and below the identified rotation ages (e.g., access issues, how long it takes to sell, length of timber sale permits, and natural disturbances).

DNR timberlands prescribed as ERF should span the spectrum of site indices and forest/ community types. In other words, ERF should not be relegated to “junk” stands. Placing ERF in specific locations for specific reasons should adequately address this concern, but it should be kept in mind.