

Responses to Public Comments on the Draft North 4 SFRMP

The Draft North 4 plan went out for public review on July 24, 2009. At the request of Minnesota Forest Industries, the comment period was extended to 60 days, closing on September 24, 2009.

Eighteen letters were received, comments were summarized, and responses drafted by the Northeast Region Core 4, per SFRMP process. Responses were drafted to approximately 45 comments, many of which were of a non-controversial nature. A number of those resulted in changes/corrections being made to the draft plan. Comments were received from the following individuals and organizations:

Pine Products, Inc.
 Norbord Minnesota OSB, mill manager
 City of Bemidji
 Norbord Minnesota OSB, purchasing
 Miller McDonald, Inc. CPA
 Potlatch Land and Lumber, LLC
 Joint Economic Development Commission
 UPM Blandin Paper Company/Forestry
 Grand Rapids Area Chamber of Commerce
 Robert Brittain
 The Nature Conservancy of Minnesota, North Dakota, and South Dakota
 The Ruffed Grouse Society
 Bill Haugen (1)
 *Bill Haugen (2)
 *Minnesota Forest Industries
 *Timber Producers Association

*Received after close of public comment period.

Some responses and changes to the draft North 4 plan required the support of a modeling specialist; changes to the plan are noted in bold type in the response summary below.

Harvest Levels

1. The proposed plan proposes to offer approximately 183,000 cords, annually. This is a reduction in volume offered when compared to historic numbers. We estimate that sustainable harvest rates within these subsections to be approximately 305,000 cords per year. The DNR reduction in harvest can be attributed to the constraints applied during the planning process. Overall, 55 percent of the commercial forest acres have a constraint applied to them.
2. Reducing the rate of harvest may demonstrate to existing mills who want to expand, and to any mill that may want to do business in our region, that our timber supply cannot support their endeavor.

Response:

DNR timber sales data show that the average volume harvested in this landscape during the previous ten year period was 191,500 cords per year. With the addition of another 7,200 acres of black spruce and approximately 1,000 acres of red pine final harvest over that proposed in the draft plan, the current plan proposes a harvest in the range of 185,000 – 205,000 cords per year. So the current plan does not offer a volume of timber that differs significantly from past available volumes. This volume compares favorably to the sustainable harvest level proposed by Minnesota Forest Industries (MFI) in their revised comments i.e., 255,000 cords/year. Even as it tried to maintain a reasonable harvest level, the North 4 SFRMP team worked to schedule a ten-year harvest that would contribute to correcting the current undesirable age class structure of the subsections' forests. It should be noted that the planning process involved collaboration among DNR Wildlife, Forestry, and Ecological Resources divisions, and considered the benefits to some wildlife species of older forest in addition to the economic benefits of timber production. Natural resources are by definition limited, and cannot sustain unlimited industrial growth, even if that were a desired goal.

DNR sets future timber harvest rates based on a number of objectives, including forest health, productivity, game and non-game wildlife habitat needs, and biological diversity concerns. That said, this plan was able to do more to optimize timber volume while considering those other factors, because of the use of the Remsoft harvest-scheduling model.

The North 4 team took into consideration the facts that the planning area contains a high percentage of state timberlands; that those timberlands contain a high percentage of aspen acres; that a number of industries rely on timber supplies from state land in the subsection, particularly aspen species; that a native plant community in which aspen is a particularly good competitor (MHN44) is common in these subsections; that the subsections are heavily hunted for species which require multiple age classes of early successional forest (e.g., ruffed grouse, woodcock, deer); that hunting and income generated by activities related to hunting are important to the economy of the region; and that the Department's Strategic Conservation Agenda includes a goal of harvesting an average of 650,000 ruffed grouse annually.

These factors combined to suggest goals for treatment of the aspen cover type (e.g., rotation ages, conversion out of the cover type) should reflect the importance aspen cover type to the economic and recreational needs of this region of the State.

3. DNR should take another look at the modeling process and give the modeling a chance to put forth several different levels of harvest, for discussion and consideration internally and externally. The review should be re-opened and modified by removing substantial numbers of these constraints.

Response: DNR leadership confirmed its intent to keep ERF ages and levels fixed for the duration of the current planning period. Therefore, the option of changing those constraints was off the table.

However, a number of scenarios that involved relaxing even-flow constraints and removing age-class distribution constraints were evaluated in the effort to find additional black spruce and aspen volume *during the current planning period*. Relaxing even flow did result in a small increase in volume being available for harvest, while minimizing volume fluctuations over the planning horizon, and avoiding severe impacts to future age-class distribution. The team proposed the following model, the outcomes of which were approved by DNR division directors (Fish and Wildlife, Forestry, and Ecological Resources-Waters):

St. Louis Moraines - 55% even-flow on all cover type volume, 41% even-flow on aspen volume, no black spruce even-flow, age-class distribution constraints on aspen and black spruce;

Littlefork-Vermilion Uplands - 15% even-flow on all cover type volume, 15% even-flow on aspen volume, 20% even-flow on black spruce, WITH age-class distribution constraints on aspen but WITHOUT age-class distribution constraints on black spruce,

Tamarack Lowlands - 10% even-flow on all cover type volume, 35% even-flow on aspen volume, 15% even-flow on black spruce, WITH age-class distribution constraints on aspen but WITHOUT age-class distribution constraints on black spruce,

Nashwauk Uplands - no even-flow constraints, volume of ALL cover types must be less 15,300 cords beginning in year 15, and WITH aspen age-class distribution constraints but WITHOUT black spruce age-class distribution constraints.

This results in approximately 53% more acres of black spruce being selected in the first (current) decade (5.7% increase in acreage overall). Some change to this estimate would be expected due to real-life operational constraints.

4. The proposed plan additionally constrains the model by designating an amount of old forest acres and the amount of acres to be within ten year age classes. These constraints significantly reduce timber outputs. Removal of these constraints increased timber outputs by nearly 70,000 cords, annually. DNR should remove old forest and age-class constraints. Application of ERF and old growth stands provide for older forests on commercial timber lands. Further, reserved and non-commercial forestlands, lands not managed for timber, provide for old forest habitat as well.

Response: DNR and other external modeling efforts suggest that the effect of these constraints is much less than 70,000 cords/year. As noted in our response to comment 1, MFI later adjusted its own model harvest level downward to a sustainable harvest level more consistent with that proposed in this plan. Balancing age-class distributions is a major underlying goal of DNR forest management; this constraint has a larger bearing on volume differences between MFI and DNR models than either ERF or normal rotation ages. Balancing age classes is an important underpinning of DNR forest management because it potentially provides a steady amount of forest products, revenue, habitat and recreation,

thereby meeting the needs of a wide array of stakeholders. Balancing forest age classes is also identified as a key strategy for mitigation of higher harvest levels in the GEIS on Minnesota Timber Harvest and Forest Management (GEIS). If this constraint were removed, a short term gain in volume could be achieved, at expense of a long term, steady predictable supply of public resources. MFI also used a clear-cut prescription in its model for forest types that DNR manages using uneven-age systems for ecological and economic reasons, e.g. northern hardwoods and lowland hardwoods.

Very little “old” birch remains in these landscapes, as is shown by the birch age-class distribution charts in the North 4 SFRMP. All of that is scheduled for a stand examination. SFRMP is a “vegetation management plan”; timber harvest is the major piece of the plan. Increasing old forest is a smart strategic move by the state in terms of the emerging global carbon market and old forest’s carbon positive attributes; it is also a “plus” with respect to the State’s ability to market certified wood.–The constraints applied to the North 4 modeling effort reflect application of existing DNR policy and guidance, and was influenced by all three participating divisions – Forestry, Fish and Wildlife, and Ecological Resources.

Removing black spruce age-class distribution constraints for all subsections except St. Louis Moraines resulted in an increase in black spruce (7,200 acres) that will be added to the ten-year stand exam list. Removal of age-class distribution constraints on the aspen type was evaluated, but they could not be removed without creating unstable age classes in future decades.

Extended Rotation and Old Forest

5. Given these are public lands, I suggest a large portion use extended rotations.
6. Restricting harvest levels now, in what is already an aging forest, will surely lead to lower levels of growth and harvest in the future. Given the high amount of federal land in the same area as the North Four subsections, it seems the DNR should use its own guidelines recommending 20 to 25 percent ERF.
7. The 1994 Generic Environmental Impact Statement (GEIS) and DNR Extended Rotation Forest Guidelines suggest that a level of 20-25 percent prescribed ERF would mitigate impacts to most wildlife species. The North Four plan prescribes 52 percent of the commercial forest acres as ERF. Some types such as red pine all acres managed on an ERF basis. Further, the ERF ages have been greatly extended. For example, recommended ERF rotation age for aspen is 50-60 years. The DNR has prescribed aspen ERF ages as high as 85 years. We recommend the DNR only prescribe 20-25 percent of any type to an ERF age. ERF rotation ages should not exceed 1.5 times recommended rotation ages.

Response: The GEIS assumed 20 percent of state and federal lands would be managed as ERF. This was simply a rough modeling assumption used to project changes in forest age-class distributions

over the 50-year modeling horizon, and associated potential effects on numerous factors (including wildlife). It is not intended to be a guideline for forest management.

It would be incorrect to say that the GEIS predicted that 20-25 percent ERF would mitigate effects on most wildlife species of an increased timber harvest. In fact, of the 17 potential significant effects predicted under the GEIS base harvest scenario, most of them were predicted to happen even with the assumed mitigations built into the second model runs (which assumed 20 percent prescribed ERF on state lands). Mitigations to those significant impacts (many of which would affect wildlife) included designating additional ERF and balancing forest age classes.

DNR's 1994 Extended Rotation Forest Guideline does not recommend any particular level of prescribed ERF; it establishes a 10 percent minimum, but no maximum. In fact, it recognizes that, "It may be appropriate to manage more than 50 percent of the timberlands" as ERF in some landscapes. The ERF Guideline presents average recommended rotation ages for various forest types as general guidance, and does recommend 50-60 years as *minimum* extended rotation ages. Rather than focus on the very small number of acres that would be held to the maximum rotation ages of 80-85 years, a more meaningful picture of the ERF scenario in the North 4 plan can be gained by looking at the average ERF rotation age, which is 66-67 years. Overall, the North 4 plan designates 35 percent of commercial forest as ERF, not 52 percent. The percentages vary by subsection, as one would expect with a landscape-based plan.

Since the adoption of the ERF guideline, DNR has consistently directed staff to adjust rotation ages based on local conditions and data, and professional judgment. To that end, the SFRMP process was changed in 2006 so that an ERF-Rotation Age work group would determine landscape-appropriate rotation ages prior to the start of a new SFRMP.

By policy, 100 percent of red and white pine forests on DNR timberlands are to be managed as ERF. For other types, the amount of timberland given an ERF prescription (i.e., prescribed ERF) was based on a goal to have a certain amount of the forest beyond the identified normal rotation age at any point in time in the future (i.e., once the forest desired age-class distribution is achieved). **In response to public comments on the draft plan, work has been done to identify a pool of red pine stands to be evaluated for a final harvest in these subsections. A pool of stands was nominated by field foresters and underwent interdisciplinary review. In May 2010, approximately 300 acres were offered for sale with a clear cut or final harvest prescription. Additional acres of red pine (a combination of planted and natural stands) will potentially be added to the 10-year stand examination list, for a total of approximately 1,000 acres of final harvest contingent upon Forestry areas identifying additional planted acres (to balance natural stands on the list) for final harvest.**

ERF is intended to provide a suite of "old forest" characteristics on the landscape in the context of a productive, working forest. This is in contrast to old-growth forests, SNAs, and other reserved forest land areas where harvest is not an explicit part of the management plan. Final harvest is merely being delayed to provide more old forest "services" to the landscape. ERF that is designated in the

North 4 plan is not focused on WMAs, however ERF is designed to provide old forest values, many of which are in fact wildlife values, including hunt-able populations of game species.

Historical conditions were not used as a management goal in the plan. Rather, those data helped the team locate ERF in parts of the subsection where soils, climate, and disturbance regimes have allowed old forest to develop in the past.

8. Old forest is defined as those stands older than commercial rotation age. While this definition may be useful for planning purposes, it has less bearing on the composition and structural conditions that develop in late-successional forests. Extended rotation forests as defined in this plan likely do not provide for the area or range of late-successional forest habitat conditions. For example, mesic fire dependent forests (FDN43) in the Manitou forest landscape in northeastern Minnesota begin developing late-successional characteristics between 50-70 years of age. The differences between economically defined rotation ages and native plant community based growth stages should be discussed. *Biological Diversity, Forest Composition, and Spatial Distribution (Section 3.1)*.

Response: There is an ongoing effort by the Department to incorporate NPC and growth stage understanding into field forest management. The Department recognizes that making this kind of a change will take time, however, the North 4 plan provides a great deal of direction to manage stands consistent with native plant communities. Again, the North 4 Team was following Department direction to balance age classes and provide an even flow of timber, direction that required retention of a significant amount of forest in younger growth stages, in recognition of industry, recreation, and wildlife interests. Strategies recommending management in designated patches include managing for components of the next older growth stage, as a way of achieving greater structural and species diversity in these areas.

9. Across northern Minnesota forested landscapes, ecologically defined late successional forest, particularly in the uplands currently covers a very small proportion of the landscape. While this document describes the importance of “old forest”, it appears that the desired balanced age-class distributions for upland types will actually significantly reduce the area later successional forest in these subsections. This should be clearly described in the document. I am concerned about what we are going to do with 150 year old timber, and what industry might be able to utilize or even pay for this stumpage.
10. It is more important to harvest and process the over-mature timber than to have it rot and die in the forest, which can create hazards and unusable areas.
11. In birch alone, it appears in your first ten years of the plan you would harvest only the equivalent of the acres over 85 years old.
12. We are concerned that the draft SFRMP proposes significant reductions in aspen and other early successional forest habitats over time. The young growth stages of these early successional types provide critical breeding and post-fledging habitats for many species of

wildlife, including numerous species identified by the MN Department of Natural Resources as Species of Greatest Conservation Need.

Response: See response to comments 5-7, above. Also, recall that the role of the SFRMP team is to balance all stakeholder interests; the model results represent the team's effort to do that. However, it is particularly old aspen that has been identified as a Key Habitat for SGCNs associated with forests – most forest-related SGCNs are associated with older growth stages and/or interior forest conditions. Young aspen forest is not a conservation concern in Minnesota, even though it may be in other parts of the United States.

New model scenarios for aspen and black spruce were reviewed for their effects on a) increased volume in the current ten year planning period; b) lack of a significant decrease in volume in future planning periods (particularly the next several planning periods when the full force of the “aspen shortage” will be realized); and c) apparent impact on age class acreage levels.

Preferred scenarios showed little or no loss of volume in future decades, little negative impact on the ability to balance age classes over time (a plan goal for even-aged species), and produced an increase in current plan volume that appeared to be “real” (i.e., higher than the anticipated reduction of volume resulting from eventual field staff review for marketability).

Using these criteria, an alternative model scenario was developed for each subsection, with a resulting increase in volume of 4.4 percent.

13. Reductions in ruffed grouse populations will reduce hunting opportunity and economic benefits to local communities. The ruffed grouse is Minnesota's most popular game bird and generates \$50 – 100 million annually to the state's economy.

Response: The Department values and appreciates the importance of ruffed grouse and grouse hunting in the state. While individual species plans are not directly addressed within SFRMPs, the DNR Conservation Agenda provides the following target with respect to ruffed grouse:

“Provide an average annual harvest of 650,000 ruffed grouse. By promoting forest management practices that are ecologically sound and socially and economically beneficial to Minnesota citizens, DNR will provide abundant ruffed grouse habitat. DNR's SFRMP process will help ensure that early successional forest habitats used by ruffed grouse and other wildlife are adequately represented in appropriate landscapes (see Subsection Forest Resource Management Plans and DNR Timber Sales indicators).”

The Conservation Agenda can be found at <http://files.dnr.state.mn.us/aboutdnr/reports/conservationagenda/fisherieswildlife.pdf>

The North 4 SFRMP team believes the plan will contribute to the achievement of the long term grouse harvest goal for the following reasons:

- a. Early successional hardwood (e.g. aspen, balsam poplar, paper birch) treatment levels were set with the assistance of the Remsoft harvest-scheduling model using a goal to provide sustainable volume flow over time. This will lead to more consistent harvest levels in early successional hardwoods over time. Due to the current age class imbalance in early successional hardwood types, a suggestion of higher treatment levels in the short term would further exacerbate the age class imbalance and result in much less early successional habitat for grouse in future decades, potentially threatening the ability to achieve future grouse harvest goals.
 - b. The plan's short and long term goals will result in a younger average age of treatment in most early successional hardwood stands than has occurred in the past (see page 3.69 and Table 3.9d in the North 4 SFRMP), increasing the likelihood of successful high density regeneration favored by ruffed grouse for a portion of their habitat needs.
 - c. The plan's application of Maximum Rotation Ages helps insure that stands the State wishes to keep in early successional hardwood types can be successfully regenerated back to the desired type.
 - d. Plan goals to convert early successional hardwoods to other types do not imply wholesale conversion of individual species within the stand from one to another. As an example, see figure 3.1d on page 3.15 and figure 3.1e on page 3.16 in the plan, which show several typical scenarios where early successional hardwood are retained with a stand being converted to conifer. This retained early successional hardwood presence in converted stands will continue to provide habitat needs for ruffed grouse even as the cover type changes.
 - e. Even plan goals to manage stands as native plant communities will result in young forest and potentially a spatial mosaic of forest conditions more congruent with the range of natural variation under which ruffed grouse naturally occur.
14. *Use the concept of carbon sequestration to remove carbon dioxide...*It should be noted here that it is very clear in scientific literature that older forests store significantly more carbon than younger forests. Based on the plan, it appears that in upland forests, carbon storage potential will be limited by the short rotations and low areas of extended rotation forests.
15. In this plan 53 percent of the red pine type is planned for extended rotation forestry from 160 to 220 years old (page 4.46) . . . this is economically and professionally wrong. The ERF level must be reduced. Similar concern with jack pine stands (page 4.51). I recommend revision of the rotation age for red pine to 80 years.

Response: The North 4 SFRMP calls for increasing these species on the landscape – implementation of the plan’s goals will create increased opportunities for pine harvest in the long term. Red pine ERF levels are determined by a DNR process (see response to comment 34). It should also be noted that Native Plant Communities in which red pine is a good competitor are relatively rare in the North 4 subsections – especially rare are older growth stages of plant communities that include red pine.

Pine forests in the North 4 subsections over the age of 17 years were selected for examination. These stands will be entered at least every ten years and evaluated for thinning. In this way, they will produce a continuous stream of product until they are deemed ready for a final harvest. This management scheme will allow forest managers to achieve multiple SFRMP goals i.e., improving the health and productivity of pine stands, producing additional volume of timber from thinning entries, and producing a high quality final product in the form of saw logs.

In response to these comments, and under direction from DNR Division Directors, the Northeast Region Core Team undertook to identify a pool of red pine stands for final harvest during the current decade. The Core Team requested Forestry areas in the North 4 subsections to nominate an equal number of natural-origin and planted red pine stands they considered suitable for inclusion in a final harvest pool, for a total of approximately ten percent of each area’s red pine acreage. Of the 123 stands nominated, the **Core Team identified 33 stands (319 acres) to be assigned a field visit in May, 2010. These were offered at a special auction in May 2010.** The remaining stands needed further evaluation due to insufficient information, or potentially conflicting priorities, but the intent is to have a ten-year list of stands that amounts to between 3 and 5 percent of the red pine cover type available for final harvest. Due to the fact that the majority of the stands identified as appropriate by the field are natural-origin pine stands, the team would like to hold off on approving those for final harvest until they can be balanced with a number of planted stands proportional to the number of planted stands in the subsections. **Currently there are approximately 600 additional red pine acres in a pool for evaluation for final harvest; approximately equal numbers of natural and planted-origin acres are in the pool.**

Economic Concerns

16. The proposed plan does not consider the cost of the constraints placed on timber management. A net present value analysis shows that the proposed plan would return at NPV of \$35.1 million. A NPV of \$58.7 million is realized when the added constraints of the constraints were removed. A four percent discount rate was used for this analysis. Unrealized state revenues over the next ten years are estimated at \$29.2 million (2.9 million annually). The unrealized local and regional economic activity is estimated at approximately \$120 million, annually. In terms of jobs, we estimate 610 direct and indirect jobs will be unrealized, annually. The DNR must consider the added costs constraints are having on the timber program. The DNR should provide an economic analysis of the

proposed timber program and the cost the added constraints are having on state revenues and local and regional economies.

Using the 122,000-cord gain premise, MFI's present value (PV) and economic impact estimates are a reasonable representation of unrealized fiscal and economic impacts. MFI's PV estimates are the present value of unrealized gross timber revenues, not net, because the cost of selling timber was not subtracted. Of note, the MFI 305,000 cord alternative includes: (i) liquidation of all aspen, jack pine, and birch greater than age 70 and (ii) strict adherence to harvesting non-ERF stands at the stated "normal" rotation age. An estimated 40-50% of the difference between the MFI alternative and the DNR proposal would be a ONE-TIME GAIN, not repeatable in future planning cycles.

DNR Proposal: 183,000 cords offered per year

MFI Alternative: 305,000 cords offered per year

Difference = 122,000 cords per year or 1,220,000 cords for the 10-year planning period.

Reverse engineering the economic projections provided the following information:

MFI #s

1) Given: maximum unrealized state stumpage revenue = \$29.2 million or \$2.9 million annually, the average all-species all-products stumpage value ≈ \$24 per cord

2) Unrealized economic activity ≈ \$120 million annually or \$41 per \$1 stumpage

Minnesota DNR recognizes that value is also added to the forest resource by interests other than timber, e.g. ecotourism, recreation, hunting, emerging markets (carbon), and development of a third-party certified timber base.

17. More than 85 percent of the timberlands (615,000 acres) within the planning area are Permanent School Trust Lands. By State statute timber revenues collected through the management of these lands are to benefit the public schools of Minnesota. The DNR has a responsibility to maximize revenue from these lands while maintaining the integrity of forest resources. Assuming that 85 percent of the revenue will be generated by harvest on PSF lands we estimate that unrealized revenues to the PSF exceed \$2.5 million, annually. The DNR should manage PSF lands to generate revenue consistent with the Minnesota Forest Resources Council Voluntary Site-level Guidelines. Further, an assessment of added constraints must be performed that shows the impacts to PSF revenues and the rural schools of Minnesota.
18. The reduction in harvest from this region is also in direct violation of the DNR mandate to maximize return from school trust fund lands. Over the first decade the reductions will amount to \$30 million dollars. What analysis within the plan justifies this detriment?
19. Consider weighting the analysis to better incorporate economic criteria.

Response: The team set up the model used in planning to maximize volume outputs within the following predetermined constraints: rotation ages, extended rotation targets, and moving towards more balanced age classes. These constraints are used on all the timberlands covered in the planning area regardless of land status (Trust Fund, Acquired, etc). Removing or changing one or

more of these constraints could provide more volume for the forest products industry, generating more dollars for the Trust, only at the expense of other stakeholder interests, such as older forest habitats or maintaining a steady supply of resources. The team did however, attempt to place some ERF where it would provide multiple benefits (along streams and lakes, and clumped around designated old-growth forest), and where it would have the least volume impact e.g., by avoiding areas of very high site index aspen.

In developing a response to these concerns, the northeast region Core Team worked with the new DNR Forestry modeling specialist to evaluate a number of changes to the model constraints, in an effort to balance the expressed desire to find additional volume, while keeping impacts to future forest age classes within acceptable limits.

The Core Team was instructed to leave rotation ages and ERF ages and percentages unchanged. In its effort to identify additional timber volume, the model was run with various combinations of even flow, and age-class distribution constraints. Additional lowland black spruce acreage resulted from this exercise.

The North 4 team recognized that the planning area contains a high percentage of state land timber; that it contains a high percentage of state land aspen/balm of Gilead acres; that a number of industries rely on supply of timber from state land in the subsection; that a native plant community which is well suited to aspen (MHn44) is common within the subsections; that the subsections are heavily hunted for species which require multiple age classes of early successional forest (e.g. ruffed grouse, woodcock, deer); that hunting and income generated by activities related to hunting are important to the economy of the region; and that the Department's Strategic Agenda includes a goal of harvesting an average of 650,000 ruffed grouse annually.

These considerations influenced subsection goals for treatment of the aspen cover type (i.e., rotation ages, conversion out of the cover type); these goals are intended to reflect the importance and suitability of the aspen/BAM cover type to the economic and recreational needs of this region of the state.

Global Climate Change:

20. The NPC based approach is important for spatial patterns, but should also be included in the section describing species diversity.

Response: GDS 3-A on page 3.42 already includes the following language: "Use the NPC Field Guide, site index, soils data, and ECS Silvicultural Interpretations to aid in determining the *species composition and structure* most appropriate for the site [emphasis added]."

21. While invasive species are mentioned here, these are likely to be an increasing problem in this region. Greater attention could be given to planning for this threat.

Response: Division of Forestry personnel are required to adhere to Invasive Species Operations Order 113 Discipline Guidelines when undertaking forest management.

Issue G2 in the North 4 SFRMP addresses invasive species. The following general direction statements (GDSs) and strategies address this issue, however the North 4 team agrees that additional mention could be made in specific reference to climate change.

A new strategy (b) on structural diversity was added to GDS-7C, which addresses climate change. A monitoring goal (#40 – SFRMP Monitoring Plan) applies to invasive species – the priority of this goal will be reviewed in light of these comments. The Division of Forestry’s Invasive Species Guidelines

http://files.dnr.state.mn.us/assistance/backyard/treecare/forest_health/invasiveGuidelines.pdf also address this concern.

- a. GDS-1D (Patch Management) includes the following acknowledgement of the importance of this issue, “Mature and older growth stage large patches have benefits for some wildlife species (e.g., goshawk, red-shouldered hawks) and provide conditions that favor many native plant species over invasive and weedy plant species. “
- b. GDS-1E (Sites of biodiversity significance) also talks about the risk from road construction that permit entry of invasive species into previously unaffected sites, “Roads contribute to a decrease in interior forest conditions and an increase in terrestrial invasive species abundance. All efforts should be taken to minimize new road construction and enlarging existing roads/trails in MCBS sites.”
- c. GDS-3A (Species and structural diversity) advocates using the least intensive site preparation methods possible to ensure success with site preparation, because site preparation can create conditions favorable to invasive species and alter structural diversity in the ground layer. Striving to minimize site preparation intensity will minimize these threats.
- d. GDS-7A (limiting damage to forests from insects, disease, and exotic species) specifically mentions monitoring insect, disease, and harmful exotic species populations . . . and documenting their occurrence on state-managed lands. Adherence to Minnesota DNR Operational Order 113 (Invasive Species) to minimize the spread of invasive exotic species during forest management activities is also recommended in this GDS.
- e. GDS -7C (climate change) also mentions the importance of site-level management in reducing the likelihood if invasive species becoming established.

22. D. *Use the concept of carbon sequestration to remove carbon dioxide...*It should be noted here that it is very clear in scientific literature that older forests store significantly more carbon than younger forests. Based on the plan, it appears that in upland forests, carbon storage potential will be limited by the short rotations and low areas of extended rotation forests. Looking at the age distributions in the plan, it appears that future forests will store

less carbon than the current landscape. It should also be noted that dimensional lumber and other wood products used in construction can store carbon for significant time periods, while pulp and paper contribute little to carbon storage. Significant carbon is also lost back to the atmosphere through wood processing. It should be noted here that kinds of management and forest products produced do have an impact on carbon storage.

23. Approximately 60% of carbon in northern forests is in the forest floor and soil pools. I think it is important to mention to importance of below ground carbon pools and that literature indicates that these below ground and forest floor pools can be vulnerable to disturbances such as clear-cutting and severe fire. The significance of below ground carbon pools should included in this document.
24. Many useful forest management strategies are listed here that could enhance carbon storage.

Response: While older forests do store a greater amount of carbon than younger forests, we recognize that the rate at which young, rapidly growing forests sequester carbon is much faster, so our strategy of balancing age classes will accrue both kinds of carbon sequestration benefits.

25. DNR must base its decisions on solid field data and known science as well as economic and social considerations, when determining harvest timing and levels.

Response: The best available forest inventory and satellite imaging, wildlife population, and rare species data are used to develop the current forest management recommendations. The SFRMP team includes three foresters, two forest wildlife biologists, and a forest ecologist, and is supported by a forestry planner, a GIS specialist, and a modeling specialist.

Sustainability requires that timber harvest be balanced with the other forest benefits. The DNR does desire that Minnesota have a thriving forest-based industry while sustainably managing forests through a balanced approach that provides for a diversity of benefits (ecological, economic, and recreational) for current and future generations (DNR's *Strategic Conservation Agenda 2003–2007*). Based on the terminology used in the *Governor's Advisory Task Force on the Competitiveness of Minnesota's Primary Forest Products Industry (July 2003)* relating to the economic importance of the timber industry in Minnesota, Issue H.1 on page 2.11 of the North 4 SFRMP reads, "Establishing an appropriate timber harvest level will require the successful integration of economic, social, and ecological factors. Timber harvest provides forest products for society and jobs for those in forest-related industries. Demand for timber continues to grow in most parts of the state. Managing for sustainability requires that we balance timber harvest with other forest benefits. Sustainably managed 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."

26. It may be time to move to volume rather than area control. . . .Volume control would better incorporate intermediate treatments (like thinning) and conversions through protective harvesting (such as releasing advanced cedar or white pine).

Response: Some stakeholders would like to see Minnesota DNR manage for numbers of acres in certain age classes, habitat types, or forest condition classes, especially as they pertain to wildlife habitat. DNR could not easily respond to questions such as, “How many acres of young aspen do you have for ruffed grouse and deer”, if management was strictly based on volume control. It seems there is value in both acreage and volume but neither one alone gives us all the answers

27. What is the reason for including diverse subsections in one plan? If the plans are for combined units, why not revert to administrative boundaries, watersheds or timbersheds to make them easier to implement and monitor?

Response: Subsections are combined to facilitate the process of planning, by saving time and money. However, the ecological distinctions that make subsections different from one another are retained as data analysis takes place for each individual subsection. When recommendations are formulated, they are tailored for specific subsections if the data warrant i.e., show that there are reasons to do so. It has been Department policy to move toward planning based on biological-ecological units for some time. SFRMP is a vegetation management plan; subsections “are defined using glacial deposition processes, surface bedrock formations, local climate, topographic relief, and the distribution of plants, especially trees. DNR website: <http://www.dnr.state.mn.us/ecs/index.html>

When programmed into the model, the constraints that really affected the model were provided as individual subsection data going into the model. The packaging of the report was combined for ease of reporting, after the modeling results were in hand.

28. The plan could use some clarification and better organization.

Response: This commenter further explained that the Executive Summary was difficult to read because there were a number of new terms and acronyms that required going to the glossary. He asked that the Executive Summary in particular be simplified to make it more reader-friendly.

The DNR SFRMP process has evolved over time in response to the needs of the public as well as internal stakeholders. This will continue, as SFRMP teams work to make plans meet the needs of users by making them more user-friendly and continuing to make use of web-delivered material to improve accessibility, flexibility, and search-ability, and to reduce the cost of delivery.

The Executive Summary was revised in light of these comments. The SFRMP Process Work Group is revising the SFRMP plan template to increase its readability and accessibility to all users.

Harvest “timing restrictions” in pine stands:

29. It appears that this plan would be placing harvest restrictions from March to August. This is not the time of the year to cancel harvesting. It is in fact the time of the year when the soils in this area can tolerate harvesting of timber. Restraints during this time frame would certainly show economic hardships.
30. The avoidance of pine slash and cut products from March to August go beyond sensibility . . . Please remove this excessive policy limitation from the plan.

Response: Seasonal harvest restrictions are implemented at the site level, and are done with consideration of the soils, ecology, access, and health of individual stands. The DNR Forest Health Unit provided some management recommendations for specific forest types that are being affected by disease organisms in the North 4 subsections. This is not a broad recommendation or a mandate; ultimately site-level prescriptions are the purview of the field forester responsible for administration of a particular site, with input from other divisions. Standard appraisal language does provide some restrictions on how slash is treated if a summer pine thinning takes place.

Mixed forests

31. Given these are public lands, I suggest a large portion use extended rotations and two-age forest management towards an end result of more mixed deciduous-coniferous forests. Spruce fir is a natural forest type in some of this area and there should be management to work with it. Any reforestation should be with mixed species appropriate for the site. White pine should be restored in mixed forests. Many stands can be diversified by planting small clumps. Upland cedar, northern hardwood and old red and white pine forests should be maintained.

Response: The process by which extended rotation forest (ERF) is applied, is described in GDS-1A. An interdisciplinary statewide working group (including representatives from the Divisions of Forestry, Fish and Wildlife, and Ecological Resources) determines the acreage to be given ERF status, and provides direction regarding harvest ages for ERF stands. The SFRMP team is then charged with implementing that direction. This direction considers a variety of factors, including historical age class distribution by cover type, fish and wildlife concerns, timber productivity, and economic concerns.

Final decisions on where to retain or increase mixed forest conditions are left to field staff following field evaluation of stands planned for treatment. Placing that field evaluation within the scope of the SFRMP process and other forest management direction such as third-party forest management certification, is a result of both SFRMP and Department direction, as is direction encouraging the development of more mixed forests.

The planning team recognized the significant acreage of mesic hardwood plant communities in the planning area and the potential for managing them for mixed forest conditions. Desires to move towards maintenance and increasing mixed deciduous-conifer stands are found in a number of strategies within the plan. For specific examples, see GDS- 1A strategies d and e, and GDS -1C, strategy b. The plan also proposes movement toward mixed deciduous-conifer stands during conversion activities. As an example, see figure 3.1d on page 3.15 and figure 3.1e on page 3.16 in the plan, showing several typical scenarios where hardwood presence is retained within a stand being converted to conifer.

The Department has made a commitment to apply Minnesota Forest Resources Council (FRC) voluntary site-level guidelines as a *minimum* standard on all timber sales, including the guideline for conifer retention and regeneration.

Both Department guidance and the SFRMPs direct resource managers to collect and incorporate knowledge of native plant communities (NPCs) into forest management actions. This strategy generally encourages forests of mixed deciduous-coniferous composition on appropriate locations. Finally, consideration and application of DNR ECS silvicultural interpretations (see http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html) generally encourages forests of mixed deciduous-coniferous composition on appropriate locations.

32. Please see the following attached publication for further suggestions: *Multi-species planting and other practices to restore forest diversity in northeastern Minnesota* by R. Vora, S. Lerol, and N. Danz. *Ecological Restoration* 26(4):340-349.
33. Cedar should be protected from deer by not creating deer habitat adjacent or within it.

Response: Management direction for the cedar cover type can be found starting on page 4.76 of the plan. Very limited treatment levels for cedar are proposed within the plan. The Remsoft harvest scheduling model was programmed to exclude cedar stands. Cedar planned for limited treatment within the plan is located in lowland areas within the LittleFork area, where deer damage to cedar regeneration has not been a significant barrier to regeneration success.

When stands within areas where deer damage might be expected are proposed for management on DNR lands, protection strategies can be applied to better facilitate cedar regeneration success.

Connectivity

34. Habitat fragmentation should be minimized.
35. *Maintain connectivity that permits the migration of plants and animals...*These patch management methods look like promising strategies. It would be very helpful to see some of the output from REMSOFT to see how connectivity might be enhanced using these strategies.

Response: There is broad consensus among scientists that managed forest landscapes are more fragmented and contain fewer large patches currently, than landscapes where spatial patterns are determined primarily by natural disturbance and physical factors. It is estimated that the average overall patch size has declined nearly 50 percent since the 1930s in northeastern and north-central Minnesota (Northern Superior Uplands and Drift and Lakes Plains sections). Stand selection and treatment as part of the SRFMP process can significantly reduce forest habitat fragmentation and maintain and promote larger patches over time. The best available information on natural spatial patterns in these subsections was used as a guide to understanding the distribution of patch sizes, cover-type groupings, and age classes for patch management on state lands. GDS-1D of the North 4 SFRMP states:

“Patch management in these subsections maintains existing large patches and increases the average patch size on state lands over time, with consideration of natural spatial patterns.”

The North 4 SFRMP team invested considerable resources in the development of its patch management plan, with a focus on large current and future patches, and the management of designated patches to increase components of older forest growth stages. Fifty-three designated patches were identified in this plan; current forest inventory indicates there are 4 class one patches in the North 4 now. Implementation of this plan will result in 11 such patches at the end of the planning period. The North 4 SFRMP team also programmed its harvest-scheduling model to select ERF along rivers and stream (riparian areas), which has the effect of maintaining more contiguous forest cover along these travel lanes, due to less frequent entries for management. The model was also programmed to select whole stands, and blocks of several stands, as a way of minimizing further fragmentation.

Although this plan considered management activities on other ownerships, patch management primarily focuses on identifying opportunities that exist on state land.

36. Generally, do not increase opportunities for motorized access. Construction of new roads should be minimized and new roads should be blocked and made unusable as soon as logging is completed. Look at opportunities to decrease road densities.

Response: GDS-10 and related strategies on page 3.80 state, “ Forest access routes are well planned and there is a high level of collaboration with federal, private, and local units of government to share access and minimize new construction”. A comprehensive transportation plan is beyond the scope of the SFRMP (see previous plan comments), however strategies listed under GDS-10 include five that are related to other General Direction Statements; these apply to forest roads throughout their planning, development, and disposition phases.

It should also be noted that Minnesota DNR maintains a separate planning process for Off Highway Vehicle (OHV) trail designation and use.

Structural Diversity

37. Create structural diversity in red pine plantations by thinning to varied densities, including some wide spacing and leaving un-thinned islands. Retain reserve islands in all clear cuts where opening widths exceed 600 feet.
38. As noted in this document, the Native Plant Community classification and associated silvicultural information can be used to increase compositional and structural diversity. However, given the desired regulated age distribution with much of the upland forest less than 45 years in age, it's difficult to see how applying this ecological information will have a significant impact unless more patches are allowed to progress beyond commercial rotation ages.

Response: DNR resource managers are using NPC silvics in young age-classes to guide species diversity, abundance, planting densities, and to identify appropriate places to convert to other forest types (and to which type). Furthermore, the North 4 SFRMP team has broadened the definition of what is counted as a conversion to include efforts that move a stand toward a relative increase in a species; actual conversion to a different cover type may take more than one rotation period to become a reality. There will be direction to move stands toward greater agreement with NPC diversity over time. In aspen that has not been identified for conversion, the North 4 team has provided direction that encourages leaving components of older growth stages (reserves, coarse woody debris, etc.) in aspen stands.

Red pine management strategies listed in the North 4 SFRMP that are intended to enhance structural diversity include:

- a. Variable density thinning and/or variable retention thinning or other techniques as appropriate to meet stand objectives. Thinning will maintain (especially in natural-origin stands) or increase within-stand diversity, while retaining NP as the main cover type by the following methods:
 - i. Reserve from harvest individual trees or patches of other species appropriate to the site, where possible.
 - ii. Consider creating or maintaining variable densities within stands when thinning.
 - iii. Protect advance regeneration of desirable understory species, where possible.
 - iv. Higher stand densities (basal area) are recommended along stand edges exposed to wind and along high visual quality corridors, such as major roads and lakes.
 - v. Consider under-planting tolerant species, where seed sources or advance regeneration for these are lacking. For species suggestions, refer to the *NPC Field Guide* and associated Silvicultural Interpretations.

39. While there is a lot of information here on forest patch size distribution, the tables presented here are very difficult to interpret (*Patch Management (GDS-1D)*). As a reviewer, I want to understand how the proposed plan would affect patch size variability across the

four subsections. Does the average patch size and standard deviation increase across the four subsections? Does the distribution shift from smaller to larger patches? It is very difficult to determine the outcome here. Graphs showing current and future patch size distributions along with estimates of variability would be a big help. The following publication has estimates of pre-European patch size distribution for three of the four subsections.

White, M.A., and Host, G.E. 2008. Disturbance frequency and patch structure from pre-European settlement to present in the Mixed Forest Province of Minnesota, USA. *Canadian Journal of Forest Research* 38: 2212–2226

Response: The North 4 SFRMP only addresses vegetation management on State-administered land, therefore conclusions cannot be drawn on a landscape basis. An analysis of the “public” land base might provide a more realistic picture, but is beyond the scope of this process. Some of the designated patches in the North 4 SFRMP were selected with adjacency to large patches of land in other public ownerships in mind i.e., opportunities for future collaboration. This work has the potential to lead to increasing numbers of larger patches in some cases.

The short answer to this question is that mean patch size will increase across the North 4 subsections following plan direction to create a number of large patches where none currently exist. The Remsoft harvest-scheduling model was programmed to select stands for the 10 year examination list in blocks of several stands when possible. This will have the effect of maintaining or increasing patch size over time.

Future SFRMPs will have a simplified patch management narrative, and the majority of tables will be moved to the Appendices to enhance readability.

40. *Forest management on state lands attempts to mitigate global climate change effects on forest lands (GDS-7C)*

- *a. Maintaining or increasing species diversity* is listed as key strategy. However, the significance of structural diversity is not discussed as a strategy. We believe that increasing structural diversity goes hand in hand with compositional diversity as an adaptation strategy to maintain diverse, functioning forests. Please consider including structural diversity/complexity in this section.

41. It appears that achieving significant changes in composition and structural diversity would require a greater shift to uneven age management than is indicated in this plan.

42. Place a greater emphasis on alternative silvicultural methods rather than clearcuts and short rotations in aspen.

Response: As time passes, plans are showing more emphasis on uneven-age management, but that change will happen over time, and must be balanced with timber interests, who prefer shorter rotations and even-age management. Aspen is a highly successful species in a number of native

plant communities, and there is no plan to eliminate that important resource. However, see response to comments 14-15, above, which addresses retention of components of older growth stages in prime aspen production areas.

Work in designated patches in the North 4 subsections can be seen as an effort to balance timber interests and retention of a mixed residual forest – the economic benefits of that strategy have yet to be determined.

A strategy addressing structural diversity has been added to GDS-7C (page 3.65)

Rare Species Habitat

43. Habitat should be maintained for goshawk (survey) and other rare species. Existing nesting sites should be protected, including adequate foraging habitat.

Response: A GIS shapefile for goshawk nesting areas that was considered in locating ERF, EILC, and large patches. Statewide goshawk considerations are relevant to forest management and will continue to be considered during forest management activities. DNR Ecological Resources Division not only has an opportunity every year to review annual stand exam lists for relationship to critical goshawk habitat areas, but also reviews any added, unplanned stands for possible unintended effects on such areas. The SFRMP has a two-pronged approach – both protecting existing breeding territories and creating new habitat through large patches located in goshawk landscapes.

44. Where the county biological survey has not been completed, please check with Minnesota DNR County Biological Survey for their inventory of high quality ecological sites. Maintain all old growth.

Response: DNR Ecological Resources Division reviews all stands on annual stand exam lists as well as any unplanned stands proposed for treatment. High priorities for review are MCBS Sites of High and Outstanding Biodiversity Significance and Natural Heritage data that include records for high quality native plant communities. To the degree staffing allows, Ecological Resources personnel typically field visit stands within MCBS sites together with DNR foresters and wildlife biologists to work out a management approach to sustain or enhance the values that contribute to its biodiversity significance. High and outstanding biodiversity sites were used to designate EILC stands (see page 7.12 of the North 4 SFRMP). Designation of high conservation value forests (not a part of this plan) will also make use of these data and raise the bar on our approach by requiring us to “maintain or enhance” the values that make these areas HCVF.

All designated old-growth stands are protected, and the Department has a process for nominating additional stands as they are discovered in the course of field work. In addition, designated old-growth stands have an Old Forest Management Complex plan developed that includes management

strategies for stands that surround the designated old-growth, as a way of protecting their old-growth forest properties.

45. Reductions in golden-winged warbler populations will further threaten the continued viability of this already seriously imperiled species – the forests of northern Minnesota support 42% of the global population of this species.
46. In February 2007, the American Bird Conservancy identified “Early Successional Deciduous Forests in the Eastern United States” as one of our nation’s 20 most imperiled bird habitats. Minnesota plays a key role in sustaining these habitats. The projected loss of these habitats as outlined in the North 4 SFRMP will only exacerbate nationwide efforts to stem the population declines of those species dependent upon these habitats.

Response: Resource managers share the concern for golden-winged warblers and their habitat. The North 4 SFRMP team believes that stability over time of golden winged warbler (GWW) populations --as well as other species which require early-successional hardwood habitat --will be enhanced by actions recommended in this plan. Little or no management in golden-winged warbler lowland shrub habitat is prescribed in this plan.

The application of the Remsoft harvest-scheduling model results to treatment levels within the plan—designed to optimize volume flow over time—has also helped plan for a sustainable supply of early-successional habitat over time.

47. If you consider the new demand for woody biomass that will inevitably take place with Governor Pawlenty’s mandate of 25 percent renewable energy by 2025 . . . while leftover slash and tops can fill some of that future demand, that material will not be able to produce the quality of woody biomass fuels that will be needed for energy production. Those quality fuels can only come from clean round wood sources. Proposed harvest rates for the future should be increased, not decreased.
48. There should be an allowable cut for white cedar on state land. This would reduce the current pressure on county land. There is a net growing stock of 12,080,000 cords (2005 figures from the U of MN information Cooperative), 57 percent of this is on state-administered land and the mills that use it are in the North 4.

Response: DNR is currently using 14 percent of merchantable roundwood volume as an estimate of available tops and limbs. Under the scenario proposed in the draft North 4 plan, $183,000 \text{ cords} * 0.14 = 25,500 \text{ cord equivalents}$ would be made available annually, or 255,000 cord equivalents of tops and limbs over the 10-year planning period. Note that an additional 6-10 percent live cull and dead $\geq 5"$ DBH wood is also available, at least 11,000 cords annually or 110,000 cord equivalents over the 10-year planning period. Total cord equivalents of biomass material not merchantable for other products is at least 36,500 cord equivalents annually or 365,000 cord equivalents for the planning period. In FY09, approximately 25,000 cord equivalents of tops and limbs were harvested from state lands. [Prepared by Don Deckard, Forest Economist, Oct 16, 2009]

The North 4 SFRMP management direction for the white cedar cover type (starting on page 4.75) stresses cedar's value for wildlife habitat and biodiversity. Difficulties in successfully regenerating upland cedar, coupled with a desire to retain acres within the cover type suggested that the responsible course of action is to limit harvest levels. A limited harvest of predominantly lowland white cedar within the Littlefork area – designed to continue past harvest levels of cedar within that area – was approved based on experience with more success in cedar regeneration within lowland stands in that area. DNR Divisions will continue to work in a coordinated manner to practice a limited cedar harvest and investigate ways to improve cedar regeneration methods.

49. Practicing ERF in short-lived pioneer species like jack pine has led to its demise.

Response: Extended rotation forests are intended to provide a suite of “old forest” characteristics on the landscape in the context of a productive, working forest. This is in contrast to old-growth forests, SNAs, and other reserved forest land areas where harvest is not an explicit part of the management plan. Because some kind of harvest will be conducted in ERF areas at some time, a forest with this designation can be any age at a given time; the final harvest merely being delayed to provide more old forest “services” to the landscape. Early successional species such as aspen, jack pine, and birch are critically important for designation as ERF because they are typically managed through even-age harvests, and the typical rotation ages are short (40-60 years). With continuous improvement in data collection and increasing understanding of ecological systems, DNR personnel anticipate being able to refine the designation of ERF areas in future planning periods.

ERF and SFRMP policy provide protection against unintentional loss of a cover type due to age-related mortality in these ways:

- a. By ERF policy, stands chose for ERF designation are to be those that can withstand the extra time before final harvest and still be successfully regenerated back to type;
- b. The plan has protections that guard against holding stands past an age at which they can be successfully regenerated, when the intention is to retain the same cover type.

Prescribed Fire:

50. Your mention of the use of fire in mature pine stands is of concern and I recommend we minimize its use.

Response: Fire is an important factor in the retention of fire-dependent forest communities on the landscape. Careful use of prescribed fire use can aid pine regeneration success through reduction in duff layer depth, elimination of heavy shrub competition, preparation of mineral-soil seedbed, and (in the case of jack pine) can help open cones to facilitate natural seeding. The Department is sensitive to concerns that prescribed fire in mature pine stands may lead to damage to timber quality. This issue is considered during development of prescriptions for planned burns, and in some cases actions may be taken to lighten fuel loads around mature trees to minimize the intensity

of fire burning near pine trees. Due to variations in fuel density across burn sites, some scarring may still occur; this contributes to within-stand diversity and structural diversity, which are important elements of biological diversity associated with fire-dependent native plant communities. The DNR will continue to monitor the concern and adjust prescriptions and/or fuel reduction efforts as necessary.

Language regarding the use of prescribed fire has been added to the white pine management recommendations (page 4.40) so that the management recommendations for both of these fire-dependent cover types are consistent.