2. SFRMP Issues

How SFRMP Issues Were Identified

SFRMP teams used assessment information[1], DNR policies and guidelines, local knowledge, existing plans, and public input to identify the final issues relevant to the scope of this plan. The subsection team began with a common set of issues developed from previous SFRMPs. These common SFRMP issues were refined and supplemented based on subsection-specific conditions and considerations and public comments.

Issue Definition

A SFRMP issue is a natural resource-related concern or conflict that is directly affected by, or directly affects, decisions about the management of vegetation on lands administered by the Minnesota DNR divisions of Forestry, Fish and Wildlife, and Trails and Waterways. Relevant issues were defined by current, anticipated, or desired forest vegetation conditions and trends, threats to forest vegetation, and vegetation management opportunities. The key factor in determining the importance of issues for a SFRMP is whether the issue can be addressed in whole or substantial part by vegetation management decisions on DNR-administered lands.

Issues that *cannot be addressed* in whole or substantial part by vegetation management decisions on DNR-administered lands *are outside the scope of the SFRMP process*. For example, a SFRMP will not address recreation trails system issues or planning. However, aesthetic concerns along existing recreational trail corridors can be a consideration in determining forest stand management direction in these areas. Another example is wildlife populations, the plan establishes wildlife habitat goals (e.g., amount of various cover types and age-class distribution) but not goals for wildlife population levels.

Issues

Issue topics A through I were identified as "Preliminary Issues" in the first steps of the SFRMP process. Some revisions have been made to the preliminary issues and issues A3, J1, and K1 (See pages 2.2, 2.12) were added after the public review period that was completed in December 2002.

A. Desired age-class distribution
B. Forest composition, structure, spatial arrangement, growth stages, and plant community descriptions
C. Access to state land
D. Biological diversity and wildlife habitat
E. Riparian and aquatic areas
F. Harvest level
G. Timber productivity
H. Forest health
I. Visual quality

[1] Minn. DNR, November 2002, *Preliminary Issues and Assessment*, Subsection Forest Resource Management Plan.

J. Cultural resources (NEW issue)
K. Rare features (NEW issue)

A. Desired Age-Class Distribution

A1. What are the desired age-class and growth-stage distribution of forest types across the landscape?

Adequate representation of all age classes and growth stages provides a supply of wildlife habitats, timber products, and ecological values over time. A forest with a variety of stand ages and growth stages provides habitat suitable for more species and has greater potential to provide a sustainable yield of timber. A diverse forest is healthier and more resilient to widespread insect and disease outbreaks than a less diverse forest.

There are many likely consequences of managing a non-diverse forest (without adequate representation of all age classes and growth stages). A forest with too few age classes and growth stages risks epidemic insect and disease outbreaks, loss of species with age-specific habitat requirements, and the loss of forest-wide diversity. Such a forest would also provide a boom-and-bust scenario for forest industries that depend on an even supply of particular forest products over time.

A2. What is the appropriate amount, kind, and location of old forest?

Old forest, in the context of this issue, is defined as stands that exceed their normal rotation age. The distribution of old forest represents age classes and growth stages of forest beyond the normal rotation age of each cover type. Old forest provides necessary habitats for some animal and plant species and communities, and diversity. Old forest can also reduce timber quantity and quality for some types of forest products over time by holding timber longer between harvests. Therefore, a balance is needed that considers necessary habitats, forest diversity, and timber productivity levels.

The likely consequences of managing a forest *without* age classes beyond the normal rotation age are 1) the loss of species with old forest-specific habitat requirements, 2) loss of diversity, and 3) the loss of potential for some large-diameter forest products (sawtimber, cabin logs, etc). The likely consequences of managing a forest *with* an overabundance of age classes beyond the normal rotation age are 1) reduction in populations of species that use younger forest habitats, 2) decreased timber productivity, and 3) decreased timber quality and quantity due to decay, disease, windthrow, and mortality.

A3. What is the appropriate amount, kind, and location of young, early successional forest? *(Added after first public review step.)*

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 issue.

Young, early successional forest is an issue because it provides important habitat for several plant and animal species that must be represented on the landscape to maintain overall biodiversity. These associated plant, game, and nongame species are important to those who use state forestlands. Some species depend on dense young forests to provide cover from predation and an ample supply of available foods. In addition, the patch size and spatial distribution of this young forest on the landscape is an important element of habitat quality.

Currently, significant acres of young age classes exist in the aspen and jack pine cover types. There are very few acres of paper birch cover type (approximately 140 acres, or 0.4 percent) in the 0-30 age group.

If an appropriate amount of early successional forest does not occur in the landscape, the likely consequences of *not* addressing this issue are 1) reduced populations of important game species, particularly ruffed grouse, deer, moose, and American woodcock, 2) reduced recreational hunting opportunities associated with these game species, 3) reductions in some associated songbird populations, 4) loss of social, economic, and ecological value of these species, and 5) loss of traditional use of the natural resources associated with these young forests (e.g., berry picking).

B. Forest Composition, Structure, Spatial Arrangement, Growth Stages, and Plant Community Distributions

B1. What is the appropriate forest composition, structure, representation of growth stages, within-stand diversity, spatial arrangement of vegetative types, and native plant community distributions necessary to maintain sustainability goals for biodiversity, forest health, and productivity across the three subsections? How do we get there?

The three subsections have experienced changes that represent a movement away from ecological diversity. Since European settlement, forest composition and structure have been simplified. White pine, white spruce, yellow birch, tamarack, and upland white cedar have declined while aspen and balsam fir have increased markedly. Many forest stands today are not as diverse as they were historically. The age structure of the forest has been truncated (cut short) compared to historical conditions. Currently more of the forest is in younger age classes and less in older age classes. Harvesting and other factors have reduced forest patch size. The forest is becoming increasingly fragmented by construction of roads, trails, and residential development. Ongoing sales of large tracts of land by private corporations will undoubtedly exacerbate forest change. Habitat connectivity has suffered as a result of all of these changes.

The likely consequences of *not* addressing this issue are 1) loss of wildlife habitat, 2) loss or reduction of species associated with declining habitats, 3) increase in exotic and undesirable species, 4) increase in populations of desirable species to the point where they reach undesirable levels, 5) dominance of a few species (i.e., loss of biodiversity), 6) loss of ecologically intact landscapes, and 6) loss of ability to produce a diversity of forest products (e.g., sawtimber, aesthetics, nontimber forest products, recreation, and tourism).

B2. How will we ensure restoration of important component tree species that have declined within forest communities in these subsections?

Declines in many important species have occurred in these subsections. For example, white pine, yellow birch, white cedar, and white spruce have declined in mesic (moderately moist) hardwood forests. Mesic mixed forests have experienced declines in white pine, white spruce, white cedar, white birch, and tamarack. These declines have resulted from historic harvests that were not sustainable, insect infestations, disease, drought, and herbivory (plant communities resulting from the browsing and grazing of wildlife). As a result, many forest stands have lost the composition, structure, and function of native plant communities. This results in a loss of regenerative capacity for these tree species, and also the composition and structure necessary to sustain associated species. Many of these tree species are difficult to regenerate due to herbivory, lack of long-lived trees and large downed trees (for nurse logs and to create micro-sites for seed germination and plant and wildlife habitat), spruce bark beetle, white pine blister rust, a lack of seed trees, and management in forest communities that doesn't retain these species and the structure needed to regenerate them.

The likely consequences of *not* addressing this issue are 1) loss of native tree species diversity within forest communities, 2) simplified forest stands and landscapes, 3) loss of native plant community composition, structure, and function, 4) loss of associated wildlife to the ecosystem, and 5) loss of the social, economic, and ecological values of these species and the forest communities that sustain them.

B3. How will we maintain forest communities of particular concern in these subsections?

Certain native plant communities are outstanding for their uniqueness, known association with rare species, limited occurrence in these subsections, and representing native plant community diversity of pre-European settlement. Examples of these types of forest communities in the North Shore Highlands Subsection are rich northern hardwoods, pines, upland white cedar, red oak, deciduous swamp, upland spruce-fir, coastal wetlands, fens, and conifer types within one-half mile of Lake Superior. In the Laurentian Uplands and Toimi Uplands subsections examples are fens, wet forests (ash, cedar, tamarack, and rich spruce swamps), conifer peatland complexes, white cedar-yellow birch, mesic white spruce-paper birch, and mesic mixed conifer types (red and white pine, upland tamarack, upland black spruce) and jack, white, and red pine woodlands. There is a concern for maintaining the composition, structure, and function of high-quality examples of these native plant communities.

The likely consequences of *not* addressing this issue are 1) loss of examples of high-quality intact native plant communities used as controls to compare and monitor the effects of management on biodiversity, 2) continued forest stand and landscape simplification, and 3) loss of habitat for rare species.

B4. How can intensive management of forest communities be adapted to retain some of the characteristics of natural stand-replacement disturbance events?

Intensive management of forest communities often results in forest simplification and fragmentation of native plant communities at the stand and landscape scale. Even in fire-dependent systems, where the intensity of a natural disturbance (e.g., wind and fire) is often a "stand-replacing" event, a forest mosaic results with undisturbed islands of vegetation. These areas are considered refugia (areas where plants and animals persist through a wind and/or fire event).

Plantations often include ground-disturbing activities such as rock-raking and herbicide application that can further reduce plant species and structural diversity in the forest community. It may result in disruption of the soil profile, soil compaction, loss of native herbaceous species diversity, reduced structural complexity, and an increase in exotic plants such a smooth brome grass and aggressive native plants such as bracken fern, Canada blue-joint grass, reed canary grass, and raspberry.

The likely consequences of not addressing this issue are increasing 1) simplification of forest stand and landscape communities, 2) fragmentation of high-quality native plant communities, and 3) loss and fragmentation of habitat for associated wildlife species.

B5. How can management on state lands, especially large patch management, better reflect natural landscape patterns (the size and configuration of growth stages and types resulting from broad-scale natural disturbances) in these subsections?

Existing landscape patterns do *not* reflect natural disturbance patterns and the composition, structure, and function of native plant community complexes that have developed historically over long periods of time. This has resulted in problems with 1) fragmentation and simplification of forest ecosystems at the landscape scale, 2) lowered availability of habitat complexes and associations, and 3) reduced habitat for native animals and plants.

The likely consequences of *not* addressing this issue are 1) increasing isolation of wildlife and plant populations, 2) species loss or decline, 3) reduced resilience of forest ecosystems to disturbance events, and 4) increases of certain populations to undesirable levels resulting in negative impacts to forest communities.

B6. How do we limit forest fragmentation and maintain connectivity between habitats?

In the three subsections, harvesting and other factors such as road and trail construction and residential development have reduced forest patch size, composition, structure, and age. These changes represent a movement away from biodiversity and a forest able to produce a range of forest products. Ongoing sales of large tracts of land by private corporations will undoubtedly exacerbate forest change. Habitat connectivity has suffered. Forest fragmentation results in a loss of habitat and loss or reduction in the population of species associated with those habitats. Loss of connectivity will result in the loss of ecologically intact landscapes.

The likely consequence of *not* addressing this issue is a reduction in forest patch size and connectivity between habitats.

C. Access to State Land

C1. How can we plan for providing access to the stands identified for management during the 10-year plan period while protecting and minimizing the negative impacts that timber access development or use may have on other forest resources?

Access routes are necessary to effectively manage forest stands identified for management during the 10-year planning period. These access routes will have both positive and negative attributes. They provide access for forest management activities, insect and disease control, fire response, and recreation. However, the development, construction, and maintenance of forest access routes may result in high costs, land disturbance, loss of acres from the timber land base, increase in the spread of exotic species and undesirable native plants and animals, conflicts with adjacent private landowners, potential for user-developed trails, degradation of water quality, destruction of fish habitat, forest fragmentation, and road densities greater than needed.

The likely consequences of *not* addressing this issue is that not having a well thought-out forest access plan will likely not minimize the negative attributes.

D. Biological Diversity and Wildlife Habitat

D1. How can management of stands within larger areas of biodiversity significance be adapted to enhance biodiversity and native plant community composition, structure, and function?

Larger areas with biodiversity significance provide reference areas to improve our understanding of these ecosystems and help us evaluate the effects of management on biodiversity. These areas present opportunities for large patch management of older forest communities and the restoration of forest communities and ecosystems. These areas have great potential for addressing biodiversity-related goals of the Minnesota Department of Natural Resources and other landowners.

The likely consequences of *not* addressing this issue are 1) degradation of existing biodiversity and ecosystem function and 2) loss of opportunities for maintaining or restoring patch relationships that are ecologically based (e.g., based on natural disturbance processes, wildlife habitat connectivity, and wildlife-habitat associations).

D2. How do we plan to retain and restore within-stand structural complexity (e.g., vertical structure, stem size and density, coarse woody debris, and pit and mound micro-topography) on actively managed lands where natural succession pathways are truncated (cut short)?

Forests are dynamic ecosystems. Management has altered the rate and direction of natural change. Current practices tend to reduce within-stand structural complexity and diversity of

vegetation, both directly and indirectly (through substrate modification). The concern is that structure is impacted directly by management where the objective is usually maintenance of a simplified structure and by silvicultural practices where existing woody debris and finer organics are removed and micro-topographic features are reduced or eliminated.

The likely consequences of *not* addressing this issue are 1) loss of composition and vertical structure necessary to sustain native plant and animal species, 2) loss of regeneration sites for some species, 3) loss of native tree species diversity within forest communities, 4) simplified forest stands and landscapes, 5) loss of native plant community composition, structure, and function, and 6) loss of associated wildlife.

D3. How do we manage forest vegetation to balance the habitat needs of game and nongame species?

Forest wildlife is important to society. A wide range of factors, from timber harvest to development, has an effect on wildlife species and populations. Interest groups advocating for wildlife are many and varied. Some are interested in the full range of species while others are species specific. Interests include the preservation of biodiversity and management of individual species for hunting opportunities or for wildlife viewing. At times, the goals of these groups may conflict. Forest wildlife depends on healthy forest ecosystems. Legal mandates, the expectations of stakeholders, and Minnesota Department of Natural Resources internal policies require the ecological integrity of the forest to be maintained and enhanced. Practical reasons to maintain ecological integrity include 1) the economic vitality of forest and tourism industries, 2) the maintenance of recreation opportunities for the public, 3) the health of wildlife species and populations, 4) public health, and 5) the control of forest insects and disease. Forest change affects forest wildlife. Some species' populations have increased in the three subsections and decreased in others. At least one species (e.g., woodland caribou) has been extirpated (i.e., no longer found in this portion of its historical range). Several species listed by the state as either threatened or of special concern live in these areas. Loss of important vegetative habitat types is a reason for concern for a number of other species.

The likely consequences of *not* addressing this issue are 1) loss of wildlife habitat, 2) loss or reduction of species associated with declining habitats, 3) economic losses resulting from a decline in recreational activity associated with wildlife viewing and hunting, and 4) social losses because of a decline in enjoyment associated with wildlife viewing, hunting, and aesthetics.

E. Riparian and Aquatic Areas

E1. How can we address the impacts of forest management on permanent wetlands, wetland inclusions, and seasonal ponds?

Site-level considerations and guidelines that are routinely applied without considering site-specific conditions may not be adequate to protect aquatic resources such as permanent wetlands, wetland inclusions, and seasonal ponds.

Relying strictly on existing guidelines without considering specific conditions associated with

the site such as soils, topography, hydrology, past management, existing vegetation, and desired vegetation may negatively impact these ecosystems. These impacts include loss or degradation of these communities and loss of associated wildlife. There is also a concern for impacts to permanent wetlands from management activities in adjacent upland stands, such as skid trails along the wetland-upland boundary.

E2. What vegetative management activities will be allowed to take place within the riparian management zone (RMZ) and how will the appropriate width of the RMZ be determined to minimize the impacts of forest management activities on water quality, fisheries, and wildlife habitat?

Forest management activities carried out within the RMZ can affect the functions associated with riparian areas. RMZs are areas of special concern along streams, lakes, and open water wetlands and are among the most important and diverse parts of the forest ecosystem. They are intended to retain a relatively continuous forest cover for the protection and maintenance of aquatic and wildlife habitat, aesthetics, recreation, and forest products.

Historically, North Shore streams maintained cold-water temperatures, but over the last 100 years the vegetation has changed dramatically due not only to turn-of-the-century logging and subsequent fires, and more recently to changes in land use such as commercial and residential development near lakes and streams. Stream temperatures have increased, becoming marginal for trout in a number of streams.

These three subsections include many lakes, rivers, and trout and non-trout streams. Failure to protect riparian zone functions may cause negative impacts to the water quality, fisheries, and wildlife habitat within the North Shore subsections.

E3. How can we address cumulative impacts to aquatic resources of forest management on a watershed/sub-watershed level?

Forest management activities may greatly affect the hydrology within any specific watershed or sub-watershed because the amount and type of vegetative cover greatly influences the rate of hydrologic change. Failure to consider the cumulative impacts to aquatic resources could result in increased run-off and stream bank erosion, more conspicuous run-off events, less stable flows, and reduction or destruction of habitat for aquatic organisms.

Issue is beyond the scope of this plan: Developing a process to evaluate cumulative effects of timber harvest within a watershed is beyond the scope of the SFRMP process. To evaluate cumulative impacts, forest management on all ownerships needs to be evaluated. At this time, a DNR process has not been developed to evaluate the cumulative effects at a watershed scale. The feasibility, methodology, and coordination of assessing cumulative effects across all ownership have not been evaluated. If and when a procedure is developed to evaluate cumulative effects on the hydrology, fisheries, and water quality within a watershed or sub-watershed in Minnesota, information regarding forest resource management activities on state lands will be provided. DNR area fisheries staff will review the SFRMP 10-year treatment plan and annual harvest plans.

F. Harvest Level

F1. What is the appropriate timber harvest level on state lands with consideration for the sustainability of all forest resources?

One of the primary outcomes of this plan is to develop a timber harvest plan for state forestlands in the subsection for the next 10 years. The harvest level will determine the future age-class distribution of the forest. Some of the cover types in the planning area have a pronounced age-class imbalance and the harvest level will be the primary tool used to correct this imbalance over time.

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. Sustainable forests support a thriving timber industry, provide diverse habitats for plant and animal species, maintain water quality, and provide recreational opportunities.

F2. How can we ensure adequate and sustainable "nontimber forest products" for the future?

Demand for some of these types of forest products has been light, for others it is increasing. Nontimber forest products (e.g., balsam boughs and decorative trees) provide diversification for local economies and are a traditional harvest for some groups. Nontimber forest products are particularly important in areas where employment opportunities in the mainstream economy are limited. They help support local individuals, families, and cottage industries in an expanding worldwide market. For example, the Christmas wreath industry is a multi-million dollar enterprise in Minnesota that relies on thousands of individuals who collect boughs in the forest.

The consequences of *not* addressing this issue include the possible unsustainable harvest of these resources, adverse impacts to wildlife habitat and native plant communities, and inadvertent harvest of rare species.

G. Timber Productivity

G1. How can we increase timber productivity on state lands?

Society continues to demand both forest products and old forests from the same public land base. In the 1990s, demand for timber increased, while some acreage previously available for harvest is now being managed on an extended rotation, reserved as old growth, or managed with less emphasis on timber production. Increasing the productivity of state forestlands is a way to continue to provide the current, or greater, harvest levels and improve timber quality, while still managing some lands with less emphasis on timber production.

A consequence of managing state forestlands without regard for increasing timber productivity levels is further declines in timber quality and quantity as older age classes continue to lose

merchantable volume without harvest. This would 1) negatively impact logging and forest products industries as the decrease in useable volumes (because of decay and mortality) would cause higher stumpage rates for timber producers and 2) higher procurement, chemical, and waste management costs for the forest products industries. Timber producers buy state timber in a competitive bidding process, which drives up base stumpage rates during times of decreasing timber availability. The forest products industries, especially paper-making, continues to compete in a global market where the associated costs of using low-quality wood are an important factor in their ability to remain competitive.

Another important consequence is increasing the acres necessary to produce equal volumes of useable forest products over time. As stands are held past their normal rotation age, the average growth rate per year usually declines, so more acres need to be harvested to produce the same amount of merchantable timber volume. The opportunity for more harvests over time on the same piece of land are less if actual harvest ages are significantly longer than the normal rotation age, as is the case currently. Usually, a longer rotation age for a cover type requires more acreage to be harvested over time to produce the same volume of timber that is produced at the normal rotation age.

H. Forest Health

H1. How do we address the impacts of forest insects and disease on forest ecosystems?

Forest insects and disease organisms influence forest ecosystem dynamics. These influences have both positive and negative impacts. What is perceived to be beneficial from one perspective may be viewed as detrimental from another. Insects and diseases can reduce timber production and lumber grade and increase fire hazard. Alternatively, they promote diversity of tree species and forest structure and generate dead wood, which provides important habitat and soil nutrients. Widespread pest outbreaks outside their natural range cause high levels of tree mortality and can have significant ecological and economic consequences. If attempts at control are too heavy, there may be an imbalance in pest populations. If control is not adequate, timber volume, aesthetics, and recreational enjoyment of the forest may be negatively impacted.

H2. How will we respond to exotic plant species threats/invasions?

Natural resource managers are concerned about exotic species that are introduced and become established on public land. Exotics have the potential to displace natives, carry or cause diseases, or disrupt natural community functions. On the other hand, there are good examples of the control of invasive exotic species. For example, introduced exotic beetles are controlling purple loosestrife populations. Some species are managed for timber production (e.g., European larch) and are technically exotic species. Increased use of public lands results in greater risk for the transport of exotics of all kinds. Failure to address the exotic species issue could result in permanent changes to native communities through invasion or displacement.

H3. How will natural disturbances like fire and blowdown be considered in forest management decisions?

Catastrophic events such as wind and fire may have a negative impact on the amount of forestland "harvested" during the 10-year stand treatment time frame. It may also impact the long-term desired future forest condition (DFFC) goals of the subsection plan. It is difficult to predict when and where a catastrophic event may occur. However, failure to consider the possibility of natural disturbances occurring within the subsections, and what forest management practices might be allowed within these disturbed areas, could result in a loss of marketable timber available for sale and an increase in fire danger in the vicinity of the catastrophic event.

H4. How do we manage vegetation to reduce herbivory, crop depredation, nuisance animals, potential spread of animal disease, and possible human health issues (e.g., Lyme disease)?

Vegetation management directly affects wildlife populations. Undesirable increases in certain wildlife populations can have adverse impacts on plant communities resulting from the browsing and grazing by wildlife (herbivory), crop depredation, nuisance animal complaints, potential spread of wildlife disease, and possible human health issues (e.g., Lyme disease).

The likely consequences of *not* addressing this issue are 1) loss of public support for management programs, 2) undesirable competition between species, 3) increased exotic and undesirable species, 4) an increase in populations to the point they become a nuisance, 5) negative economic impacts, and 6) negative impacts to native plant communities.

H5. How should forest management respond to global climate change within the planning period?

Predictions for the Midwest (*Canadian and Hadley Models - 2000*) suggest that the average temperature will have increased two to five degrees Fahrenheit by 2030 and five to 12 degrees Fahrenheit by 2095. Precipitation is expected to increase 99 to109 percent by 2030 and 124 to 127 percent by 2095 (Jeff Price). Scientists believe that predicted climate change will affect the size, frequency, and intensity of disturbances such as fires and windstorms (blowdown). It will affect the survivorship of existing plant and animal species and the distributions of plants and animals. Increases in the reproductive capability and survivorship of exotic species, insect pests, and pathogens will impact forests and wildlife. Certain tree species, such as black spruce, balsam fir, birch, and jack pine will respond negatively to increased soil warming, decreased soil moisture, etc. Carbon sequestration by forests and wetlands may be affected.

The likely consequences of *not* addressing this issue are 1) acceleration and exacerbation of climate change impacts to forest communities, 2) lost opportunity to begin directing management toward mitigating and slowing the effect of climate change on most vulnerable species and native plant communities, 3) species and community losses, and 4) reduced habitat for use and occupation by native wildlife and plants.

I. Visual Quality

I1. How will forest management activities minimize impacts on visual quality?

Scenic beauty, or visual quality, is one primary reason people choose to spend their recreation and vacation time in or near forested areas. Where forests lie adjacent to recreational trails, lakes, waterways, or near public roads and highways there is a need to consider the impacts of forest management activities to the visual quality of the site after the forest management activity is completed.

Failure to be sensitive to the visual quality impacts of any management activity may result in a negative experience for the vacationing and recreating public in forested areas of the state and increased regulations for most forest management activities.

J. Cultural Resources

J1. How will cultural resources be protected during forest management activities on state-administered lands? *(Added after first public review step.)*

Cultural resources are scarce, nonrenewable features that provide physical links to our past. A cultural resource is an archaeological site, cemetery, historic structure, historic area, or traditional use area that is of cultural or scientific value. Cultural resources are remaining evidence of past human activities. To be considered important, a cultural resource generally has to be at least 50 years old. A cultural resource may be the archaeological remains of a 2,000-year-old Indian village, an abandoned logging camp, a portage trail, a cemetery, food gathering sites such as ricing camps and sugarbushes, or a pioneer homestead. They often possess spiritual, traditional, scientific, and educational values and should be treated as assets rather than liabilities. In addition to federal and state laws that protect certain types of cultural resources, the *Voluntary Site-Level Forest Management Guidelines* provide information and recommendations to assist private and public land managers in taking responsible actions when cultural resources are encountered.

Failure to follow the recommended management practices to protect cultural resources could result in loss of or damage to the cultural resource.

K. Rare Features

K1. How can we ensure that rare plants and animals, their habitats, and other rare features are protected in these subsections? *(Added after first public review step.)*

Protecting rare features on state lands is a key component of ensuring species, community, and forest-level biodiversity in these subsections. In 1978, the Minnesota Legislature, through the Legislative Committee on Minnesota Resources (LCMR), established requirements for the DNR (Natural Heritage Program) to collect and disseminate data on Minnesota's significant biological resources. Information on the distribution, abundance, and ecology of rare species, their habitats, and other rare features gathered by the DNR (Minnesota County Biological Survey and Natural

Heritage and Nongame Research Program) provides much of the basis for determining the status of rare features in the state. The DNR acknowledges this leadership role in advocating for maintaining habitat for rare features throughout the state, regardless of ownership, and in protecting and providing habitat for rare and threatened species on state lands (Directions 2000).

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 and planned to be released in 2004.

Note that the federal Endangered Species Act of 1973, as amended (16 USC 1531 _1544) requires the U.S. Department of the Interior to identify species as endangered or threatened according to a separate set of definitions, and imposes a separate set of restrictions pertaining to those species. Four species on the federal list occur in these subsections. They are the gray wolf, Canada lynx, bald eagle, and piping plover.

The possible consequences of *not* addressing this issue are: 1) rare species extirpation at the local and state level, 2) rare species declines leading to status changes, e.g., special concern species changed to a threatened or endangered species, 3) rare species habitat loss or degradation, and 4) loss of biodiversity at the species (genetic), community, and/or landscape level.

From Issues to General Direction and Strategies

Table 2.1a provides a linkage between the issues described in Chapter 2 and the associated general direction statements (GDSs) and strategies in Chapter 3.

Table 2.1a: General Direction Statements Generated from SFRMP Issues

Major Category	Issues	General Direction Statement(s) that address the issue(s)
1 Biological Diversity, Forest Composition, and Spatial Distribution	**B1.** What is the appropriate forest composition, structure, representation of growth stages, within-stand diversity, spatial arrangement of vegetative types, and native plant community distributions necessary to maintain sustainability goals for biodiversity, forest health, and productivity across the three subsections?	**1B.** Forest cover type composition on state lands moves closer to the range of cover type composition that historically occurred within the ecosystems found in these three subsections. **1E.** Management of state lands within MCBS sites of statewide biodiversity significance implements measures to sustain or minimize the loss to the biodiversity significance factors on which these MCBS sites were ranked.
	B4. How can intensive management of forest communities be adapted to retain some of the characteristics of natural stand-replacement disturbance events?	
	B2. How will we ensure restoration of important component tree species that have declined within forest communities in these subsections?	**1F.** Rare native plant communities are protected, maintained, or enhanced in these subsections.
	B3. How will we maintain forest communities of particular concern in these subsections?	
	B5. How can management on state lands, especially large patch management, better reflect natural landscape patterns (the size and configuration of growth stages and types resulting from broad-scale natural disturbances) in these subsections?	**1C.** Patch management in these subsections maintains existing large patches and increases the average patch size on state lands over time, with consideration of natural spatial patterns.
	B6. How do we limit forest fragmentation and maintain connectivity between habitats?	**1D.** Habitat fragmentation is managed to minimize the impacts on species that are negatively affected by fragmentation.
2 Age-Class Distribution	**A1.** What are the desired age-class and growth-stage distribution of forest types across the landscape?	**2A.** Even-aged managed cover types will be managed to move toward a balanced age-class structure.
		2B. ERF stands in even-aged managed cover types will be managed to achieve a declining age-class structure from the normal rotation age to the maximum rotation age.

Major Category	Issues	General Direction Statement(s) that address the issue(s)
		2C. State lands include a representation of each of the growth stages that historically occurred in the ecosystems found in these three subsections.
	A2. What is the appropriate amount, kind, and location of old forests?	**1A.** Old forest is distributed across the landscape.
	A3. What is the appropriate amount, kind, and location of young, early successional forest? (added issue)	**2D.** Young, early successional forest is distributed across the landscape.
3 Within-Stand Composition & Structure	**D2.** How do we plan to retain and restore within-stand structural complexity (e.g., vertical structure, stem size and density, coarse woody debris, pit and mound micro-topography) on actively managed lands where natural succession pathways are truncated?	**3A.** Species, age, and structural diversity within some stands will be maintained or increased.
	D1. How can management of stands within larger areas of biodiversity significance be adapted to enhance biodiversity and native plant community composition, structure, and function?	**1E.** Management of state lands within MCBS sites of statewide biodiversity significance implements measures to sustain or minimize the loss to the biodiversity significance factors on which these MCBS sites were ranked.
		3B. Some stands on state lands will be managed to reflect the composition, structure, and function of native plant communities.
4 Wildlife Habitat	**D3.** How do we manage forest vegetation to balance the habitat needs of game and nongame species?	**4A.** Adequate habitat and habitat components exist, simultaneously at multiple scales, to provide for nongame species found in these subsections.
		4B. Adequate habitat and habitat elements exist, simultaneously at multiple scales, to provide for game species found in these subsections.
5 Riparian and Aquatic Areas	**E1.** How can we address the impacts of forest management on permanent wetlands, wetland inclusions, and seasonal ponds?	**5B.** Forest management on state lands adequately protects permanent wetlands and seasonal ponds.

Major Category	Issues	General Direction Statement(s) that address the issue(s)
	E2. What vegetative management activities will be allowed to take place within the riparian management zone (RMZ) and how will the appropriate width of the RMZ be determined to minimize the impacts of forest management activities on water quality, fisheries, and wildlife habitat?	**5A.** Riparian areas are managed to provide critical habitat for fish, wildlife, and plant species.
	E3. How can we address cumulative impacts to aquatic resources of forest management on a watershed/sub-watershed level?	*Beyond the scope of this SFRMP plan.*
6 Timber Productivity	**G1.** How can we increase timber productivity on state lands?	**6.** Timber productivity and quality on state timberlands is increased.
7 Forest Health	**H1.** How do we address the impacts of forest insects and disease on forest ecosystems?	**7A.** Limit damage to forests from insects, disease, and exotic species to acceptable levels where feasible.
	H2. How will we respond to exotic plant species threats/invasions?	
	H3. How will natural disturbances like fire and blowdown be considered in forest management decisions?	**12.** Disturbance events that occur on state land within these three subsections are promptly evaluated to determine the appropriate forest management needed to address the impacts of the disturbance on the landscape.
	H4. How do we manage vegetation to reduce herbivory, crop depredation, nuisance animals, potential spread of animal disease, and possible human health issues (e.g., Lyme disease)?	**7B.** Reduce the negative impacts caused by wildlife species on forest vegetation on state forestlands.
	H5. How should forest management respond to global climate change within the planning period?	**7C.** Forest management on state lands attempts to mitigate global climate change effects on forestlands. Management is based on our current knowledge and will be adjusted based on future research findings.
8 Visual Quality	**I1.** How will forest management activities minimize impacts on visual quality?	**8.** Minimize forest management impacts on visual quality.

Major Category	Issues	General Direction Statement(s) that address the issue(s)
9 Harvest Levels	**F1.** What is the appropriate timber harvest level on state lands with consideration for the sustainability of all forest resources?	**9A.** The SFRMP treatment level for each cover type moves toward the desired age-class structure of even-aged managed cover types (both normal and extended rotation forest) and improves the age structure and timber quality of uneven-aged managed cover types.
	F2. How can we ensure adequate and sustainable "nontimber forest products" for the future?	**9B.** The harvest of nontimber forest products is managed to provide a sustainable supply for humans while providing for wildlife habitat and biodiversity.
10 Access to State Land	**C1.** How can we plan for providing access to the stands identified for management during the 10-year plan period while protecting and minimizing the negative impacts that timber access development or use may have on other forest resources?	**10.** 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.
11 Cultural Resources (Added)	**J1.** How will cultural resources be protected during forest management activities on state-administered lands?	**11.** Cultural resources will be protected on state-administered lands.
12 Rare Features (Added)	**K1.** How can we ensure that rare plants and animals, their habitats, and other rare features are protected in these subsections?	**1G.** Rare plants and animals and their habitats are protected, maintained, or enhanced in these subsections.