

II. MONITORING QUESTIONS AND DRIVERS

Monitoring Questions and Monitoring Drivers for All Resources			
Resource	Section	Monitoring Question	Monitoring Driver
Air Quality	Air Pollution From Sources Outside The Forest And Its Effects On Forest Ecosystems, Human Health, and/or Human Enjoyment Of Forest Resources.	<i>To what extent is air pollution causing stress or impairment of forest ecosystems, human health, or human enjoyment of forest resources?</i>	D-AQ-1. Air on the forest is of high quality so that: 1) ecosystems are not impaired by pollutants originating in the air, 2) the health of visitors, residents, and employees are not impaired, 3) poor visibility does not impair scenic quality, and 4) other air quality related values are not adversely affected.
	Monitoring Of Air Pollution From Superior National Forest Management Activities		D-AQ-3. Air emissions from National Forest management actions do not degrade natural resources or uses of the Forest
Watershed and Riparian	Effects of Management Actions on Watershed Quality	<i>To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems? And to what extent is air pollution causing impairment of water quality and/or aquatic ecosystems?</i>	O-WS-1. Improve and protect watershed conditions to provide water quality and quantity and the soil productivity necessary to support ecological functions and intended beneficial water uses AND 36 CFR 219.12 (k) [2] . Documentation of the measured prescriptions and effects, including significant changes in productivity of the land.
Soils	Soil Protection	<i>To what extent are Forest Plan Standards & Guidelines being met, specifically FP standard S-WS-4 and guide G-FW-1?</i>	36 CFS 219.12 (k) [2] . Documentation of the measured prescriptions and effects, including significant changes in productivity of the land and Objective O-WS-2(c) Characterize the ecological composition, structure and function and patterns of individual lakes, streams, wetlands.....and the watershed and landscapes in which they are nested.

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Soils Cont'd		<i>Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?</i>	<p>D-WS-12; and 36 CFR 219.12k2. Soils recover from natural disturbance events and absorb the effects of human disturbances without reducing productivity and function. Soils contribute to ecosystem sustainability. Soil-hydrologic function & productivity is protected, preserving the ability to serve as a filter for good water quality & regulation of nutrient cycling. Soil exposure is minimized. There is minimal compaction, displacement, & puddling. Severely burned conditions resulting from mgt-ignited fire occur infrequently. O-WS-10. During all management actions involving soil disturbance: Maintain adequate ground cover and soil organic layers, both during and after treatment, to minimize erosion and allow water to infiltrate the soil. Minimize soil displacement, nutrient loss, and effects of severe burning. Restore and re-vegetate disturbed areas. Provide for the maintenance of physical, chemical and biological properties of the forest floor (soil organic matter, Surface O layer), that makes soil productive</p>
	Restoration		<p>D-WS-3. Watersheds and soils are maintained or restored in a way that allow for the conservation of the genetic integrity of native species. Physical properties of soil are maintained and enhanced. Watershed and habitat restoration projects are natural appearing and favor the use of native materials or naturalized species to the extent practical AND O-WS-9. Protect, and where appropriate, restore the soil resource. Improve and protect watershed conditions to provide the soil productivity necessary to support ecological functions. Protect and restore areas where soils are adversely impaired and contributing to an overall decline in watershed condition, soil productivity, soil quality, and soil function. Do this by using management practices, inventory and monitoring results, and findings from the inventory of ecological units. During all management actions involving soil disturbance, minimize soil displacement, nutrient loss, and effects of severe burning.</p>

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Insects and Disease	Managing Insect and Disease Populations	<i>To what extent is Forest management minimizing undesirable occurrences of insect and disease outbreaks?</i>	36 CFR 219.12 (k)(5)(iv). Destructive insects and disease organisms do not increase to potentially damaging levels following management activities
	Forest Managed Toward Healthy Condition		O-ID-1. Increase the amount of forest restored to or maintained in a healthy condition to reduce risk and damage from fires, insects and diseases and D-ID-2, Integrated pest management approaches are used to avoid epidemics and infestation of undesirable native or non-native invasive species.
Fire	Fuel Reduction	<i>What level of wild land fire on the landscape is appropriate and desirable and, to what extent is unwanted wild land fire on the landscape suppressed?</i>	O-ID-3. Treat areas of highest fire risk to minimize effects of unwanted wild land fire. O-ID-4. Reduce fuels and control vegetation in the under-story of stands that had naturally occurring low intensity surface fires. O-ID-2. Establish, maintain, or improve the condition of vegetation using prescribed fire, mechanical treatments, and other tools.
	Wildfires		D-ID-6. The presence of wildland fire on the landscape is appropriate and desirable, but unwanted wildland fire is actively suppressed where necessary to protect life, investments, and natural resources.
Timber	Timber Activities and Commercial Wood Harvest	<i>To what extent do timber output levels, location of timber harvest and the mix of saw timber and pulpwood products compare to plan projections?</i>	O-TM-1. Provides commercial wood for mills in Northern Minnesota. Material is harvested from the NF to supply sawmills, veneer mills, paper mills, & mills constructing engineered wood products.
	Stewardship Contracting		
	Saw Timber And Pulpwood Products		
	Restocking	<i>Are harvested lands adequately restocked within 5 years after clear cutting or final removals in seed tree or shelterwood harvest?</i>	(36 CFR 219.12(k)[5][i] and 36 CFR 219.27(c)(3). Lands are adequately restocked as specified in the forest plan.
	Proportion of Clear-cutting	<i>How much even-aged management should be used, and in what forest types should it be used?</i>	Forest Plan TABLE APP-D3 p.D-3 and EIS Table 2-9 p2-31. Clear cutting Proportion in actual and Proposed Harvest Treatments.

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Timber Cont'd	Large Patch Temporary Openings		(36 CFR 219.12(k)[5][iii]: " Maximum size limits for harvest areas are evaluated to determine whether such size limits should be continued" S-TM-2. Harvest using even-age regeneration methods (clearcutting, seed tree, shelterwood) may create a temporary forest opening no larger than 1,000 acres in size O-VG-20. Create large patch temporary openings up to 1000 acres through management activities. O-VG-21 Increase average size of temporary forest openings. Reduce amount of forest edge created through vegetation management activities, while still retaining a range of small patches and edge habitat
NNIS	Occurrence	<i>To what extent is Forest management contributing or responding to populations of terrestrial or aquatic nonnative species that threaten native ecosystems.</i>	O-WL-37. Reduce the spread of terrestrial or aquatic non-native invasive species that pose a risk to native ecosystems.
	Early Detection/Rapid Response		
	Control Measures		O-WL-38. Use Integrated Pest Management to: a. Eradicate any populations of new invaders. b. Contain or eradicate populations of recent invaders. c. Limit the spread of widespread, established invaders within the planning area.
Vegetation	Composition, Structure, and Age	<i>To what extent are Forest management, natural disturbances, and subsequent recovery processes changing vegetation composition and structure and ecosystem processes? To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?</i>	O-VG-1 "Move vegetation conditions from Year 2003 conditions toward the long-term desired composition, structure, age, spatial patterns, and within-stand diversity" O-VG-13. Maintain a full range of age classes from young to old, including old growth and multi-aged growth stages, for the variety of forested vegetation communities within each landscape ecosystem. O-VG-8. Restore structural diversity and ecosystem processes within stands when harvesting or burning by retaining a diverse mix of trees, shrubs, and herbs; live and dead standing trees; earth and tree root mounds caused by uprooted trees; coarse or large woody debris from fallen trees; and patches of live trees.
	Spatial Distribution		O-VG-17 and 18. In mature or older upland forest types managed to maintain large patches and mature or older red and white pine forest types managed to maintain large patches (100 acres or greater), manage patches to maintain the characteristics of mature or older native upland forest vegetation communities and promote the maintenance or development of interior forest habitat conditions. O-VG-19. Maintain a representative array of large patches of mature or older lowland forest. O-VG-20. Create large patch temporary openings up to 1000 acres through management activities.

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MIS/MIH Aquatic	Dark River Monitoring	<i>What is the quality of lake and stream habitat on the Superior National Forest? How does it affect RFSS, game fish, and other important fish populations?</i>	O-WL-36. MIH 14: Lake and stream habitat. Monitor and improve lake and stream habitat quality. Objective standards, and guidelines are found primarily under Watershed and Riparian Management direction.
MIS/MIH Terrestrial	Population and Habitat Trends	<i>To what extent is Forest management moving short-term (10-20 years) and long-term (100 years) objectives for their habitat conditions for management indicator species and species associated with management indicator habitats?</i>	<p>O-WL-16 Promote the conservation and recovery of the bald eagle. Population goal minimum: 85 occupied breeding territories.</p> <p>O-WL-17 Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to Statewide goal of 1250-1400.</p> <p>O-WL-31 Provide habitat to provide for population goal minimum: 20-30 breeding pairs.</p> <p>O-WL-32 Increase amount of white pine to amounts more representative of native plant communities by planting or naturally regenerating white pine trees in white pine forest types and in other upland deciduous, mixed, and conifer forest types. This objective matches white pine objectives shown in the Landscape Ecosystems Objectives section. MIH Objectives.</p>
RFSS Terrestrial	Habitat Trends and Objectives. Species Monitoring.	<i>To what extent is Forest management contributing to the conservation of sensitive species and moving toward short-term (10-20 years) and long-term (100 years) objectives for their habitat conditions?</i>	D-WL 1-9. O-WL-1-3. O-WL-18-31.
RFSS Plants	Habitat Improvement		O-WL-30: Enhance or restore high quality habitat on a minimum of 20 (average 2 sites per year) known sites of sensitive plants. Priority for habitat improvement will generally be for those species and habitats for which: a. proactive management (versus protection based on avoidance of any management activities) is needed to maintain species, and b. coarse filter management does not provide adequate maintenance or restoration

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RFSS Aquatics	RFSS Monitoring and Stream Crossing Improvement and Monitoring Projects		O-WL-28. Sensitive Fish, Mollusks, Aquatic Insects. In all known sites and breeding locations, enhance, or restore high quality habitat for these species primarily by implementing management direction that promotes desired conditions for healthy and functional watersheds, riparian areas, and vegetation. O-WL-29. Additionally, during evaluation and restoration of one to two 5th level watersheds per year, known locations of the following sensitive aquatic species will provide priority areas for proactive management to improve habitats: Lake sturgeon, shortjaw cisco, northern brook lamprey, creek heelsplitter mussel, and black sandshell mussel..
T&E Species	Habitat objectives and population trends.	<i>To what extent is the Forest contributing to the conservation of threatened and endangered species and moving short- term (10-20 years) and long-term (100 years) objectives for their habitat conditions and population trends?</i>	O-WL-4 Maintain, protect, or improve habitat for all threatened and endangered species by emphasizing and working toward the goals and objectives of federal recovery plans and management direction in the Forest Plan. O-WL-5 Seek opportunities to benefit threatened and endangered species by integrating habitat management objectives into plans for the full spectrum of management activities on NFS land. O-WL-6 Reduce or eliminate adverse effects on threatened and endangered species from the spectrum of management activities on NFS land. O-WL-7 Minimize building or upgrading of roads in areas that are important for threatened and endangered species habitat and for habitat connectivity.
Minerals	Exploration	<i>Are mineral exploration, development, and production avoidance or mitigation measures effective and being followed as recommended ?</i>	D-MN-1 Exploration and development of mineral and mineral material resources is allowed on NFS land except for federally owned minerals in designated Wilderness (BWCAW) and the Mining Protection Area (MPA). D-MN-2 Ensure that exploring, developing, and producing mineral resources are conducted in an environmentally sound manner so that they may contribute to economic growth and national defense.

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Social/ Economic	Planned Management Prescriptions Costs	<i>How close are projected outputs and services to actual outputs and services?</i>	36 CFR 219.12(k) [3]; (CFR 2004) Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the Forest Plan.
	Timber Outputs Vs Projected Levels	<i>To what extent do output levels and location of timber harvest and mix of saw timber and pulpwood compare to those levels projected?</i>	36 CFR 219.19.12(k) [1] (as of July 2004). A quantitative estimate of performance comparing outputs & services with those projected by the Forest Plans. 36CFR 219.7(f) (as of July 2004). A program of monitoring and evaluation shall be conducted that includes consideration of the effects of National Forest Management on land, resources, and communities adjacent to or near the National Forest being planned and the effects upon National Forest management from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments. (D-TM-1, O-TM-1).
Tribal	Consultation and Trust Responsibilities with Tribal Governments	<i>Does the Superior National Forest (SNF) management help sustain American Indians' way of life, cultural integrity, social cohesion, and economic well being?</i> <i>To what extent does the SNF's achieve Government to Government consultation with the Tribes?</i> <i>Does the SNF facilitate the right of the Tribes to hunt, fish, and gather as retained via Treaty?</i>	O-TR-1 Improve relationships with American Indian tribes in order to understand and incorporate tribal cultural resources, values, needs, interests, and expectations in forest management and develop and maintain cooperative partnerships projects where there are shared goals. O-TR-3 The Forest Service will work with the appropriate tribal governments to clarify questions regarding the use and protection of miscellaneous forest products with the objective of planning for and allowing the continued free personal use of these products by band members within the sustainable limits of the resources. O-TR-4 Consult, as provided for by law, with Tribes in order to address tribal issues of interest and National Forest management activities and site-specific proposals.
Heritage	Inventory	<i>Are avoidance or mitigation measures effective and being followed as recommended in project designs? 2) Are heritage resources being damaged or threatened in non-project areas?</i>	O-HR-1. Identify, evaluate, protect, monitor, & preserve heritage resources.

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Recreation Motorized Vehicles	RMV Management and Opportunities	<i>To what extent is the Superior National Forest (SNF) providing Recreation Motor Vehicle (RMV) opportunities? What are the effects of RMV on the physical & social environment & how effective are forest management practices in managing RMV use?</i>	D-RMV-1. The Forest provides Recreational Motorized Vehicles (RMV) road & trail riding opportunities with experiences in a variety of forest environments, while protecting natural resources and D-RMV-2. Allowed, restricted, and prohibited RMV uses are clearly defined to the public. Where practical, RMV policies are consistent with adjacent public land management agencies AND O-RMV-1. A maximum of 90 additional ATV trail miles and 130 snowmobile trail miles with associated trail facilities (trailhead parking, signs, toilets, etc.) may be added to the designated National Forest Trail System.
	RMV Effects		36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands. Forest planning shall evaluate the potential effects of vehicle use off roads and, on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted.
	Changes in Inventoried Semi-Primitive Non-Motorized Recreation Opportunity Spectrum		O-REC-2. Management activities will move toward the ROS class objectives in Table O-REC-1 and on Figure O-REC-1. Management activities may meet a less developed ROS class but can't meet a higher developed class than the mapped ROS class objective. O-REC-3 Through project level planning, the Forest will consider management of some inventoried semi-primitive ROS areas for separate non-motorized or motorized recreation uses.
Transportation	Road Inventories and Management Decisions	<i>To what extent is the Superior National Forest (SNF), in coordination with neighboring public road agencies, providing the minimum safe, affordable, and minimum impact road system for administrative and public use?</i>	O-TS-3. New roads built to access land for resource management will be primarily Objective Maintenance Level (OML)1 or temporary and not intended for public motorized use. Temp roads will be decommissioned after their use is completed. All newly constructed OML 1 roads will be effectively closed to motorized road and recreation vehicles following their use unless they are needed for other management objectives.
	Road Decommissioning		

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Lands	Land purchases and exchanges.	<i>How successful is the Superior National Forest's land adjustment program in support and enhancement of Forest Plan desired conditions and objectives and in contributing to efficient and effective stewardship?</i>	O-LA-1. Through various land adjustment procedures & a landownership adjustment map, secure a land ownership pattern that supports & enhances total forest plan resource management objectives.
Public Health	Drinking and Waste Water Safety	<i>Does water in Forest-provided drinking water sources and swimming beaches meet standards of quality protective of human health and aesthetics? AND Are Forest facilities and recreation sites safe for employee and public use and enjoyment?</i>	O-PH-1. Public & Non public water & wastewater systems are updated, maintained, & managed to the standards set forth in the appropriate federal guidelines and applicable state standards during this plan period. O-PH-4. Forest owned facilities and designated recreation sites and/or natural resource amenities are inspected and managed to ensure safe operation. O-PH-3. Known abandoned wells will be grouted and unused wells will be capped and maintained to prevent groundwater contamination.
	Hazardous Materials	<i>Does hazardous material storage on the National Forest meet standards of quality protective of human health?</i>	O-PH-2. Hazardous materials are appropriately stored in approved facilities, and are transported safely if necessary for forest management. O-PH-5. Where possible, minimize use of hazardous materials. Make more frequent use of non-hazardous substitute materials; and safe use and storage of hazardous materials.
Cooperation-Partnerships	Volunteer/Grants & Agreements.	<i>To what extent does the Superior National Forest involve the public, including agencies, landowners and land managers, non-profits, tribal entities, inter-governmental coordination and volunteers in carrying out its mission?</i>	D-CM-1. “The Forest works cooperatively with other landowners and land managers to protect, enhance, and restore physical and biological resources as well as social and economic values. Cooperative management includes tribal, state, county, local governments as well as other federal agencies.”