

DESIGN FEATURES AND MITIGATION MEASURES FOR NORTHWEST HOWELL SELECTED ACTION

The Forest Service developed the following design features to be used as part of all of the action alternatives (alternatives 2-4). **Appendix E contains tables depicting all stands proposed for treatment, by alternative. These tables list which of these features would be implemented in each stand. This was determined on a site-specific basis for each stand by resource professionals on the Forest.** For situations that are unknown at this time, but arise during project layout and implementation, the appropriate measures will be applied at the time of discovery.

Soils
These measures would be included as part of the timber sale contract and enforced by the Timber Sale Administrator. Locations of features A-E are not listed in Appendix E. foresters and/or biologists will determine the need for these features during sale layout and implementation. Effectiveness of design features is discussed in section 3.4.2.2 and 3.4.2.4 **Effectiveness of Design Features:** Monitoring on the ERFL District by the Forest Soil Scientist as well as observations from past harvesting practices on the District by FS personnel have verified that no detrimental long-term impacts have occurred to the soil resource where the design features have been implemented (Section 3.4.2.4 and 3.2.4.5). Local studies on the CNNF also support the effectiveness of these measures (Section 3.4.2.4).

Feature #	Location	Design Feature
A	Slopes 30 percent grade or greater	Avoid skidding on these slopes to minimize potential for soil erosion and displacement. This would be limited in sale layout and design and further controlled in timber sale administration.
B	As needed	Timber Sale Administrator will designate log landing and temporary road locations to prevent impacts on heritage resources and other sensitive sites.
C	All exposed mineral soil associated with timber sale, road reconstruction or road construction activities (primarily shoulders)	Revegetate either naturally or artificially to establish ground cover which prevents soil erosion. (See pg. 34, Wisconsin BMPs). If artificial revegetation were needed, a pre-approved, weed-free mix would be used.
1	<p>See Appendix E for a design features for each stand</p> <p>Location is generally related to soil type, but also depends on site-specific conditions, such as slope, wetter inclusions and other site properties</p> <p>For all operating seasons, on all soil types operating season may be changed by written agreement with the operator. The Forest Service Sale Administrator and Contracting Officer will determine when conditions are appropriate for a change from the normal operating season (i.e. drier than normal conditions). If timing restrictions are in place to protect resources other than soils, the operating period would not be changed, unless approved by appropriate specialist. The sale administrator has the authority to shut down sale operations any time that conditions could lead to un-acceptable damage.</p>	Equipment operations allowed only during frozen ground conditions, usually December 1 through March 15, to minimize soil disturbance. This will limit operations during periods when the soils are more susceptible to damage.
2		Equipment operations allowed only during frozen ground conditions, usually December 15 through March 1, to minimize soil disturbance.
3		Equipment operations allowed only during frozen or unsaturated ground conditions, usually July 15 through March 15, to minimize soil disturbance and prevent bark damage.
4		Equipment operations during frozen or unsaturated conditions, which usually occur year-round except for spring thaw. Operations usually allowable May 1 to March 15, to minimize soil disturbance and protect roads.
5		To minimize soil disturbance, equipment operations allowed only during frozen or unsaturated ground conditions, usually May 15 through March 15.
6		Equipment operations allowed only during frozen or unsaturated ground conditions, usually June 15 through March 15 to minimize soil disturbance. (see also mitigation measure 19 for slash)

WATER AND RIPARIAN

Utilize erosion control practices outlined in the Soil and Water Conservation Handbook (FSH 2509.22), and "Wisconsin's Forestry Best Management Practices for Water Quality", publication number FR 093, Wisconsin Department of Natural Resources. BMPs for road construction and stream crossings would be followed as described in pages 18-20 of the BMP handbook.

Forestry BMPs in wetlands protect water quality from erosion and minimize changes to the surface and sub-surface water movement that can occur from rutting and road building. Changing the surface and sub-surface water movement can affect the health of the wetland ecosystem and its flood protection function. Riparian areas are complex ecosystems that provide food, habitat and movement corridors for both aquatic and terrestrial communities. They also help minimize nonpoint source pollution impacts to surface waters. **Effectiveness of Design Features: Studies conducted by the WDNR across all ownerships show that these measures has been found to be effective, 99% of the time with no adverse impacts, and 1% of the time with only minor impacts (Section 3.5.3.2).**

The design features below are included during sale layout and timber harvest. The Timber Management Assistant Ranger and the Timber Sale Administrator will ensure that they are implemented on the ground. These measures are designed to protect the functions of riparian areas and wetlands listed below. **See sections 3.4.2.4, 3.4.2.5 and 3.5.3.2 for additional discussion on effectiveness of soil and water design features.**

Riparian areas: filtering of sediment and nutrients from runoff, allowing water to soak into the ground, stabilizing streambanks and lake shores and providing shade to streams.

Wetlands: shoreline protection-absorbs the force of waves and currents, protecting against erosion; flood protection-storing runoff from heavy rain and snowmelt to reduce flood damage; water quality protection-store and filter pollutants such as sediment and nutrients; groundwater recharge and discharge-moving surface water into groundwater systems, providing stream baseflows critical to aquatic life; animal and plant habitat-feeding, resting, nesting, escape cover or travel corridors (BMPs p.46).

The following features will be implemented during timber sale layout by the pre-sale forester, included in the contract language where appropriate and and inspected during harvest operations by the timber sale administrator.

Feature #	Location Water Body	Design Features
7	Various	The TSA will determine if water diversion structures are necessary to prevent erosive water runoff on skid trails and roads. If so the TSA will determine the proper placement of structures which will be constructed by the timber sale operator. The Sale Administrator would monitor these structures for 1 year after the sale.
8	Woodland Ponds	Where possible prevent logging equipment from entering ephemeral ponds.
9	Lakes, Perennial Streams, Rivers and Lakes	Within 50 feet of the ordinary high-water mark: To maintain shade, stabilize streambanks, and filter sediment and runoff, a no cut buffer strip 50 will be retained (p. 19 BMPs). To minimize erosion and compaction, do not allow decking or landing areas Within 100 feet of the high water mark: No slash will be piled (p.18-19 BMPs) to prevent nutrient loading To maintain shade and future down woody material, basal areas should be maintained at a minimum of 60 square feet. Manage for larger diameter trees, 12 inches and greater. Within 200 feet of high water mark on Class I and II trout streams: No clearcutting to discourage aspen regeneration and beaver activity which can increase water temperatures (Forest Plan, page. 69). See table 3.5.2.2-1
10	Intermittent Streams	Within 15 feet of the ordinary high water mark: Operation of wheeled or tracked harvesting equipment will be restricted to when the ground is frozen or dry to minimize erosion and rutting (BMPs, p.20).
11	Wetlands	Within wetland areas: To protect water quality from erosion and minimize changes to the surface and sub-surface water movement, avoid locating roads and landings whenever possible (p. 47 BMPs). Minimize forest management activities, and restrict to frozen ground to minimize rutting and compaction (p. 47 BMPs). Keep slash out of wetlands (p. 47 BMPs).

Recreation/Safety

There are approximately 24 roads totaling 10.5 acres that would be used for dual use between snowmobiles and log trucks. A full list of these roads is located in the project file. **Effectiveness of Design Features:** Limiting hauling activity during peak snowmobile use has been effective in minimizing complaints from snowmobilers and no known accidents have occurred between snowmobiles and logging trucks on Forest Service Timber Sales on the ERFL District. (Jim Churchill, Lead Forestry Technician, personal communication 4/03).

Feature #	Location	Design Feature
12	Along snowmobile trails during the snowmobile season.	To alert snowmobilers of logging activity, signing of trails would be required. Coordination with snowmobile clubs will also be done to temporarily reroute trails away from active logging when possible. Coordination would occur between the Timber Sale Administrator and local snowmobiling clubs.
13		Where necessary, restrict logging to snow-free periods to reduce snowmobile trail conflicts with logging operations. This would occur only where soils and other resources will tolerate summer logging. This would be included in the timber sale contract and ensured during implementation by the Timber Sale Administrator.
14		To minimize traffic conflicts with snowmobilers, hauling is not permitted on active snowmobile trails during weekends and holidays. This would be included in the timber sale contract and ensured during implementation by the Timber Sale Administrator.

Slash Reduction for Visuals and Soils

These measures would be included during timber sale design and layout, included in the timber sale contract. A Forest Service Sale Administrator would monitor slash treatments through regular sale inspections. **Effectiveness of design features:** All alternatives would meet the visual quality objectives listed in the Forest Plan (Section 3.6.3 and 3.6.3.2). Recreational use has been stable concurrent with timber sale activity on the ERFL District, Personal communication with Jeff Herrett, Recreation Assistant Ranger (Section 3.6.3.5).

Feature #	Location	Design Feature
15	Along FR 2176 recreation sites, Hwy 70, 2174, Hwy 55, 2206, 2458, 2193, 2172, 2454, 2457, 2423, 2424, 2426, 2427, 2169, 2485	To reduce visual impacts of logging along high use areas, all logging slash would be lopped and scattered to lie within 2 feet of the ground for 100 feet from the road
16	Along FR 2175, 2453	All logging slash would be lopped and scattered to lie within 3 feet of the ground for 100 feet from cleared right-of-way.
17	Along snowmobile trails, See Appendix E for a list of specific stands affected	To reduce visual impacts of logging, all logging slash would be lopped and scattered to lie within 3 feet of the ground for 50 feet from the trail.
18	Along other ownership.	All lo To reduce visual impacts of logging, and to keep property lines open for land line maintenance, all logging slash would be removed for a distance of 10 feet from the property line.
19	On Vilas soils within clearcut and overstory removal harvest,	To maintain long-term soil nutrient status on Vilas soils, slash including tops, branches, and unmerchantable material would be left in place. While past harvests have occurred on Vilas soils, current conditions indicate that nutrient availability (for all soils) are representative of the natural range of soil conditions inherent to the landscape of the CNNF (CNNF General Assessment-Soils, p. 6, 1998).

River Corridor

These measures would be included during timber sale design and layout, included in the timber sale contract, and ensured during implementation by the Timber Sale Administrator. Implementing these features will ensure compliance with the Forest Plan for MA 9.2 (River Corridors) and the State of WI River Plan for the Pine River. Compliance with these plans will ensure that the scenic and remarkable features of the river will be maintained (Section 3.6.3.2).

Feature #	Location	Design Feature
20	Within ¼ mile of the high water mark on each side of the North Branch of the Pine River (River Corridor)	- No road construction or reconstruction would be allowed to minimize vehicular traffic and noise impacts to recreationists and wildlife. -To ensure that treatments are compatible with the objectives for the river corridor, a Forest Service biologist will be involved in the layout of all treatments. Within 150 feet of the edge of the river: -No harvesting to minimize visual impacts to river recreationists, and to comply with the State of WI River Plan

Cultural Resources

All known and discovered cultural resource sites that are eligible and potentially eligible for the National Register of Historic Places would be protected by avoidance. These measures would be included during timber sale design and layout, included in the timber sale contract, and ensured during implementation by the Timber Sale Administrator.

Feature #	Location	Design Feature
21	All known and discovered cultural resource sites that are eligible and potentially eligible for the National Register of Historic Places	<p>To avoid disturbance to cultural resource sites:</p> <ul style="list-style-type: none"> - No timber harvesting, road construction, wildlife opening maintenance, or other project would be allowed within a cultural resource site and its required buffer zone, as determined by cultural resource professional and site protection plan. - Existing roads through a site may be used, but no additional soil disturbance within the roadbed and beyond the edge of the existing road would be allowed as determined by cultural resource professional and site protection plan. - No landings or storage of equipment or machinery may take place in these sites and their required buffer zone. - Sites will be monitored during and after the project to ensure that no site damage has occurred to known and discovered cultural resource sites.

Wildlife and Plants

These measures would be included during timber sale design and layout, in coordination with the District Wildlife Biologist and Ecologist. They will also be included in the timber sale contract. The Timber Sale Administrator will ensure that measures are enforced during timber sale harvest.

Features #	Location	Design Features
22	See Appendix F for a detailed listing of mitigation measures that would be employed if any TES species are found.	Restrict harvest activities to December 1 through March 1 to protect threatened, endangered, and sensitive (TES) species. Species requiring timing restrictions are discussed in Appendix F and in the Biological Assessment and Biological Evaluations located in the Project File.
23	See Appendix E for a list of stands with this requirement	Restrict harvest activities to July 15 through March 15 to minimize noise and disturbance to breeding birds.
24	In all harvested stands Specifically in clearcut stands	<p>Snags, snag replacements, woody ground debris, cavity trees and other selected trees valuable to wildlife would be retained (Forest Plan p.66). Reserve trees provide food, shelter, breeding and resting. Recommended number and species of trees desired to be retained are described in FSM 2600 Nicolet Supplement 18. These general guidelines are included by the Silviculturist in the marking instructions and prescriptions.</p> <p>Individual trees or groups of trees will be designated (marked) by the Biologist or Bio Tech to be retained.</p>
25	In all harvested stands	In compliance with FSM 2600 Nicolet Supplement 18, retain the following species (unless removal is necessary for access and safety considerations): hemlock -to maintain within stand diversity, potential snags and wildlife use from numerous species, such as pine marten, black burnian warblers Super canopy white pine - to maintain potential nesting and perching trees for eagles, ospreys and other raptors, and potential for developing into large diameter snags and den trees. Northern white cedar -important for thermal cover, to maintain species diversity and to maintain microclimatic conditions for sensitive forbs and flora. The Silviculturist will include these instructions in the marking prescriptions.
26	Where necessary	Wildlife biologist and botanist would be involved in laying out the stand design to protect known location of sensitive species. Mitigation measures TES species are discussed in Appendix F and in the Biological Assessment and Biological Evaluations located in the Project File.
27	Where regeneration is already present and desirable for future mgmt goal	The Timber Sale Administrator or Contracting Officer will designate skid trails, equipment restrictions, and season of operation to protect established regeneration. This will maintain structural diversity, nesting habitat and cover for numerous wildlife species and birds. It will also retain tree species diversity in the understory. Implementation will occur through timber sale contract preparation and administration.
28	See Appendix E for a list of stands with this requirement	<p>Equipment operations allowed only during frozen ground conditions, usually December 15 through March 1, to protect TES plants. This will reduce ground disturbance and the effects of trampling and disturbing understory ground flora.</p> <p>Species requiring timing restrictions are discussed in Appendix F and in the Biological Assessment and Biological Evaluations located in the Project File.</p>
29	See Appendix E for a list of stands with this requirement	<p>Equipment operations allowed only during frozen ground conditions usually December 1 through March 15, to protect TES plants. This will reduce ground disturbance and the effects of trampling and disturbing understory ground flora.</p> <p>Species requiring timing restrictions are discussed in Appendix F and in the Biological Assessment and Biological Evaluations located in the Project File.</p>
30	In stands with an understory conifer	Maintain understory conifer component for RFSS species to retain nesting habitat for Swainson's Thrush and provide overhead cover for American Marten. This will be implemented

Features #	Location	Design Features
	component (will be determined during timber sale layout)	through a clause in the timber sale contract.

Tree Species Regeneration

Feature #	Location	Design Features
31	See Appendix E for a list of stands with this requirement	<p>After the timber harvest, fencing would be installed around designated areas of natural regeneration and under planted trees to exclude browsing wildlife. Fencing will likely be installed through a contract.</p> <p>Effectiveness of design feature: Fencing to protect regeneration has not been implemented on the CNNF except on an experimental basis so effectiveness is unproven. Survival of regeneration will be monitored by the Reforestation Technician during 1st and 3rd year stocking and survival surveys. The Wildlife Biologist or Technician will be responsible for ensuring that the fencing is effective in excluding wildlife.</p>

Non-Native Invasive Species

Mitigation measures and design features will be implemented as part of an effort to prevent or reduce the spread of NNIS.

Feature #	Location	Design Feature
32	-Where fill from gravel pits is used in stands considered high risk for the types of invasive found in the pit. Forest Service Ecologists will determine these "high risk areas"	<p>-Monitor gravel sources (pit) if possible before use in the project area, to determine if there is contamination by NNIS. This activity will provide an indicator of potential future NNIS sites.</p> <p>-Where fill is used in stands considered high risk for the types of invasive found in the pit, monitor annually for a minimum of 3 years to determine if NNIS plants become established following harvest activity. This will enable quickly identification and treatment any possible NNIS infestations.</p> <p>-Weeds will be controlled with appropriate method available at that time.</p>
	Where necessary	<p>Minimize soil disturbance to the extent practical, consistent with the project objectives. Disturbed soil is ideal habitat for many NNIS species. Disturbance temporarily removes competitive native species and provides ideal habitat for NNIS which usually tend to be early successional species</p> <p>This will primarily be accomplished through design features A-E and 1-6 listed under the Soil Design Features.</p>
	Disturbed areas.	<p>Revegetate with native and desirable non-native species. Revegetation of disturbed sites provides less NNIS habitat and ensures competitions from desirable species to make infestations by NNIS less likely</p> <p>This will be accomplished through design feature C listed under soils.</p>
	On timber sales with areas that are considered high risk for NNIS.	<p>Provide awareness sessions for timber sale contractors to educate them about NNIS, at the pre-work session, and provide identification booklets for identification. This will help minimize spread of NNIS by making contractors aware of the plants so they can avoid them if possible or notify the FS of locations.</p>

TES Design Features and Mitigation Measures (These were formerly located in Appendix F in the DEIS)

These features are listed here to give the reader an idea of which measures would be applied for the different TES species. **More thorough description of these measures and effectiveness of these measures are included in the Biological Assessment and Biological Evaluation for the Project.** These documents are located in the Project File. Surveys to determine the presence of TES species have been completed and described in the Biological Evaluation and Biological Assessment. Maps and survey notes are included with the BE and BA in the Project File. All documents are available upon request.

These measures would only be applied where species are known to exist, not to potential habitat. These codes would be associated with design features for timing restrictions and involving a biologist during stand layout (features 22, 26, 28 or 29 listed above under Wildlife and Plants). Specific locations of such mitigation measures are not listed in the Appendix E tables. This is to protect the sites from illegal poaching, which is an ongoing concern on the forest. A complete stand list with these requirements is located in the Project File.

- A.** Bald eagle breeding areas will be managed and protected utilizing the following direction in the Northern States Bald Eagle Recovery Plan (1983): (1) from 0 to 330 feet from the nest tree, all land use activities will be excluded except those necessary to protect nest sites; (2) from 330 to 660 feet from the nest tree, land use activities will be permitted when there will be no significant changes to the landscape. Activities such as intermediate harvest, rehabilitation of permanent openings, and pruning may occur from August 1 to February 15. Clearcutting, land clearing, and construction activities will not be permitted in this area. Specific management activities may be initiated in this zone to ensure the continued presence of nest and roost trees, e.g., planting white pine and maintaining existing subcanopy white pine; and (3) from 660 to 1320 feet from the nest tree, site disturbing land use activities will not be permitted from February 15 to August 1 (when justified, this zone may be extended beyond 1320 feet).
- B.** Active and historic red-shouldered hawk and goshawk nest sites would be protected with a minimum size of 20-acre “no-cut” zone. This area may be larger to retain territory productivity and to include adjacent historic territories in high quality habitat. All land use activities will be excluded except those necessary to protect active and/or historic nest sites for as long as the stand is suitable habitat. Harvest treatments in the adjacent area would maintain 80% crown cover and no clearcuts would take place within 300 feet of nesting territory (20 acre protection zone).
- C.** Activities within designated red-shouldered hawk or goshawk territories would be minimized between March 1st and August 1st. No timber harvest operations would take place in these areas during this time, including hauling through the protected area.
- D.** To avoid impacts to nesting ospreys, loons, and trumpeter swans, no timber harvest activities would take place between March 15th and August 1st in areas adjacent to sites that have known nesting activity.
- E.** Per direction provided by the Wisconsin Department of Natural Resources Wisconsin Wolf Management Plan, (October 1999), Eastern timber wolf den and rendezvous sites will be protected from disturbance. Tree harvest/ tree removal would not occur within 330 ft. of these sites and timber harvest activities would not be allowed within 0.5 mi. between March 1st and July 31st.
- F.** Regional Forester’s Sensitive Species plant typically occurring in rich deciduous forest: Specific species include goblin fern, (*botrychium mormo*). Timber harvest activities would occur only during the frozen ground period, December 1st to March 15th. Additional protection measures will also include: a 250 ft. radius “no cut” / “no soil disturbance” zone around plant populations. The plant protection zone will be clearly identified on the ground and as a reserve area on timber sale maps. Field identification of these areas will be coordinated with the district biologist or plant ecologist/botanist.

- G. Regional Forester's Sensitive Species plant typically occurring in rich deciduous forest: Specific species: ginseng (*panax quinquefolius*) and foam flower (*tiarella cordifolia*). Timber harvest activities would occur only during the frozen ground period, December 1st to March 1th.
- H. Regional Forester's Sensitive Species plant typically occurring in rich deciduous forest: Specific species include butternut (*juglans cinerea*): Mature and seedling/sapling individuals and populations of this species will be protected from timber harvest and damage from logging operations. The plant protection zone will be clearly identified on the ground and as a reserve area on timber sale maps for larger size populations, especially areas of regenerating seedlings and saplings. Field identification of these areas will be coordinated with the district biologist or plant ecologist/botanist.
- I. Regional Forester's Sensitive Species plant typically occurring in rich deciduous to low wet forest: Specific species include American elm (*ulmus Americana*). Mature and seedling/sapling individuals and populations of this species will be protected from timber harvest and damage from logging operations. The plant protection zone will be clearly identified on the ground and as a reserve area on timber sale maps for larger size populations, especially areas of regenerating seedlings and saplings. Field identification of these areas will be coordinated with the district biologist or plant ecologist/botanist.
- J. Regional Forester's Sensitive Species plant typically occurring in shaded, acidic forest: Specific species include blunt-lobed grapefern, (*botrychium oneidense*). Timber harvest activities would occur only during the frozen ground period, December 1st to March 15th. Additional protection measures will also include: a 250 ft. radius "no cut" / "no soil disturbance" zone around plant populations. The plant protection zone will be clearly identified on the ground and as a reserve area on timber sale maps. Field identification of these areas will be coordinated with the district biologist or plant ecologist/botanist.