

**APPENDIX B
DESIGN CRITERIA
and
MITIGATION MEASURES**

APPENDIX B: DESIGN CRITERIA AND MITIGATION MEASURES

Specific design criteria and mitigation measures described herein have been developed to be used as part of the action alternatives. Also, certain measures listed include Forest Plan Standards and Guidelines (S&Gs) applicable to action alternatives. Mitigation measures not included in this section are the Forest Service standard operating procedures. An example would be the standard provisions in a Timber Sale Contract and road design specifications. Design criteria and mitigation measures are listed below under the applicable resource area or topic.

Hydrology and Soils

Management requirements and mitigation measures will be required to reduce the impacts of the proposed project on the soils and watersheds. All management requirements and mitigation measures are designed to insure compliance with BMPs, which are LRMP management requirements (Appendix A of Watershed Report). BMPs are designed to protect water quality and soil productivity.

Protected stream courses will provide a buffer in the WIZ (100 ft. total width, 50 feet each side of the stream). Protected stream courses will include Rapid Creek, Wild Irishman Gulch, Victoria Creek, South Victoria Creek, Boone Draw, Shanks Gulch, Prairie Creek, Brush Creek, Clear Creek, Deer Creek and several unnamed tributaries to the named streams, as shown in the protected stream course map contained in the Project File. In the water influence zone (WIZ), allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.

Soil mitigations will be required in order to prevent excessive erosion and protect long-term site productivity. See Project File for the soil mitigation map.

Machinery operations must be restricted to dry or frozen soil conditions on soils subject to compaction when wet and on slopes greater than 20% on soils with severe erosion or moderate or high mass wasting potential. Sites with these soil conditions are listed in the Watershed Report held in the Project File.

Ground skidding must be avoided on soils with severe erosion potential and moderate or high mass wasting potential and slopes steeper than 40%. Sites with these soil conditions are listed in the Watershed Report held in the Project File.

Retain 50% or more of fine (less than 3 inches in diameter) logging slash in the stand on soils with low organic matter (See Appendix D of Watershed Report).

Prescribed fire must be conducted when soils are moist or frozen on areas that have severe prescribed fire hazards. See Project File for the burn mitigation map.

The PPA will have Forest Plan Management Requirements, WCPs and BMPs prescribed and implemented. This will protect the water quality of the streams and creeks in the PPA and the projects that are planned for in the PPA will meet the requirements of the CWA.

Transportation

Criteria established in this analysis for implementation and management of the transportation system is recommended.

Road closure devices, including gates, barriers, slash or other devices needed to prohibit or eliminate use, would be located on the ground to provide the most effective means of accomplishing the desired travel management strategy.

Physical closures, such as slash, stumps, rocks and revegetation are to be used to eliminate use. Earthen barriers may be used when there is not adequate material available for slash, stumps or rock closures. This may be done after the sale, to allow use of a road by the purchaser, or as funds become available. Closure gates may be utilized where administrative access is needed.

Whenever possible, roads shall be relocated or constructed out of draw bottoms to improve drainage and protect soil and water resources. Abandoned roadbeds shall be revegetated and returned to as natural a state as possible.

All temporary roads and newly constructed system roads used to access harvest units would be closed or decommissioned after management activity is completed.

Where sod has effectively stabilized existing roadbeds, efforts would be made to minimize disturbance to the sod layer during maintenance and reconstruction activities.

Drainage devices are designed and installed in accordance with South Dakota's Best Management Practices and guidelines set forth in FSH 7709.56 Road Preconstruction Handbook and FSH 7709.56b Transportation Structures Handbook. Surface drainage devices include culverts, rolling dips and water diversion structures. Culverts and water diversion structures are generally considered for use on grades steeper than 10%. Culvert size and spacing are in accordance with the above mentioned Handbooks. Water diversion structures are spaced from 150' to 200' apart. Rolling dips are spaced from 200' to 500' apart depending on soil type and road grade and may be plated with rocky material to protect the soil. Outlets of drainage devices provide for dispersion of water to dissipate flow. Catchment basins are of adequate size and location to prevent soil movement off the site. Subsurface drainage devices are in accordance with Handbook references.

Reduce steep (greater than 10%) grades where possible and relocate roads out of bottoms to minimize impact in intermittent draws. Marshy, wet areas are avoided where possible. Rocky fills and geotextiles are used in marshy, wet areas when avoidance is not possible. Highly erodible soils, steep grades and flat areas may be protected by placement of aggregate on the roadbed. Depth of aggregate may vary depending on type of soil but 4" is generally the

minimum depth applied to ensure proper bearing strength and soil protection. Where crossings of intermittent drainages, draws and valleys are proposed, 1' to 2' of rocky material may be used to protect the soil. Cut and fill slopes are seeded as soon as possible following completion of road template. Natural revegetation also occurs to supplement specified seeding.

Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained.

Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and drainage area. Ensure fill slope protection with riprap, gabions, prompt seeding of slopes and/or other methods approved by the hydrologist, fisheries biologist and soil scientist. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Routinely maintain bridges and culverts to ensure unrestricted flow. Immediately repair damaged or eroded fill slopes.

Maintain a buffer zone (in accordance with South Dakota Best Management Practices) between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are used where terrain permits. Fill slopes and other disturbed areas are revegetated. Construction equipment would not operate in buffer zones except as necessary to construct fills.

Consider seasonal or annual road and area closures to protect roads. Reference FSH 7709.56 Road Preconstruction Handbook for all design standards. Road Management Objectives, including road standards, maintenance level and travel management, are documented and approved for all roads.

Minimize new construction. New roads are constructed to the minimum standard necessary for the type of use in accordance with FSH 7709.56. New road construction is closed following timber management activity unless documented and approved Road Management Objective states otherwise.

Properly permitted (by Corps of Engineers) discharge of fill or dredged material into waters of the United States would be performed with minimal encroachment of construction equipment outside the fill itself. Minimize disturbance of vegetation in waters of the United States during construction and maintenance of roads. Borrow material needed for road construction would be taken from upland areas. Road construction in non-wetland meadows is in accordance with the Forest Plan.

BEST MANAGEMENT PRACTICES COMPLIANCE

33 CFR 323.4(a)(6) [States that] Construction or maintenance of farm roads, forest roads, or temporary roads for moving mining equipment, where such roads are constructed and maintained in accordance with best management practices (BMPs) to assure that flow and circulation

patterns and chemical and biological characteristics of waters of the United States are not impaired, that the reach of the waters of the United States is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized. These BMPs which must be applied to satisfy this provision shall include those detailed BMPs described in the state's approved program description pursuant to the requirements of 40 CFR 233.22(i), and shall also include the following baseline provisions: **(NOTE: Items in bold print are engineering design guidelines or standard operating procedures as related to each BMP.)**

(i) Permanent roads (for farming or forestry activities), temporary access roads (for mining, forestry, or farm purposes) and skid trails (for logging) in waters of the United States shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural or mining operations, and local topographic and climatic conditions;

Reduce steep (greater than 10%) grades where possible. Consider seasonal or annual road and area closures to protect roads. Reference FSH 7709.56 Road Preconstruction Handbook for all design standards. Road Management Objectives, including road standards, maintenance level and travel management, are documented and approved for all roads. Minimize new construction. New roads are constructed to the minimum standard necessary for the type of use in accordance with FSH 7709.56. New road construction is closed following timber management activity unless documented and approved Road Management Objective states otherwise.

(ii) All roads, temporary or permanent, shall be located sufficiently far from streams or other water bodies (except for portions of such roads which must cross water bodies) to minimize discharges of dredged or fill material into waters of the United States;

Relocate roads out of bottoms to minimize impact in intermittent draws. Outlets of drainage devices provide for dispersion of water to dissipate flow. Catchment basins are of adequate size and location to prevent soil movement off the site. Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and drainage area. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Maintain a vegetative buffer as identified by Vbfr Equation between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are used where terrain permits. Fill slopes and other disturbed areas are revegetated. Road construction in non-wetland meadows is in accordance with the Forest Plan.

(iii) The road fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows;

Drainage devices are designed and installed in accordance with 33CFR323.4(a)(6) and applicable State BMPs and guidelines set forth in FSH 7709.56 Road Preconstruction Handbook and FSH 7709.56b Drainage Structures Handbook. Surface drainage devices include culverts, rolling dips and water diversion structures. Culverts and water diversion structures are generally considered for use on grades steeper than 10%. Culvert size and spacing are in accordance with the above mentioned Handbooks. Water diversion structures are spaced from 150' to 200' apart as needed on continuous grades. Culverts and stream crossings will be stabilized to the 100-year event. Rolling dips are spaced from 200' to 500' apart, on continuous grades without breaks, depending on soil type and road grade and may be plated with rocky material to protect the soil. Outlets of drainage devices provide for dispersion of water to dissipate flow. Catchment basins are of adequate size and location to prevent soil movement off the site. Subsurface drainage devices are in accordance with Handbook references. Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained. Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and drainage area. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Routinely maintain bridges and culverts to ensure unrestricted flow.

(iv) The fill shall be properly stabilized and maintained during and following construction to prevent erosion;

Rocky fills and geotextiles are used in marshy, wet areas when avoidance is not possible. Highly erodable soils, steep grades and flat areas may be protected by placement of aggregate on the roadbed. Depth of aggregate may vary depending on type of soil but 4" is generally the minimum depth applied to ensure proper bearing strength and soil protection. Where crossings of intermittent drainages, draws and valleys are proposed, 1' to 2' of rocky material or concrete cable mats may be used to protect the soil. Cut and fill slopes are seeded as soon as possible following completion of road template. Natural revegetation also occurs to supplement specified seeding. Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained. Ensure fill slope protection with riprap, gabions, prompt seeding of slopes and/or other methods approved by the hydrologist, fisheries biologist and soil scientist. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including

placement of fill and measures to control sedimentation. Immediately repair damaged or eroded fill slopes.

(v) Discharges of dredged or fill material into waters of the United States to construct a road fill shall be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself;

Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Maintain a vegetative buffer as identified by Vbfr Equation between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are used where terrain permits. Fill slopes and other disturbed areas are revegetated. Construction equipment will not operate in vegetative buffer except as necessary to construct fills. Properly permitted (by Corps of Engineers) discharge of fill or dredged material into waters of the United States will be performed with minimal encroachment of construction equipment outside the fill itself. Minimize disturbance of vegetation in waters of the United States during construction and maintenance of roads.

(vi) In designing, constructing, and maintaining roads, vegetative disturbance in the waters of the United States shall be kept to a minimum;

Cut and fill slopes are seeded as soon as possible following completion of road template. Natural revegetation also occurs to supplement specified seeding. Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained. Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and drainage area. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Routinely maintain bridges and culverts to ensure unrestricted flow. Construction equipment will not operate in vegetative buffer except as necessary to construct fills. Minimize disturbance of vegetation in waters of the United States during construction and maintenance of roads.

(vii) The design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body;

Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation.

(viii) Borrow material shall be taken from upland sources whenever feasible;

Borrow material needed for road construction will be taken from upland areas. Also, discharge of waste material from maintenance of drainage structures shall be placed at upland sites.

(ix) The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species as defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species;

The presence of Threatened and Endangered Species and their habitat is identified in Project Area analysis. Seasonal and/or annual road closures for wildlife considerations are identified in Travel Management documentation.

(x) Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist;

Marshy, wet areas are avoided where possible. Rocky fills and geotextiles are used in marshy, wet areas when avoidance is not possible. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Immediately repair damaged or eroded fill slopes. Maintain a vegetative buffer as identified by Vbfr Equation between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are used where terrain permits. Fill slopes and other disturbed areas are revegetated. Road construction in non-wetland meadows is in accordance with the Forest Plan.

(xi) The discharge shall not be located in the proximity of a public water supply intake;

Specific mitigation measures would apply to municipal watersheds if utilized.

(xii) The discharge shall not occur in areas of concentrated shellfish production;

There are no areas of concentrated shellfish production on the Black Hills National Forest.

(xiii) The discharge shall not occur in a component of the National Wild and Scenic River System;

There are no components of the National Wild and Scenic River System on the Black Hills National Forest.

(xiv) The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts;

Materials to be used will be manufactured from non-contaminated sources.

(xv) All temporary fills shall be removed in their entirety and the area returned to its original elevation.

Under Public Works, compliance will be enforced by use of FAR clause 52.223-2 by the authorized contract personnel. Under timber sales, compliance will be ensured by enforcement of timber sale contract clauses (such as B6.62 and C6.62#) by designated timber sale contract personnel. All temporary structures (including fills) to be removed as part of specified work will be enforced from specifications and project notes contained and referenced in the contract.

Minerals

Protect all mining claim corner posts and active mining claim developments.

Future road access needs for operating on unpatented mining claims are unknown; however, once an operating plan is submitted to develop a mining claim, access needs to be provided. This requirement for road access is required under 36 CFR 228.1 subpart A and United States Mining Laws 30 U.S.C. 21-54 which confers a statutory right to enter upon public lands to search for minerals. If road access becomes a necessity, then the category of road use and maintenance level of the road will be determined. Roads currently in place may be suitable for access thus reducing the need to open decommissioned or construct new roads.

Vegetation

The transportation system of roads and fire trails should be maintained for fire access and protection of the timber resource. Roads necessary for future timber management should remain on the system maintained and/or closed by gates or barriers as other resource needs require.

Activity fuels should be removed, lopped, scattered or piled for later burning. Slash piles, other than those created for wildlife habitat, should be burned within one year. This will reduce the risk of Ips beetle mortality.

During determination of skid trail and landing locations, the timber sale administrator should see that areas with high water tables are avoided, or that operations in such areas are seasonally restricted. Stream courses will be protected per the timber sale contract and under 36 CFR Part 251.14 (a13), protection of stream courses.

Broadcast prescribed burning generally should be designed to limit mortality in the polesize and sawtimber size pine stands to 10% or less with seedling/sapling mortality less than 75%.

Fire and Fuels

Where possible, all activity fuels should be treated so the expected fire behavior is less than 200 BTU/sec/ft at the 90th percentile by the third year after a treatment. Areas exceeding 200

BTU/sec/ft need to be divided up into blocks less than 40 acres in size with fuelbreaks that are constructed on ridges or other defensible areas. Acceptable methods of fuel treatment include prescribed burning, piling, chipping or removing the fuel from the site.

Pile and burn or chip activity fuels within 300 feet of private property and the foreground of trails, recreation sites, county road 44 or highway 385.

Lop and Scatter all activity fuels not removed from the site to 18" standard or less.

Rehabilitate and seed all fireline needed for prescribed burns.

Rehabilitate and seed piles created by logging and/or thinning debris.

Treat prescribed burns to prevent spread of noxious weeds.

Protect heritage resource from degradation by prescribed fire operations

Visual effects of Prescribed fire will comply with the approved SIO of the area.

Defer prescribed burned areas from livestock grazing for a portion or all of the following growing season to ensure regrowth of forage species.

Prescribed burn plans will include silvicultural prescriptions with approved mortality guidelines. Locate slash piles that are scheduled for burning out of meadows that contribute to Waters of the United States.

Treat activity fuels adjacent to roads and trail per Forest standards.

In Alternative C, require whole tree logging where the practice is feasible. Require whole tree logging, where terrain permits, on units adjacent to private property in Alternative D.

In Alternative C, harvest or remove all 5-9" trees that are scheduled for removal.

Range and Weeds

Range fences to be protected by the contractor during the life of the sale will be delineated on the project map. There are many miles of range fences within the Prairie project area. These fences need to be protected during the timber sale and kept intact during the grazing season. When the sale is active the timber contractor will be expected to make sure that any fence crossings they create are repaired before cattle go into each unit.

Range improvements include boundary and pasture fences where natural barriers (trees) are removed. Some dams have long man-made drainages, which need to be maintained and cleaned of debris during and after timber sale activity.

All roads and decking of logs should be located in the timber out of meadows and riparian areas. Slash at these sites will be either piled and burned or chipped and hauled. It will also include grass seeding of decking areas and skid trails, and maintenance of existing dams/collection ditches. Meadows and existing openings should be maintained as grass/forb sites to provide forage for livestock and other wildlife. Opportunities to relocate roads on higher ground should be explored.

Use integrated weed management practices, in accordance with Environmental Assessment for the Management of Control of Noxious Plants on the Black Hills National Forest, USDA Forest Service to provide timely treatments of noxious and invasive weeds.

Reseed highly disturbed ground and burn/slash piles with noninvasive annual grasses and perennial native grasses to reduce the potential for noxious and invasive weeds establishment. Seeding needs to be started on the skidder trails, cleared deck landings and burn pile areas as soon as operations are completed, this will help in suppressing weed growth. Select natives or non-invasive introduced species for seeding. Provide for testing of seed to verify the absence of noxious weed seed. Monitor and treat areas within the perimeter of the project area and adjacent to known private land weed infestations.

Use weed free mulch and erosion materials as required.

Provide for the use of an Aphthona flea beetle insect mix in the Leafy spurge areas and Canada thistle insects as a means of integrated noxious weed control for 3 to 5 years.

Monitor known distributed soil locations that occurred during timber sale efforts. Treat immediately for noxious weeds and follow-up action needs to be 3 to 5 years after initial treatment.

Wildlife Habitat.

Snags

During treatment of hardwoods for regeneration and with District Wildlife Biologist review, retain live hardwoods that show signs of cavity nesting where this will not conflict with management objectives (e.g. regeneration) (Guideline 2204, treated as a Standard).

Alternative D – At least 1700 ponderosa pine hard snags would be created from large diameter green trees to compensate for the deficient snag density in this alternative. Trees selected for snag creation should be from the largest diameter class available with a large mature crown and many branches. The best available method would be used (inoculation with heart rot fungi, girdling, etc.). Created snags will comply with Forest Plan Objective 211, Standard 2301, and Guideline 2303 (treated as a Standard) in terms of diameter, height, and distribution.

Retain all existing snags (hard or soft) in harvest units, especially those greater than 10" DBH, unless they are determined to be a safety hazard (Guideline 2305). All such snags should be

designated as leave trees prior to treatment. Existing snags will be protected during prescribed burning where feasibility and safety permits. Snags determined to be a safety hazard should be felled and left in place.

Retain snag replacement trees as documented in the silvicultural prescriptions to insure minimum snag densities in outyears per Standard 2301. These trees should be at least 10" BDH and marked prior to treatment. Replacement trees selected may be those trees with broken tops, evidence of crown decay, "wolfy" trees, or otherwise deformed or damaged. Replacement trees may be clumped or scattered within stands, but should be well distributed across treated stands.

Minimize the length of time during which temporary roads are open to facilitate timber harvest and other management activities to minimize removal of standing dead and large down woody debris. Remove only hazard trees that pose a safety hazard along roads that will be open (seasonally or yearlong) to the public.

Minimize the removal of large (>10" DBH) snags along fence lines and other structures (e.g. power lines). Clearing in these areas should be limited to trees that would cause immediate damage to these structures (Standard 2302).

Cutting of standing dead trees for fuelwood is prohibited, except in designated areas (Guideline 2304, treated as a Standard).

Dead and Down Woody Debris

Leave large woody debris on harvested or thinned sites (Guideline 2307, treated as a standard). On conifer forested sites, retain an average of at least 50 linear feet per acre large of course woody debris with a minimum diameter of 10" DBH (Standard 2308a). Felled cull trees >10" DBH will be retained at site of felling unless they contribute to visual quality concerns or they are determined to create a fire/fuels or safety hazard. Decked trees will be returned to the unit. Leave large woody debris on harvested or thinned sites to help retain moisture, trap soil movement, provide microsites for establishment of forbs, grasses, shrubs, and trees, and to provide habitat for wildlife (Guideline 2307, treated as a Standard).

Slash piles >10 feet in diameter will be retained in all non-commercial thinning units at a rate of 1 per 2 acres unless determined to be a fire/fuels hazard. Wherever feasible, locate these piles near forest/opening edges (Objective 212).

Northern Goshawk

Management activities (including fencing, temporary roads) in goshawk nest stands should be limited to those that maintain or enhance the stands' value for goshawks (Standard 3109). Activities should not reduce the structural and compositional integrity of goshawk nest stands (Guideline 3110, treated as a Standard).

Management activities at goshawk nest sites should be designed to conserve or enhance site conditions (e.g. thin regeneration), (Guideline 3112, treated as a Standard).

From March 1 through August 31, minimize additional (new) human caused noise and disruption beyond that occurring at the time of nest initiation (e.g. road traffic, timber harvest, construction activities) within one-quarter mile of all active goshawk nests (Standard 3111).

From March 1 to September 30, avoid timber harvest schedules that cause simultaneous, widespread disturbance across active goshawk fledgling habitat. Fledgling habitat should include areas without constant human disturbance (Guideline 3113, treated as a Standard).

Other Raptors

Protect known current and historic raptor nests (Guideline 3204, treated as a Standard). Any active raptor nest (other than goshawk) discovered during sale layout, sale operations, or post sale treatments will be reported to the District Wildlife Biologist for evaluation. Modifications to Forest Service contracts, and or mitigation measures such as seasonal or other restrictions (e.g. March 1 – August 30) may be required to protect the nest.

Big Game

Maintain escape cover along a portion of each patch clear cut if it already exists.

Maintain hiding cover adjacent to existing openings when possible.

For Alternative B and D, maintain existing big game screening cover along edges of arterial and collector roads. For Alternative C, maintain existing cover as appropriate (Guideline 3203, treated as a Standard).

Turkey

Provide at least 2-6 turkey roost sites per section, consisting of mature trees with an average diameter of 10-14", widely spaced horizontal branches, and basal areas at least 90 square feet per acre. Sites should be at least one-fourth acre in size, and not isolated from adjacent forested stands. Emphasis should be on the upper third of east facing slopes if available (Guideline 3205, treated as a Standard). Such trees will be designated on the ground prior to treatment.

During layout of thinning units adjacent to forest openings and meadows, maintain up to 20% of the timbered edge for turkey hiding cover (>100 square feet per acre basal area), consisting of dense thickets of vegetation and down logs. Where possible, this hiding cover should be at least 300' from the edge of the opening. Maintain large diameter, open grown, low horizontal branched trees on the remaining timbered edge of the opening for roosting and escape cover.

Riparian Habitats

Avoid disturbance (e.g. road building, trail building, skid trails), non-commercial and commercial harvest adjacent to and within riparian communities (Standards 1304 and 1306, and Guideline 3212, treated as a Standard). Buffer distance from riparian habitats will vary on a site-specific basis, and will be determined based on topography, vegetation community, etc.

Prohibit motorized vehicles from entering streams except at specified points (Guidelines 9107 and 9108, treated as Standards).

Use of chemicals in riparian and wet meadow areas should be evaluated for effects to butterfly host and nectar species and to riparian shrubs. Other means of Integrated Pest Management that do not involve the use of herbicides or pesticides (e.g. biological control agents) should be considered to treat noxious weeds (Guideline 4302, treated as a Standard).

Maintain slash and large woody debris within riparian communities (Guideline 3212, treated as a Standard). Boundaries of riparian habitats will vary on a site-specific basis, and will be determined based on topography, vegetation community, etc. Large woody debris and slash should not block stream flow or spring flows in these areas.

Sites with moist soil conditions where construction or reconstruction of spring developments, water catchments and other water facilities are proposed will be surveyed for sensitive species prior to ground-disturbing activities. If sensitive plants or animals are present, alternate sites will be selected (Guideline 3104, treated as a Standard).

New water developments will be located outside of hardwood communities (Guideline 2207, treated as a Standard).

Endangered, Threatened, Proposed, and Sensitive Species

Follow all Forest Plan Standards and Guidelines for threatened, endangered and R2 Sensitive species. These standards include but are not limited to northern goshawk habitat, sensitive snail habitat, and snags.

A sensitive species located after contract or permit formation will be appropriately managed by active coordination between permittee, contractor, or purchaser, Forest Service line officer, project administrator, and biologist. Viable solutions will be based on circumstances surrounding each new discovery and must consider the individual sensitive species needing protection, contractual obligations and costs, and mitigation measures available at the time of discovery (Standard 3115).

Protect all identified colonies (Frest and Johannes 1993, Frest Johannes 2002) of the following snail species (*Discus shimaki*, *Oreohelix strigosa cooperi*, *Vertigo arthuri*, *Vertigo paradoxa*, *Catinella gelida*, *Oreohelix strigosa n. subspecies* and *Oreohelix strigosa berryi* from adverse effects caused by management activities (Standard 3103). Management activities include vegetation treatment, road maintenance, construction or reconstruction, noxious weed treatment, prescribed fire and livestock grazing.

Avoid creating barriers (i.e. new open roads) between red-bellied snake hibernacula and wetlands (Standard 3116).

Protect identified sensitive plants and their habitat during trail, road and highway construction (Guidelines 3106 and 3107, treated as Standards).

Seed any disturbed areas with native plants (Guideline 1110, treated as a Standard). Initiate revegetation as soon as possible, not to exceed six months, after termination of ground-disturbing activities. On areas needing immediate establishment of vegetation, non-native non-aggressive annuals, non-aggressive perennials, or sterile perennial species may be used while native perennials are becoming established.

Prior to prescribed burns and noxious weed treatment, surveys for regal fritillary and tawny crescent butterflies will be completed during the breeding season to determine if localized populations exist within the treatment area. If found, such activities should occur after host plants are no longer needed for butterfly life cycle (September through April) (Guideline 3105, treated as a Standard).

Prescribed fire used in native prairie habitat should have clear objectives developed to enhance and protect sensitive butterfly host and nectar species (Guideline 3105, treated as a Standard).

Use of herbicides and pesticides should be limited to target areas (individual plant or group of plants) instead of broadcast treatments (Guideline 4304, treated as a Standard). Other means of Integrated Pest Management that do not involve the use of herbicides or pesticides (e.g. biological control agents) should be considered to treat noxious weeds (Guideline 4302, treated as a Standard).

Defer prescribed burn units from livestock grazing for at least one year after burning to ensure re-growth of forage species, butterfly host and nectar species, and soil stabilization (Guidelines 3105 and 4107, treated as Standards).

Locate slash piles that are scheduled for burning out of grasslands, meadows, and native prairie to protect from invasion of non-native species and loss of habitat for butterfly species.

Caves and Mines

Avoid ground disturbance within 500 feet of an opening of a natural cave (Guideline 1401, treated as a Standard). In addition, avoid ground disturbance within 500 feet of abandoned mines identified as being used by bats. Slash shall not be piled at the entrance of caves or mines.

Protect caves or mines identified as bat nurseries or hibernacula, and their microclimates when designing management activities (e.g. timber harvest, road construction, recreation facilities, trail construction). Protect known bat day and night roosts (Guideline 3102, treated as a Standard).

Use seasonal closures for known nursery roosts and hibernacula where there are conflicts with people (Guideline 3208, treated as a Standard). Close roads and/or trails to such sites if not needed for public access to arterial or collector roads, or private land.

Protect known bat nursery roosts and hibernacula (Standard 3207).

Protect and monitor known areas of high bat use, including water sources and feeding sites.

Any caves or mines discovered during sale layout, sale operations, or post sale activities will be reported to the District Wildlife Biologist and District Archaeologist for evaluation. If determined that the site may be suitable bat maternity or hibernation habitat, buffers will be maintained protect the microclimate of the site (Standard 3207).

Miscellaneous Wildlife Habitat

The maximum width of openings created by the application of uneven-aged silviculture will be no greater than 2 tree heights (Guideline 2102, treated as a Standard).

Certified noxious weed free-seed and mulch shall be used for re-vegetation of disturbed areas (Standard 4306). Use seed mixtures following Guidelines 1110 and 4106 (treated as Standards) on temporary roads, obliterated roads, and landings following harvest, or any other disturbed areas.

Travel Management and Recreation

Design criteria for Use-Areas - Alternative C:

OHV or Mountain Bike Use areas would consist of designated routes or tracks. Examples might include non-motorized mountain bike trails, or trail systems for dirt bikes, ATV's and/or modified 4x4's. The criteria for these designated areas include:

- Designated routes/areas will be subject to the conditions within each zone. For example, a motorized trail system will not be developed within a zone designated for non-motorized use.
- User groups or individuals will be responsible for sponsoring and helping design the proposal, and for developing and maintaining the use area. A special use permit may be required.
- Environmental protection and social or other mitigation will be integrated into the design and operation of these areas, as appropriate to eliminate or resolve associated issues.

Scenery

Where commercial vegetation treatments occur, utilize whole tree harvesting or hand pile and burn logging activity slash/fuel, within the immediate foreground of primary roads to reduce fuel levels where feasible. This will reduce the amount of slash and enhance the scenic integrity of the area.

Within the immediate foreground of primary roads and the Centennial Trail, vary harvest prescriptions for diversity in tree spacing, tree size, and unit shapes to create a natural appearing matrix of forest & opening. This is particularly important in the overstory removal units and seed cuts. The edges of units in foreground & middleground views should have the edges

feathered. A feathered horizontal transition zone of 1.5 times the height of the overstory is recommended.

Treatments around private lands, in forested areas, should blend with the current condition on those lands, where possible. Avoid creating strong lines between private and National Forest boundaries. The transition zone width is dependent upon management and use of private lands, slope, and variety of vegetation. A feathered horizontal transition zone of 1.5 times the height of the overstory is recommended.

Skid trails and landings located along state and county highways, and the Centennial Trail should be obliterated and returned to a natural condition (seeding) within the immediate foreground (150 - 300 feet or sight distance of the main roads) within 1 year of the completion of the logging activity.

Prescribed burning adjacent to travel corridors, roads & trails, should be burned toward the road or trail to limit scorch height to 1-2 feet above the ground, where possible. Where this is not possible, due to terrain, cooler firing conditions and firing techniques, should be considered, and used, to limit scorch heights.

Design water developments, if constructed under these alternatives, so cut/ fill slopes are laid back such as a 1:3 or 1:4 ratio. This allows for access by animals, aids in re-establishing vegetation, limits erosion and sedimentation. Site the development near small trees, where possible - and protect those trees, to provide a natural setting. In addition, design the impoundment in an irregular shape so that the form appears natural in the landscape. (Square shapes do not meet any SIO for any area.) Have Landscape Architect review plans prior to construction, as needed.

Lands and Special Uses

Provide access routes as needed to utility companies for utility line new construction, reconstruction and maintenance of existing rights-of-ways corridors.

Adhere to Power Line Construction, Reconstruction and Maintenance Best Management Practices dated 04/03/2002.

Protect all documented National Forest System lands boundary corners, posts and bearing trees.

Heritage.

Guideline 6101 provides for the consideration of long term Forest Management needs in determining appropriate use of mitigation of effects to, or avoidance of, heritage resources during project planning. Heritage sites located within treatment areas will be marked according to specifications provided in FS Manual 2309.24 and FSH 2361.28. Marked heritage sites will

be avoided during mechanical tree thinning, firewood collecting, fire line construction, road maintenance, and other land disturbing activities associated with the project.

Heritage sites with exposed burnable material will be protected by removing surrounding/interior fuels, foaming wooden structures, building fire lines around sites, using back-fires or a combination of measures to be determined on-site by the District or Forest Archaeologist, depending on the site's location. If no protective measures can be effectively applied, sites will be avoided during prescribed burning activities.

Indian tribes will be consulted to schedule project activities to avoid or minimize effects to traditional uses - TCPs (Traditional Cultural Properties) or spiritual use sites within the project area. Additionally, the church camp at Placerville Camp will also be notified to co-ordinate with their use of the area.

Heritage resources may be present in the subsurface with no surface manifestation. Therefore, if additional heritage resources are discovered during earth disturbing (e.g. timber thinning) activities, all operations must cease within a 300 ft. (100 meter) radius of the site and a forest archeologist notified immediately. Any additional heritage resources located during project implementation will be protected based on recommendations of the district archaeologist and State Historic Preservation Officer. All sites will be evaluated under the terms specified in 36 CFR 60.4 and 36 CFR 800 and applicable Forest guidelines [FP Guidelines 4102, 6101, 6106] (USDA Forest Service 2001). If a heritage resource site is damaged during project implementation, work at and within the immediate vicinity of the site will cease until a Forest Service archaeologist evaluates the damage, make stabilization recommendations, and determines what additional protective measures are needed to protect the site. Project work will not restart until authorized by either the District or Forest Archaeologist.

No timber cutting or related activities (skidding, decking, etc.) will be allowed within a 35-meter perimeter of a designated site boundary, except where mitigated. No new road construction will be allowed within 35 meters of a site boundary, except where mitigated. Existing roads through a site will not be improved. Logging trucks and heavy equipment will not drive through or park within a site boundary, except within existing road prisms. During the planning stage, all proposed road construction through known site areas will be checked on the ground. On-the-ground flagging of the construction effect through known sites will be checked and confirmed. Once confirmed, the District needs to decide which mitigative steps seem most appropriate given the spatial/vertical extent of the NRHP-significant site and its historic values. Additional archeological fieldwork may be required in certain instances to address these issues. The management choices then resolve down to mitigation through data recovery versus mitigation through avoidance. The latter could include permanently capping the site (or portions thereof) that exhibits the significant historic values (i.e., site preservation).

In order to protect known sites and mitigate damage to sites that may be discovered during ground disturbing activities. A special contract provision, *Protection of Heritage Resources*, will be included to assure that such resource damage during harvest operations is minimized. This provision requires the purchaser to protect all known, identified, or discovered historic, architecture, or prehistoric sites, buildings, objects and properties related to American History,

archaeology, and culture against destruction, obliteration, removal or damage during purchaser's operations. The purchaser shall immediately notify the Forest Service if damage occurs to any Heritage resource and immediately halt operations in the vicinity of the resource where damage occurred until the Forest Service authorizes the purchaser to proceed. If such damage is negligently or willfully caused by the purchaser's operations, the purchaser shall bear the costs of an investigation and restoration in accordance with 36 CFR 296.14(c), provided that such payment shall not relieve the purchaser from civil or criminal remedies otherwise provided by law. The Forest Service may unilaterally modify or cancel a contract to protect an area, object of antiquity, artifact, or similar object that may be entitled to protection.

All Forest Service and out-service personnel who may be working in the area of a site will be advised that under the provisions of 36 CFR 261.9, the following are prohibited: digging in, excavating, disturbing, injuring, or destroying any archeological, paleontological or historic site; or removing, disturbing, injuring, or destroying an object in such a site.