

## CHECKLIST ENVIRONMENTAL ASSESSMENT

<b>Project Name:</b>	Shadoan Salvage Timber Sale
<b>Proposed Implementation Date:</b>	September 2013
<b>Proponent:</b>	DNRC/ Bozeman
<b>Location:</b>	Sections 16, Township 2 South, Range 7 East
<b>County:</b>	Gallatin

### I. TYPE AND PURPOSE OF ACTION

DNRC, Bozeman Unit, is proposing to harvest an estimated 1550 MBF of Douglas fir, lodgepole pine and spruce sawtimber from approximately 260 acres located in Section 16-T2S-R7E. Approximately 3.8 miles of minimum standard new road construction would be needed to access the harvest units. The sole access route into the project area passes through private property. The landowner has imposed restrictions (such as time restrictions, etc) as a condition of use. The purpose of the action is to generate revenue for the Common School trust; improve the health, vigor and productivity of the forest stands through the removal of dead, dying, at-risk, overstocked and suppressed timber; and reduce susceptibility to fire and additional insect and disease in the proposed project area.

Lands involved in this proposed project are held by the State of Montana in trust for the Common Schools (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X Section 11). The Board of Land Commissioners and the DNRC are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). The DNRC would manage lands involved in this project in accordance with the State Forest Land Management Plan (DNRC 1996), the Administrative Rules for Forest Management (ARM 36.11.401 through 450), and all other laws applicable to timber harvest activities on State lands.

(See Attachment A for site specific locations).

### II. PROJECT DEVELOPMENT

#### 1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

*Provide a brief chronology of the scoping and ongoing involvement for this project.*

Adjacent landowners K. Coffin, R. Gray, D. Glasgow and subdivision landowners were contacted to discuss access to the State parcel.

DNRC Archaeologist P. Rennie conducted a field review in August 2012.

Individual scoping notices were sent in September 2012. (See Attachment H – List of scoping notices).

A meeting was held for adjacent subdivision landowners on September 12, 2012.

DNRC Resource Management Supervisor G. Frank, DNRC Soil Scientist J. Schmalenberg, DNRC Wildlife Biologist R. Baty, and DNRC Forester C. Barone conducted field reviews in October 2012.

MFWP Wildlife Biologist K. Loveless, P. Brown (Gallatin Valley Land Trust), B. Cestero (Greater Yellowstone Coalition), DNRC Bozeman Unit Manager Craig Campbell and DNRC Forester C. Barone conducted a field review in October 2012.

Publication of a legal notice in the Bozeman Chronicle and the Livingston Enterprise in February 2013.

#### Other contacts:

DNRC Fisheries Program Specialist J. Bower  
Montana Natural Heritage Program

**2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:**

The Gallatin County Weed District administers the State weed laws in Gallatin County. The Weed District is contacted by the DNRC and given a weed plan for each project.

DNRC is classified as a major open burner by the Montana Department of Environmental Quality (DEQ), and is issued a permit from the DEQ to conduct burning activities on State lands managed by the DNRC. As a major open burning permit holder, DNRC agrees to comply with all of the limitations and conditions of the permit.

Access to the State parcel would require a temporary road use agreement with a private landowner.

**3. ALTERNATIVES CONSIDERED:**

No Action Alternative: Current management actions would be maintained and forest management and harvesting actions would be deferred. These tracts are currently leased for grazing and agriculture. Present and impending insect and disease infestations would continue to escalate with estimated losses to mature timber resources of 85-90% in lodgepole pine cover types and 20-30% in Douglas fir cover types, and the probability of additional resource losses due to the risk of fire associated with the dead, dying and overstocked timber.

Action Alternative: Commercially harvest approximately 1550 MBF of overstocked and unhealthy timber from an estimated 260 acres of State land, located on Sections 16-T2S-R7E. Approximately 3.8 miles of minimum standard new road construction would be needed to access the harvest units. Approximately 3.4 miles of the new road construction on State lands would be reclaimed at sale completion.

**III. IMPACTS ON THE PHYSICAL ENVIRONMENT**

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" if no impacts are identified or the resource is not present.*

**4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:**

*Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.*

In general, soils in the project area are moderately productive clay loams with a high percentage of coarse rock fragments. Soils are moderately drained and can have elevated soil moisture well into early summer. High volumes of coarse rock fragments along with a clay loam texture limit the risk of soil erosion on disturbed sites to a moderate hazard on all but the steepest slopes.

Extended periods of cold temperatures during winter months, low precipitation, dry conditions in late summer, and low levels of soil organic matter limit the productivity of these soils. Coarse and fine woody material is variable throughout the project area and ranges from 5-25 tons per acre.

In areas where a moderate risk of slope stability was identified, harvest plans and treatments were modified to reduce the risk of slope failure from the proposed actions.

Under the no-action alternative forest stands would continue to age with natural mortality expected to increase as insect and disease outbreaks continue to flourish in southwest Montana. No direct, indirect or cumulative effects to soil resources would be expected. Soil resource conditions would remain similar to those of in the existing conditions.

Under the action alternative, detrimental soil impacts resulting from compaction, displacement and erosion would be expected on approximately 15% or less of each harvest unit and would be localized to primary skid trails and log landing sites. No direct or indirect impacts to soil productivity are expected if 85% of the soil resource remains functional and intact.

Project area nutrient pools are not expected to be effected if 5-10 tons of fine and coarse woody material is retained onsite for long-term soil organic matter supply and nutrient cycling. This woody material retention in concert with limiting disturbance is expected to maintain long-term productivity. Implementation of the proposed action presents a low risk to slope stability within the project area. Skid trail location, silviculture prescription, and road locations have all been designed to mitigate slope stability concerns to this low risk. All harvest activities are restricted to one winter season (November-March).

No areas are proposed for reentry under this action alternative. For an impact to soil resources to be cumulative they must overlap at least twice in both time and space. Considering this constraint, the proposed action presents a low level risk of cumulative effects to soil resources in the project area.

(See Attachment C –Soils and Watershed Assessment)

#### **5. WATER QUALITY, QUANTITY AND DISTRIBUTION:**

*Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.*

The proposed project area is located in an unnamed tributary to Rocky Creek, a Class I stream supporting a fishery that has moderate channel stability and a typical snowmelt flow regime.

One road currently bisects State land and is the only existing road on the parcel. This road is a high standard, gravel surfaced road designed for residential access to private lands surrounding the State section. The State of Montana has no access rights on the gravel road. This road crosses numerous Class I stream channels with corrugated metal culverts that have had various degrees of maintenance since the roads construction with some not meeting BMP's.

The drainage areas consist of partially forested lower mountain slopes and ridges with broad valley bottoms. The unnamed tributary to Rocky Creek drains a watershed area of approximately 986 acres. This drainage is classified as B-1 in Montana's Surface Water Quality Standards

The B-1 classification is for multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, agricultural, and industrial uses. Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentrations of sediment, which would prove detrimental to fish or wildlife. The State has adopted Forestry Best Management Practices through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities. Downstream beneficial uses in the affected watersheds include: domestic, irrigation, livestock watering, wildlife, and cold-water fisheries.

Rocky Creek is listed on the 2012 303(d) list for partial support of aquatic life, cold-water fishery, industry and primary contact recreation. The listed probable causes for not fully supporting this use include alternation of streamside or littoral vegetative covers, other anthropogenic substrate alterations and physical substrate habitat alterations.

The proposed Shadoan Salvage timber sale would result in approximately 260 acres of commercial timber harvest (distributed over 11 units) and 3.8 miles of new road construction located on State and private lands. Approximately 3.4 miles of the new road construction on State lands would be reclaimed at sale completion.

The primary concerns regarding water quality is the potential for increased levels of erosion and subsequent sediment delivery to streams from roads, road stream crossings and constructed skid trails. The proposed action includes the construction and subsequent removal of four new temporary road stream crossings. Installation of either permanent or temporary culverts and removal of temporary structures may lead to erosion

of road surface and fill slope materials and subsequently increase levels of fine sediment delivery to streams. Low levels of increased sediment delivery can be expected to occur at stream crossing sites during and immediately following the construction of road stream crossings and the removal of temporary stream crossing structures. These increases are expected to be minimal, limited in spatial extent and temporary. Road construction and stream crossings would implement all applicable forestry BMP's and requirements of the Montana Stream Protection Act (124 Permit), Montana Streamside Management Zone Law (SMZ Law) and DNRC Forest Management ARMS. The anticipated temporary low level increases in sediment delivery at these sites are not expected to adversely impact downstream beneficial uses. No direct or indirect impacts to water quality are expected to occur from existing roads or proposed new road construction.

Harvest activities would occur on gentle to moderate slopes ranging from 5-45%. All streams channels and other ephemeral drainage features located within and immediately adjacent to the proposed harvest units would be well buffered from all harvest activities. Sediment delivery to stream channels is not expected to result from the proposed timber harvest or ground based skidding. All requirements of the Streamside Management Zone (SMZ) law and Forest Management ARMS to Riparian Management Zones (RMZ) and Wetland Management Zones (WMZ) would be implemented into the design of these buffers. Timber harvest and road activities would implement all applicable forestry BMP's to avoid or minimize the risk of soil erosion and potential for sediment delivery. No adverse direct or indirect impacts to water quality or downstream beneficial uses are anticipated to result from the proposed timber harvest.

The proposed levels of timber harvest and new road construction are not expected to contribute to adverse cumulative watershed effects due to modified stream flow regimes. Substantive changes in the magnitude, timing and duration of peak flows are not expected to result from the proposed activities in the affected watershed. The proposed levels of timber harvest when combined with the existing levels of timber harvest in watershed are below those levels associated with detrimental increases in water yield.

A moderate risk of short-term moderate level impacts from sediment delivery during stream crossing construction is expected in the watershed analysis area. These impacts would be short-term and would occur immediately during and after culvert installation, removal, repair and/or maintenance. A high level of BMP effectiveness can be expected during and after implementation of the proposed actions on roads owned by the State within the project area. A low risk of moderate cumulative effects from sediment delivery can be expected as a result of implementation of the proposed actions. Reasonable land, soil, and water conservation practices outlined in Montana BMP's for forestry applied during and after project activities present a low level of risk for these impacts to occur.

(See Attachment C –Soils and Watershed Assessment)

## **6. AIR QUALITY:**

*What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.*

The project includes piling and burning of logging slash. Localized short duration particulate emissions occur during slash burning. Slash burning is normally conducted in late October through November. The DEQ and the Cooperative Airshed groups regulate particulate emissions during this period. Burning times are coordinated to 1) limit burning periods of acceptable smoke dispersion and 2) to limit the cumulative generation of particulates.

DNRC is a member of the Montana/Idaho Airshed Group, which coordinates burning activities related to forest management among the group's members in order to minimize impacts from smoke generated by those activities. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, MT. Thus direct, indirect, and cumulative impacts associated with the proposed action are expected to minimal.

## **7. VEGETATION COVER, QUANTITY AND QUALITY:**

*What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.*

The State parcel is located in the southern edge of the Bridger Range within what is known as the Bozeman Pass Wildlife Corridor. Lands occur in open, rolling country with generally broad and gentle ridge tops. Vegetation is a complex of grass range with mosaic stands of Douglas fir and lodgepole pine. Varied timber harvesting has occurred on the landscape in the last 100 years.

Forested stands occur on northerly and southerly aspects and are predominately even aged, single story Douglas fir and lodgepole pine cover types. North aspects are Douglas fir/Pinegrass habitat type dominated by Douglas fir with lodgepole pine as a seral species. Lodgepole Pine/Pinegrass habitat type occurs on some small isolated sites. Stand composition ranges from dense mature forest to moderate to heavily overstocked and near stagnant forest. Regeneration is sparse with moderate to heavy understory vegetation and coarse woody debris and cattle/wildlife use is heavy in all stands.

The dry south aspects are Douglas fir/Ninebark habitat type. Douglas fir is a major seral species and is present in every stand. These stands are comprised of sparsely to moderately stocked forest. Regeneration is sparse with light understory vegetation and coarse woody debris and cattle/wildlife use is heavy in all stands.

Stand structure is a result of some past timber harvesting and stand replacing fire that occurred approximately 135 years ago. Older Douglas fir trees (>150 years) occur in most of the stands as scattered individual trees or small patches of <5 acres. Aspen stands are being overtaken by conifer encroachment. The absence of fire, in combination with encroachment, has resulted in overstocked and suppressed stands. These conditions make the stands more susceptible to fire and attack from insects and disease. There is currently more total forest cover in Gallatin County than in prior historical conditions.

Old trees do occur within the proposed project area but are generally found as small clumps of old relic trees (<5 acres) and/or scattered individuals that would not meet the minimum criteria for old growth. Historically, these remnants were typically naturally fragmented, open-park like communities maintained by frequent low intensity fires. None of the 260 acres in the proposed project harvest units would meet the DNRC definition of old growth.

Douglas fir stands and individual Douglas fir are exhibiting moderate to heavy crown defoliation due to repeated, heavy infestations of Spruce Budworm. All lodgepole pine stands are presently under attack from Mountain Pine Beetle and the majority of the mature trees, >80 years old, have already been infested or are expected to yield to beetle attack within the next two years. Additionally, these numerous stands are moderately infested with Dwarf mistletoe, which can reduce height growth, stand volume, seed production and tree vigor. Years of regional drought and warm winters combined with high stand densities of mature and over-mature timber have compounded and aggravated the risk of more serious insect and disease outbreak. Mountain Pine Beetle and Spruce Budworm have periodically infested these stands, in varying degrees, over the life of the forest.

There would be no human development that would significantly decrease linkage value and proposed activities would not impede wildlife movements across the landscape, valley or foothill area. The proposed project would harvest a total of 260 acres, over 11 harvest units, and increase the amount of non-forest in the area for the short term. Species of wildlife preferring less dense forest conditions would benefit from the creation of additional habitat, whereas species adversely affected by decreased forest density would not. Endemic species that occur in this area would likely not be affected appreciably, as they most likely evolved with naturally fragmented forest conditions created by natural disturbance events. The proposed levels of harvest and subsequent reduction in forest canopy would be accelerated compared to what would be expected to occur under the present natural conditions. Due to the size of the proposed harvest units and number of acres harvested, expected direct and indirect effects to habitat linkage and use of the area as a movement corridor would be low.

The proposed 3.8 miles of temporary new road construction would have minimal expected adverse impact on fragmentation of habitat or increases in human activity as it would be reclaimed and effectively closed upon

completion of the project. Direct, indirect and cumulative effects related to the proposed new road construction in the project area would be minimal due to the small area affected and road reclamation.

Average patch size of existing forested acreage would be reduced within the proposed project area. Stand density and forest canopy structure within the proposed harvest units would be reduced dramatically. Moderate direct and indirect effects to habitat security for wildlife would be anticipated due to the loss of cover. Minor adverse cumulative effects to habitat security, habitat linkage and movement corridors for wildlife would be anticipated.

The State parcel would exhibit moderate changes due to the proposed harvest but would still continue to contribute to the Bozeman Pass Wildlife Corridor area only at a slightly diminished capacity. The remaining tracts within the Bozeman Pass Wildlife Corridor area would likely continue on their present varied course of vegetative manipulation, property subdivision/subdivision construction, management under conservation easements and/or no management.

Treatments for lodgepole pine cover types would target all dead, dying and at-risk lodgepole pine and other shade intolerant species exhibiting signs of insect/disease, poor health and/or poor tree form characteristics for removal and overall stand density reduction, utilizing regeneration harvests. Older, large shade tolerant trees would be harvested to cull out defective or damaged trees, where applicable.

Treatments for Douglas fir cover types would target dead, dying, at-risk and overstocked trees for removal. Trees of all age classes exhibiting signs of insect/disease, poor health and/or poor tree form characteristics would be designated for harvest. Additionally, overall stand density would be reduced by 50-60% of the merchantable volume, targeting shade tolerant species and trees exhibiting overstocked/suppressed conditions, while favoring younger age classes for the residual stand, utilizing group selection/selection/seed tree harvests. Large live trees, live cull trees, snags, cull snags, and coarse woody debris and fine materials would be protected and retained in sufficient quantities where applicable.

In general, submerchantable trees and shrubs would be protected and retained for visual screening. A regeneration harvest would be utilized within 75-100' of aspen colonies for aspen restoration. No rare plants or cover types have been noted by the Montana Natural Heritage Program or observed within the project area.

The DNRC requires the washing of equipment, seeding of grass and monitoring of disturbed areas to minimize the potential of noxious weeds being introduced. There is low risk of direct, indirect, or cumulative impacts due to weeds.

Due to the size, duration (~1 year) and harvest method of the proposed project, road closures and additional recommended mitigation measures, impacts to vegetative communities from commercial harvesting are expected to be minor.

(See Attachment F – Vegetative Analysis/Stand Prescription)

## **8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:**

*Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.*

A variety of big game, small mammals, raptors and songbirds potentially use this area. The unnamed tributary to Rocky Creek and Rocky Creek support known cold-water fisheries.

The project area lies within the MT. Fish, Wildlife and Parks Bridger Elk Management Unit/Hunting District 393. Managing "elk populations within the range of habitat availability and social tolerance" and "limited public elk hunting on private lands" are primary concerns expressed by MFWP in this hunting district. Achieving these goals can be hampered when available cover at the landscape level is reduced appreciably through timber harvest activities, road management, or natural disturbances, such as large scale stand-replacement wildfires.

Timber harvesting and road construction would alter a total of 260 acres of hiding/thermal cover and would likely have a moderate influence on mitigating elk vulnerability within the proposed project area. Of the 3.8 miles of

proposed new road construction, 3.4 miles would be reclaimed minimizing the potential for increased motorized access from existing levels. Additionally, public access to the State parcel is restricted due to the surrounding private ownership.

Visual screening properties of hiding cover would change considerably in all harvest units. Following the proposed harvest, visual obstruction would be provided by smaller patches and stringers of mature and sub merchantable trees than the larger, dense patches, which currently exist in the proposed project area. Douglas-fir leave trees would be retained in a clumped distribution to minimize sight distance where opportunities exist. Mature forest within the State parcels could have hiding cover value reduced by up to 60% in most treated portions. Moderate proportional increases in elk vulnerability and energy expenditures could be expected for elk that use this area during the fall and winter seasons until vegetation is reestablished.

Over time the treatment areas would recover. Additionally, there is adequate habitat available on adjacent lands and within the affected watershed which would provide hiding/security cover. Cover removal associated with the proposed project would result in a minor adverse contribution to cumulative effects, but would be additive if additional timber harvests occurred on other ownerships.

The proposed 640-acre project area lies within a 43,800-acre area identified as the Heart of the Rockies Initiative (HOTR) and within the Bozeman Pass Wildlife Corridor. Many homes and low density subdivisions occur in this area and patches of forested habitat security cover do not exist in this area due to the high density of usable private and public roads, and home sites. Thus, security habitat in this landscape is relatively poor in its existing condition. Existing habitat patches are moderately to highly fragmented due to natural fragmentation, and roads and home sites. Cover removal affecting security habitat would occur predominately on ~107 acres in harvest units 1, 2, and 3 in the southern portion of the project area where the most dense and continuous patch of mature cover currently exists. It is expected that enough patches of mature trees would remain to facilitate continued use of the area by species known to frequent the area.

Moderate direct and indirect effects to habitat security for wildlife would be anticipated due to the loss of cover. However, low direct and indirect effects to habitat linkage and use of the area as a movement corridor would be anticipated. Minor adverse cumulative effects to habitat security, habitat linkage and movement corridors for wildlife would be anticipated.

Due to the treatment methods and subsequent recovery of treatment areas, the availability of adequate habitat on adjacent lands and within the affected landscape, road closures and additional recommended mitigation measures, adverse direct, indirect or cumulative impacts to wildlife as a result of the proposed actions are expected to be minor.

Any direct, indirect or cumulative impacts to the fisheries within the watershed are expected to be minimal as a result of implementing the proposed actions.

(See Attachments B, C, D & G – Wildlife Security and Linkage Assessment, Soils and Watershed Assessment; Grizzly Bear Assessment; Checklist for Endangered, Threatened and Sensitive Species)

**9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:**

*Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.*

The proposed project is located within an area identified as the Bozeman Pass Wildlife Corridor. This area helps to provide linkage between the Gallatin and Madison ranges and the Bridger and Bangtail ranges. Given that: 1) all of the newly constructed roads would be reclaimed following their use prohibiting any additional increase in motorized activity; 2) about 40% of existing mature trees would remain in draws and clumps following harvest providing some residual cover; 3) the project area exists in an area where forest stands are naturally fragmented; 4) animals that use this area on a frequent basis must have some habituated tolerance to human activities given the relatively high density of homes and roads; 5) the likelihood of additional vegetative manipulation on other ownerships that would affect cover in the cumulative effects analysis area; and 6) that the

density of human dwellings or long-term traffic volumes would not change; minor adverse cumulative effects to habitat security, habitat linkage and movement corridors for wildlife would be anticipated.

Occasional Grizzly Bear use of the Bridger Mountains may occur, however, the project area is generally considered outside of their normal occupied habitat. Preferred habitat for grizzly bear is present within the proposed project area but is marginal. Adverse direct, indirect and cumulative impacts to Grizzly Bear's as a result of this project are expected to be minimal.

No known denning or rendezvous sites for Gray Wolf occur within 1 mile of the project area. However, wolves may occasionally use the project area and occasional sightings have been noted in the area. Minimal risk of direct, indirect or cumulative effects that would result in harm to wolves would be anticipated under either of the alternatives considered. If wolves or an active den site were detected in the immediate area, operations would cease, and a DNRC biologist would be consulted.

The proposed project area is located along the fringes of preferred lynx habitat. Suitable lynx habitat is potentially present and Lynx could occasionally use the project area. However, habitats high in coarse woody debris that are preferred for denning, and large acreages of dense conifer regeneration at high elevations that are preferred for foraging are not present in the project area. Lynx habitat is marginal due to naturally induced fragmentation, and the high level of interspersed native grassland habitat and dry forest types; and to the lack of highly desirable habitat conditions for lynx and their primary prey, snowshoe hares. No adverse direct, indirect or cumulative impacts to lynx are expected as a result of this project.

The proposed project area falls within the range of wolverines. The DNRC is not aware of any specific observations of wolverines associated with the proposed project area, however, periodic or transient use of the proposed project area could occur. Due to the size, nature, duration and location of the proposed project, activities associated with this proposal are expected to have minimal effect on wolverines.

Sagebrush semi-desert habitats suitable for use by Sage Grouse do occur within one mile of the project area. No leks are known to occur within one mile of the proposed project or haul route. Should sage grouse be present in the vicinity of the project area, any effects to habitat or disturbance-related effects would be expected to be minimal, due to the late start-up date of activities (i.e., post June 15), and preferred sagebrush habitat would not be altered. Impacts to Sage Grouse would not be anticipated.

The watershed within the project area is known to support cold-water fisheries. Direct, indirect or cumulative impacts to the fisheries resources within this watershed as a result of implementing the proposed actions are expected to be low or negligible.

A bird species of concern, Veery, has been observed within the project area. No other sensitive species/species of special concern have been documented or observed within the proposed project area. No threatened or endangered species are known to have been documented within the proposed project area.

Due to the size, duration, season of harvest and harvest methods, road reclamation and additional recommended mitigation measures, adverse direct, indirect or cumulative impacts to endangered, threatened or sensitive species as a result of the proposed actions are expected to be minimal.

(See Attachments B, C, D & G – Wildlife Security and Linkage Assessment; Soils and Watershed Assessment; Grizzly Bear Assessment; Checklist for Endangered, Threatened and Sensitive Species)

#### **10. HISTORICAL AND ARCHAEOLOGICAL SITES:**

*Identify and determine effects to historical, archaeological or paleontological resources.*

In August of 2012, the DNRC staff archaeologist conducted a Class III inventory of cultural and paleontologic resources within and adjoining the area of potential effect. No significant cultural or paleontologic resources were identified. The proposed project would have No Effect to heritage properties.

#### **11. AESTHETICS:**

*Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.*

The proposed project area in Section 16-T2S-R7E is visible to a moderately populated area and a majority of the sale area can be seen from Interstate 90. Due to the aspect and topography of the proposed sale area and limited viewing area, impacts concerning aesthetics are expected to be minimal.

**12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:**

*Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.*

None.

**13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:**

*List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.*

A Preliminary Environmental Review was completed in June 1980 for the Shadoan Timber Sale (Section 16-T2S-R7E) for the harvest of 834 MBF on 107 acres.

Cumulative impacts as a result of the proposed action are expected to be minor.

**IV. IMPACTS ON THE HUMAN POPULATION**

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" if no impacts are identified or the resource is not present.*

**14. HUMAN HEALTH AND SAFETY:**

*Identify any health and safety risks posed by the project.*

NONE

**15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:**

*Identify how the project would add to or alter these activities.*

NONE

**16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:**

*Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.*

People are currently employed in the wood products industry. Due to the relatively small size of the timber sale program, there would be no measurable direct, indirect, or cumulative impact from this proposed action on employment.

**17. LOCAL AND STATE TAX BASE AND TAX REVENUES:**

*Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.*

People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale program, there would be no measurable direct, indirect, or cumulative impact from this proposed action on tax revenues.

**18. DEMAND FOR GOVERNMENT SERVICES:**

*Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services.*

There would be no measurable direct, indirect, or cumulative impacts related to demand for government services due to the small size of the timber sale program, the short-term impacts to traffic and the small possibility of a few people temporarily relocating to the area.

**19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:**

*List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.*

Gallatin County Growth Policy adopted April 15, 2003, providing general direction for decisions relating to land use in Gallatin County.

Bozeman Pass Zoning Regulation adopted May 16, 2006, designed to maintain the rural residential and agricultural character within the Bozeman Pass Development Pattern and Development District by planning and guiding future growth.

The proposed project would not be affected by the growth policy or zoning plan.

**20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:**

*Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.*

Persons having legal access to the parcel and possessing a valid state lands recreational use license or FWP conservation license may conduct various recreational activities on the parcel. The proposed project would not affect the existing access for the general public.

**21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:**

*Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.*

There would be no measurable direct, indirect, or cumulative impacts related to population and housing due to the relatively small size of the timber sale program, and the fact that people are already employed in this occupation in the region.

**22. SOCIAL STRUCTURES AND MORES:**

*Identify potential disruption of native or traditional lifestyles or communities.*

NONE

**23. CULTURAL UNIQUENESS AND DIVERSITY:**

*How would the action affect any unique quality of the area?*

Minor adverse cumulative effects to habitat linkage and movement corridors for wildlife within the Bozeman Pass Wildlife Corridor would be anticipated.

**24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:**

*Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.*

The estimated return to the trust would be \$103,418.00 (1550 MBF of tractor sawtimber @ \$66.72/MBF). This estimate is intended for comparison of alternatives, not as an absolute estimate of return.

Income from a grazing lease of \$1,709.68/year and a home site lease of \$7,835.31/year would continue with or without the harvest proposal.

<b>EA Checklist Prepared By:</b>	<b>Name:</b> Chuck Barone	<b>Date:</b> June 28, 2013
	<b>Title:</b> Bozeman Unit Forester	

**V. FINDING**

**25. ALTERNATIVE SELECTED:**

I have selected the Action Alternative with the recommended mitigating measures because it:

- adequately addresses all issues and concerns raised by the public and internally,
- adequately meets the purpose of the project and accomplishes the project objectives,
- contains an appropriate level of mitigation for the various affected resources, and
- meets all applicable rules and regulations.

**MEASURES RECOMMENDED TO MITIGATE POTENTIAL IMPACTS:**

- 1) Compliance with Forestry Best Management Practices (BMP's), Streamside Management Zone (SMZ) laws, the Montana Stream Protection Act (124 Permit) and applicable DNRC Forest Management Administrative Rules.
- 2) Limit equipment operations to periods when soils are dry (less than 20% soil moisture), frozen or snow covered (12 inches packed or 18 inches unconsolidated) to minimize soil compaction, rutting, vegetative disturbance and maintain drainage features. Control erosion by installing adequate drainage on roads and skid trails.
- 3) The Forest Officer shall approve a plan for felling, yarding and landing location in each harvest unit prior to the start of operations in the unit. The locations and spacing of skid trails and landings shall be designated and approved by the Forest Officer prior to operations and skid trails would not be spaced less than 50 feet. Retain all fine litter as feasible and 5-10 tons/acre of large woody debris >3" diameter. Minimize soil disturbance by general skid trail planning and limit sustained tractor skidding to slopes ≤45% throughout entire project. Limit scarification to 30-40% of the harvest area. Slash would be left in the harvest units where feasible, and distributed on skid trails upon completion of use, for nutrient cycling, to control erosion and to provide shade and protection for seedlings.
- 4) For slope stability on the road construction segments, construct cutslopes at 1:1 (run/rise) in common material and 1/4:1 for rock. Install adequate road drainage to control erosion concurrent with harvest activities and road opening and new construction. Provide effective sediment filtration along drainage features near crossing sites. New construction and major skid trails on State lands would be closed with slash and debris and/or barriers, and adequate drainage provided.
- 5) All road and logging equipment would be power washed and inspected prior to being brought on site. Sale area would be monitored for weeds following harvest and a treatment plan would be developed should noxious weeds occur. All road-stream crossings would be monitored for sedimentation and deterioration of road prism.
- 6) At sale closure, grass seed roads, skid trails (where needed) and landings with an appropriate seed mixture.
- 7) One snag and one snag recruit per acre, of the largest diameter class, would be retained where applicable. Cull live trees and cull snags would be retained where applicable.

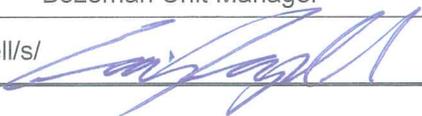
- 8) Retain live, healthy older trees and stand attributes suitable for old growth development where available and applicable.
- 9) Contact DNRC wildlife biologist should any threatened or endangered species be encountered within the proposed project area.

**26. SIGNIFICANCE OF POTENTIAL IMPACTS:**

I have determined that none of the anticipated environmental impacts outlined in the EA are significant according to the criteria outlined in ARM 36.2.524. I find that no impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that the identified adverse impacts will be avoided, controlled, or mitigated by the design of the project to the extent that the impacts are not significant.

**27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:**

EIS       More Detailed EA       No Further Analysis

<b>EA Checklist Approved By:</b>	<b>Name:</b> Craig Campbell
	<b>Title:</b> Bozeman Unit Manager
<b>Signature:</b> Craig Campbell/s/ 	<b>Date:</b> 7/2/2013

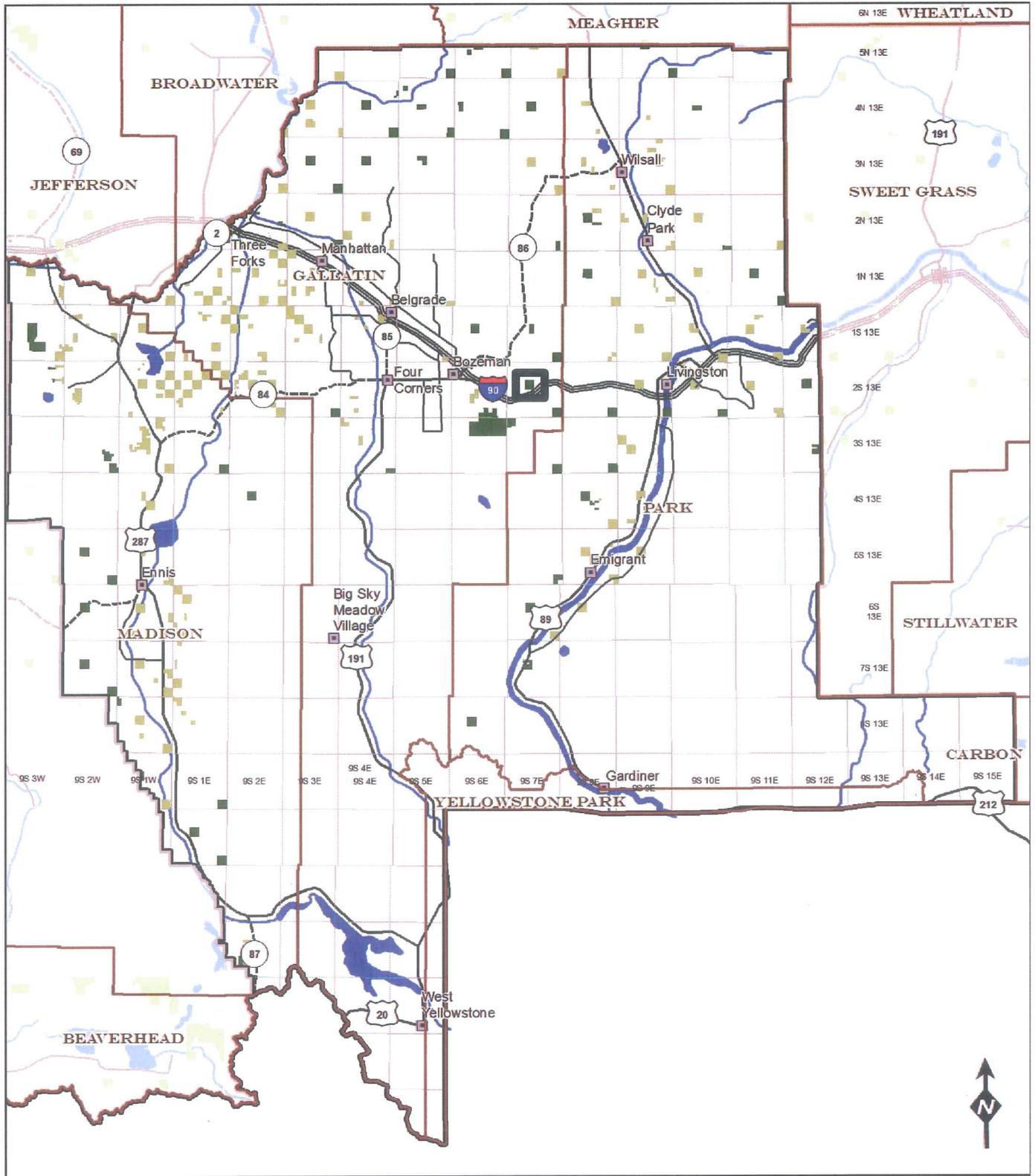
ATTACHMENTS

- A – Vicinity/Site Specific Map
- B – Wildlife Security and Linkage Assessment
- C – Soils and Watershed Assessment
- D – Grizzly Bear Assessment
- E – Checklist for Endangered, Threatened and Sensitive Species
- F – Vegetative Analysis/Silvicultural Prescription
- H – List of Individual Scoping Notices

# ATTACHMENT A

## Shadoan Salvage Timber Sale Vicinity Map

### Section 16-T2S-R7E, Gallatin County



4 June 2012  
 Montana DNRC  
 OIT/GIS dr

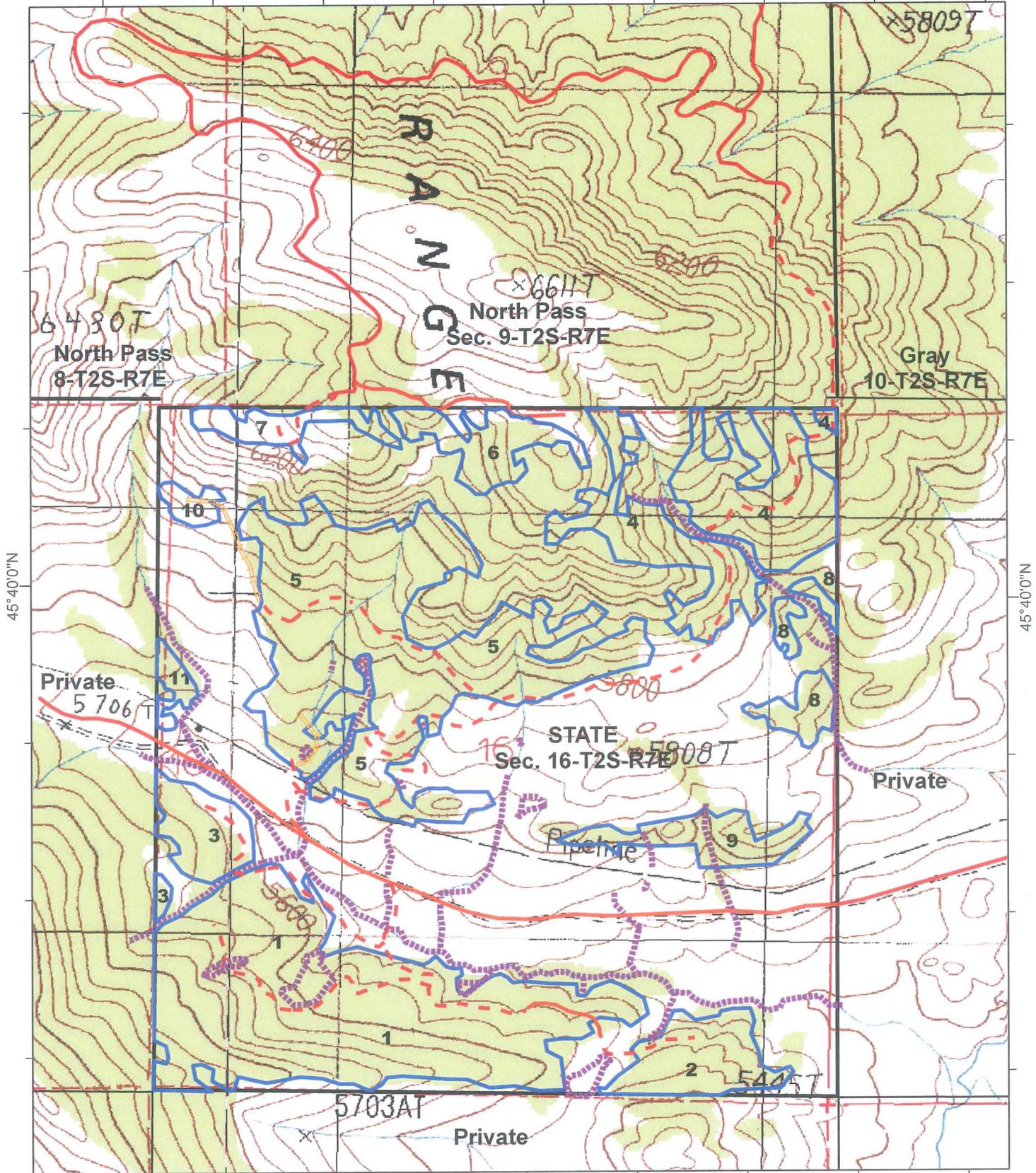
	Interstate Highway		County		City
	U.S. Route		DNRC other		Township/Range
	State Highway		DNRC managed for timber production		Management Unit
	Secondary Roads				





**ATTACHMENT A**  
**Shadoan Salvage Timber Harvest**  
**Section 16-T2S-R7E, Gallatin County**

110°52'0"W



1:12,500

- Existing Road
- - - - New Road
- - - - Designated Skid Trail
- · · · · SMZ/Wetland Area
- Harvest Area





## ATTACHMENT B

### Shadoan Salvage Wildlife Security and Linkage Assessment

R. Baty, FMB Wildlife Biologist

June 11, 2013

There is concern that harvesting and roads may adversely affect wildlife habitat and a wildlife linkage corridor for large free-ranging species of wildlife such as elk, deer, grizzly bears, black bears, moose, mountain lions and wolves.

An important habitat component for wildlife is the presence of habitat connectivity and linkage (Hilty et al. 2006, Servheen et al. 2003). Servheen et al. (2003) define habitat linkages as "the area between larger blocks of habitat where animals can live at certain seasons where they can find the security they need to successfully move between these larger blocks of habitat." The importance of maintaining habitat linkage and minimizing habitat fragmentation is an issue recognized by federal, state, and county governments; conservation organizations; and many others (Servheen et al. 2003, GVLT 2007). It is an issue encompassing not only wildlife conservation, but also human safety and economics, since vehicle-wildlife collisions on highways result in human fatalities and injuries each year, and cost millions of dollars in property damage (Servheen et al. 2003, Craighead et al. 2001). The main factors generally considered to affect the quality of linkage zones are major highways, railroads, road density, human site development, availability of hiding cover, and the presence of riparian areas (Hilty et al. 2006, USFS 2005, Servheen et al. 2003, Craighead et al. 2001). Maintaining linkage and connectivity between isolated populations can benefit wildlife species in several ways by: (1) allowing immigrant individuals to bolster a resident population in an area that has been affected by catastrophic events or negative environmental conditions, and (2) preserving genetic diversity by reducing negative effects from inbreeding.

The 640-acre proposed project area is comprised of approximately 220 acres of grassland habitats interspersed with approximately 420 acres of patchy, mature forested habitats. Douglas-fir is the dominant tree species in most stands and lodgepole pine is present in lesser amounts. The proposed 640-acre project area lies within an approximately 43,800-acre area identified as the Heart of the Rockies Initiative (HOTR) -- Gallatin/Paradise Valley Focal Area and within the Bozeman Pass High Value Lands. This area was also identified by Noss et al. (2002) as an important wildlife corridor at risk. The Gallatin Valley Land Trust and other partners have prioritized conservation efforts in this area and projects have included: conservation easements, wildlife monitoring, wildlife crossing structures, vehicle collision reduction, zoning implementation, weed management, and access enhancement on National Forest lands. The corridor spans approximately 12 miles between units on the Gallatin National Forest south of I-90, and the Bridger and Bangtail units north of I-90. Interested parties have voiced concerns that the removal of trees and construction of roads on the project area could adversely affect wildlife security on the parcel and

impede the ability of large, free ranging wildlife species to use this important movement corridor.

Public access to the State parcel is restricted due to the surrounding private ownership. A private gravel road in the south half of Section 16-T2S-R7E is open to authorized use under specific easements and leases only. The State of Montana has no access rights on the gravel road. All other roads on the State parcel within the proposed project area are administratively closed to motorized vehicle use for recreational purposes.

To analyze cumulative effects, a 21,856-acre cumulative effects analysis area, roughly centered on the project area, was delineated to assess cover and habitat linkage values and impacts across a broader landscape than simply the 640-acre project area. This cumulative effects analysis area (CEAA) is bisected by I-90, and contains a number of accessible public roads, county roads and private roads. Many homes and low density subdivisions occur in this area and patches of forested habitat security cover as described by Hillis et al. (1991) do not exist in this area due to the high density of usable private and public roads, and home sites. Thus, security habitat in this identified 21,856-acre landscape is relatively poor in its existing condition. Existing habitat patches throughout the CEAA are moderately to highly fragmented, much of which is natural fragmentation due to native grassland inclusions. However, roads and home sites fragment these areas of habitat as well. The greatest density of forest cover occurs in a ~5,680-acre patch that runs relatively linear north to south just west of the project area. While this landscape has experienced considerable human use and development during the last several decades, a number of large mammal species, such as mule deer, white-tailed deer, moose, elk, black bears, wolves, and mountain lions periodically, or frequently use the CEAA, indicating that some species have been able to habituate to some degree to the high level of human use and presence in this area.

No Action -- Under the no action alternative, no harvest or road construction activities would occur. Habitat security and hiding cover would remain in its current condition, and conifer encroachment into nearby grasslands would likely continue. No adverse direct, indirect or cumulative effects to wildlife security, corridors or habitat linkage would be anticipated under this alternative.

Action Alternative -- Under the Action Alternative approximately 3.8 miles of road would be constructed and used, and 3.4 miles of existing road would be used (7.2 miles total) for the duration of the project (~1 year). Immediately following project completion, 3.4 miles of the new road miles would be made impassible with slash and debris. Following harvest activities, the gravel road in the south half of Section 16-T2S-R7E would remain open as a private access and for periodic DNRC administrative uses only.

Approximately 260 acres (62%) of the existing 420 acres of forested stands on the project area would be harvested, resulting in the removal of approximately 60% of the mature trees. In some portions of harvest units, small openings would be created where pockets of diseased and dying trees are present. Given the type of treatment proposed, hiding cover could be reduced on the project area by up to 60% as well, which would also reduce the quality of security habitat for wildlife. Cover removal

affecting security habitat would occur predominately on ~107 acres in units 1, 2, and 3 in the southern portion of the project area where the most dense and continuous patch of mature cover currently exists. Trees that would be retained would be clumped to the extent possible to maintain potential bedding sites and hiding cover. Dense stringers of cover would also be retained in draw bottoms and riparian areas, which would provide some escape cover and mitigate for high increases in sight distance within most treated stands. While approximately 60% of the mature forest cover would be removed on the project area, it is expected that enough patches of mature trees would remain to facilitate continued use of the area by species known to frequent the area. Elk would likely find the stands in the southern portion of the project area less suitable as bedding or loafing areas and may generally be displaced to areas with greater levels of mature forest cover for several decades, whereas, white-tailed deer and mule deer would likely be affected less. Overall, given that: 1) all of the newly constructed roads on the State parcel would be reclaimed following their use prohibiting any additional increase in motorized activity; 2) about 40% of existing mature trees would remain in draws and clumps following harvest providing some residual cover; 3) the project area exists in an area where forest stands are naturally fragmented; and 4) animals that use this area on a frequent basis must have some habituated tolerance to human activities; moderate direct and indirect effects to habitat security for wildlife would be anticipated due to the loss of cover. However, low direct and indirect effects to habitat linkage and use of the area as a movement corridor would be anticipated.

Cumulative Effects -- Under the Action Alternative approximately 3.8 miles of road would be constructed and used, and 3.4 miles of existing road would be used (7.2 miles total) for the duration of the project (~1 year). Immediately following project completion, 3.4 miles of the new road miles would be made impassible with slash and debris. Approximately 260 acres (~5%) of 5,680-acres of relatively dense mature forest cover within the 21,856-acre cumulative effects analysis area would be harvested.

Additionally, the GVLTL has a conservation easement on the adjacent section to the west of the State parcel and is considering a forest management project which may include aspen restoration, fuel reduction/breaks and some light commercial thinning on up to ~100 acres.

Cover removal affecting security habitat on the State parcel would occur predominately on ~107 acres in units 1, 2, and 3 in the southern portion of the project area where the most dense and continuous patch of mature cover currently exists. Stands in this area are part of a larger complex patch of mature forest cover (~540 additional acres) that extends immediately west of the project area on neighboring ownerships. Habitat in this adjacent forested area is interspersed with young conifer stands, natural openings, several developed home sites, and rugged terrain. Elk would likely find the logged stands in the southern portion of the project area less suitable as bedding or loafing areas and may generally be displaced to areas with greater levels of mature forest cover for several decades, whereas, white-tailed deer and mule deer would likely be affected less. Dense stringers of cover would be retained in draw bottoms and riparian areas, which would provide some escape cover and mitigate for high increases in sight

distance within most treated stands. While approximately 60% of the mature forest cover would be removed on the project area, it is expected that enough patches of mature trees would remain to facilitate continued use of the project area and cumulative effects analysis area, albeit at lesser levels, by species known to frequent the area. Further, this project would have no additional influence on the abundance or density of developed home sites, traffic volumes, or other long-term increases in human activity in the cumulative effects analysis area, which can have considerable influences on habitat linkage for some species of wildlife (Servheen et al. 2003). Overall, given that: 1) all of the newly constructed roads would be reclaimed following their use prohibiting any additional increase in motorized activity; 2) about 40% of existing mature trees would remain in draws and clumps following harvest providing some residual cover; 3) the project area exists in an area where forest stands are naturally fragmented; 4) animals that use this area on a frequent basis must have some habituated tolerance to human activities given the relatively high density of homes and roads; 5) the likelihood of additional vegetative manipulation on other ownerships that would affect cover in the cumulative effects analysis area; and 6) that the density of human dwellings or long-term traffic volumes would not change; minor adverse cumulative effects to habitat security, habitat linkage and movement corridors for wildlife would be anticipated.

## References

- Craighead L., Craighead A. and Roberts E.A. 2001. Bozeman Pass wildlife linkage and highway safety study. IN: Proceedings of the 2001 International Conference on Ecology and Transportation, Eds. Irwin CL, Garrett P, McDermott KP. Center for Transportation and the Environment, North Carolina State University, Raleigh, NC: pp. 405-422.
- GVLT 2001. Bozeman Pass wildlife corridor project: 2007 project priorities. Unpublished report. Gallatin Valley Land Trust. Bozeman, MT [www.gvlt.org](http://www.gvlt.org). 14 pp.
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- Hilty, J. A., W.Z. Lidicker Jr., and A.M. Merenlender. 2006. Corridor ecology. Island Press. Washington, DC. 324 pp.
- IGBC Public Lands Linkage Task Force. 2004. Identifying and managing wildlife linkage approach areas on public lands. A report to the Interagency Grizzly Bear Committee (IGBC). IGBC Public Lands Wildlife Linkage Taskforce. June 17, 2004. 33 pp.

Noss, R.F., C.Carroll, K. Vance-Borland, and G. Wuerthner. 2002. A multicriteria assessment of irreplaceability and vulnerability of sites in the Greater Yellowstone Ecosystem. *Conservation Biology* 16:895-908.

Servheen, C., J.S. Waller, and P. Sandstrom. 2003. Identification and management of linkage zones for wildlife between the large blocks of public land in the northern Rocky Mountains (July 8, 2003). Unpublished report. USFWS, College of Forestry and Conservation, University of Montana, Missoula, Montana. 83 pp.

USFS. 2005. Grizzly Bear (*Ursus arctos*) final biological assessment for the forest plan amendments for grizzly bear conservation for the Greater Yellowstone Area National Forests.



## ATTACHMENT C

Soils and Watershed Report  
Shadoan Salvage Timber Sale  
J. Schmalenberg, FMB Soil Scientist  
May 6, 2013

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### SOILS RESOURCE

#### Introduction

The Shadoan Salvage project area was field reviewed on October 16 and 17, 2012 by the Forest Management Bureau's soil scientist to verify soil map unit descriptions and to identify areas potentially requiring project specific mitigation measures to provide adequate soil resource protection during implementation of the proposed actions. The following discloses the anticipated environmental effects of implementing the proposed actions and the methods used to reach the stated conclusions.

#### Potential Issues

Potential issues affecting soil resources were identified from both public and internal scoping with the identified issues being the focus of the following effects analysis. The identified issue statements are presented below.

- Road construction and log landings can displace and compact surface soils and permanently change the land use of these impacted areas from forest products to transportation.
- Removal of both coarse and fine woody material off site during timber harvest operations can reduce nutrient inputs required for future forest stands and can affect the long-term productivity of the site.
- Ground-based harvest techniques can displace and compact soils which can adversely affect the hydrologic function and long-term productivity of the impacted area.
- Reduced infiltration capacity of an impacted soil can result in overland flow and off site erosion typically localized to road surfaces, main skid trails and log landings.
- Activities associated with the proposed actions such as timber harvest and road construction have the potential to affect slope stability through increased water yields and road surface drainage concentration resulting in the exceedence of resisting forces.

#### Analysis Area

##### *Direct and Indirect Effects Analysis Area*

The analysis area for direct and indirect effects will include all proposed harvest units and new road locations (permanent, temporary and/or abandoned roads) within the legal description describing the project area (T2S 7E S16 and 36).

##### *Cumulative Effects Analysis Area*

For an impact to soil resources to be cumulative they must overlap at least twice in both time and space. Considering this constraint, the cumulative effects analysis area for this analysis will be the same that is described for the direct and indirect impacts above but limited to only those units that have had previous harvest activities.

## **Analysis Methods**

### *Soil Disturbance*

All harvest units in the project area were field reviewed to assess existing soil conditions and harvest limitations, as well as, to design mitigation measures to reduce the potential for soil resource impacts. This field information will be used in concert with DNRC soil monitoring data (DNRC, 2011) to forecast potential rates of soil disturbance given the project area topography, landforms and soil types, season of use and the harvest systems and/or equipment used during harvest activities.

### *Erosion*

The risk of erosion of individual soil map units (k factor) will be considered in conjunction with the forecasted rate of soil disturbance from the activity, the existing condition of the soil resource, harvest unit slope and local climatology to qualitatively assess the risk of erosion.

### *Nutrient Cycling*

The risk of impacts to nutrient pools will consider the proposed harvest intensity, habitat type, and existing volumes of coarse and fine woody material, measured ocularly or by pace transects (Brown, 1974), in conjunction with recommendation within *Graham et al.* (1994) to qualitatively assess the risk of impacts to site nutrient pools.

### *Soil Productivity*

Soil productivity is a cumulative measure that includes an assessment of direct and indirect impacts to the soil resource from mechanical disturbances, erosion and/or slope instability, and nutrient pool modifications resulting from the proposed action. Soil productivity may also be affected by repeat entries into a forest stand. Direct and indirect impacts to soil productivity will be qualitatively assessed considering the above variables and only assessed cumulative if previous management activities have occurred within an analysis area.

### *Slope Instability*

The risk of slope instability will be qualitatively assessed using professionally published land system inventories and/or soil surveys, aerial photo interpretation, geologic maps and investigations in concert with field observations. The magnitude of activities proposed on unstable landtypes will help determine and communicate potential risk and impacts.

### *Risk Communication*

Effective risk management requires assessment of inherently uncertain events and circumstances, typically addressing 2 dimensions: how likely the effect is to occur (probability) and the magnitude the effect (impact) would be if it happened (Hillson and Hullett, 2004).

In terms of the risk that an impact may occur, a low risk of an impact means that the impact is unlikely to occur. A moderate risk of an impact means that the impact may or may not (50/50) occur. A high risk of an impact means that the impact is likely to occur.

A very low impact means that the impact is unlikely to be detectable or measurable, and the impact is not likely to be detrimental to the resource. A low impact means that the impact is likely to be detectable or

measurable, but the impact is not likely to be detrimental to the resource. A moderate impact means that the impact is likely to be detectable or measurable, and the impact is likely to be moderately detrimental to the resource. A high impact means that the impact is likely to be detectable or measurable, and the impact is likely to be highly detrimental to the resource.

### Existing Conditions

#### *Physical properties, nutrients and productivity*

The soils within the project area are listed below in *Table SS-1* along with the associated risk of compaction, displacement and erosion resulting from implementation of the proposed actions. A map showing their location within the project area is attached as *Appendix I*. In general, soils in the project area are moderately productive clay loams with a high percentage of coarse rock fragments. Soils are moderately drained and can have elevated soil moisture well into early summer.

Soil Map Unit	Map Unit Name	% of Project Area	Displacement Hazard	Compaction Hazard	Erosion Hazard
294E	Yellowmule-Lonniebee, stony complex, 15 to 45 percent slopes	15.6%	Moderate	Low-Moderate	Moderate
396E	Loberg, very stony-Danaher, stony complex, 15 to 45 percent slopes	10.9%	Moderate	Low	Moderate
479E	Bangtail-Bridger complex, 15 to 45 percent slopes	9.6%	Moderate	Moderate	Moderate
480E	Libeg, stony-Copenhaver complex, 15 to 45 percent slopes	1.0%	Moderate	Moderate	Low
494E	Bangtail-Timberlin, stony complex, moist 15 to 45 percent slopes	3.1%	Moderate	Moderate	Moderate-High
494F	Bangtail-Timberlin, stony complex, moist 35 to 60 percent slopes	25.5%	Moderate	Moderate	Moderate-High
647E	Hoppers, stony-Tolbert, very stony-Timberlin complex, 15 to 35 percent slopes	2.8%	Moderate	Low	Low
647F	Hoppers, stony-Tolbert, very stony-Timberlin complex, 35 to 60 percent slopes	25.3%	Moderate	Low	Moderate
779E	Bridger-Libeg, stony complex, 8 to 25 percent slopes	4.7%	Moderate	Low	Low
879E	Bangtail-Copenhaver-Adel complex, 15 to 35 percent slopes	1.5%	Moderate	Moderate	High

*Table SS-1; Project area soils and risk of impacts from forest management activities.*

High volumes of coarse rock fragments along with a clay loam texture limit the risk of soil erosion on disturbed sites to a moderate hazard on all but disturbed sites on the steep slopes. Moderate precipitation intensities can likely be expected during or after project implementation. Precipitation intensities and associated recurrence intervals for the project area are presented in *Table SS-2* below. Recurrence of high intensity precipitation events is useful information to forecast the likelihood of an erosive event occurring during and after project implementation. Standard erosion control practices on skid trails and log landing site should be effective at controlling erosion from a 10 year recurrence rainfall until the sites become revegetated.

Recurrence Interval (years)	24hr Precipitation (inches)	Event Probability of Occurrence per Year (%)
1	1.1	100%
2	1.3	50%
4	1.5	25%
5	1.6	20%
10	1.9	10%
20	2.2	5%
25	2.2	4%
50	2.3	2%

*Table SS-2; Recurrence intervals for various precipitation intensities modeled for the project area.*

Extended periods of cold temperatures during winter months, low precipitation, dry conditions in late summer, and low levels of soil organic matter limit the productivity of these soils. Coarse and fine woody material is variable throughout the project area and ranges from 5-25 tons per acre.

#### *Slope Stability*

Several historic and small rotation failures have shaped the morphology of particular landforms in the project area. Localized areas where slope instability presented a high risk of failure were noted within

the project area and where avoided during project design. In areas where a moderate risk of slope stability was identified, harvest plans incorporated specialist input to avoid road construction across the identified features and modified treatments and harvest plans to allow a low level of risk of slope failure from the proposed actions.

#### *Previous management activities*

Previous management activities in the project area potentially affecting the soil resource include license issuance for forest grazing and timber harvest. Grazing intensity has been very light through the project area and has had negligible effects to the soil resource. No previously harvested areas have been proposed for reentry under the current proposed action. Previous harvest areas show adequate regeneration and disturbed areas have revegetated and are erosively stable.

#### **Project Mitigation Measures**

- Harvest activities including felling, skidding and processing will only occur during winter conditions when the soil surface is frozen and/or adequate snowpack is present to provide soil resource protection.
- Ground-based logging equipment (tractors, skidders, and mechanical harvesters) shall be limited to sustained slopes less than 45% throughout the entire project area.
- The Forest Officer shall approve a plan for felling, yarding and landing location in each harvest unit prior to the start of operations in the unit. The locations and spacing of skid trails and landings shall be designated and approved by the Forest Officer prior to operations and skid trails will not be spaced less than 50 feet. Existing skid trails will be reused if properly located and complies with BMP's.
- Levels of coarse and fine woody material will be retained on site as prescribed by the forest officer and recommended by the project soil scientist using guidance from the best available science (Graham et al. 1994). 5-10 tons/acre of material >3" is recommended for the Shadoan Salvage Timber Sale project area with as many needles and fine material retained as possible.

#### **Environmental Effects**

##### *Direct, Indirect and Cumulative Effects of the No Action Alternative*

No direct, indirect or cumulative effects to soil resources would be expected if the no-action alternative was selected. Soil resource conditions would remain similar to those described in the existing conditions.

##### *Direct, Indirect and Cumulative Effects of the Action Alternative*

Based on DNRC soil monitoring projects of prior timber harvests it is expected that 15% or less of the harvest area will have detrimental soil disturbance (compaction, displacement and erosion) located primarily on skid trails, log landings and other disturbed sites. No direct or indirect impacts to soil productivity are expected if 85% of the soil resource remains functional and intact.

Project area nutrient pools are not expected to be effected if 5-10 tons of fine and coarse woody material is retained onsite for long-term soil organic matter supply and nutrient cycling. This woody material retention in concert with limiting disturbance is expected to maintain long-term productivity.

Implementation of the proposed action presents a low risk to slope stability within the project area. Skid trail location, silviculture prescription, and road locations have all been designed to mitigate slope stability concerns to this low risk.

No areas are proposed for reentry under this action alternative. For an impact to soil resources to be cumulative they must overlap at least twice in both time and space. Considering this constraint, the proposed action presents a low level risk of cumulative effects to soil resources in the project area.

## WATERSHED RESOURCES

### Introduction

The project area watersheds were field reviewed on October 16 and 17, 2012 by both DNRC’s forest management hydrologist and soil scientist. The existing conditions of each watershed were evaluated in conjunction with the proposed actions. This information will be qualitatively assessed to forecast potential impacts to watershed resources with respect to the issues and concerns identified during public and internal scoping.

### Potential Issues

- Road construction, road use and road reclamation has to potential to generate, transport and deliver sediment to water features within the project area.

### Watershed Analysis Areas

Three watershed analysis areas will be considered in this analysis and include an unnamed tributary to Rocky Creek, Timberline Creek and an unnamed tributary to Meadow Creek. All of these watersheds are tributary to Rocky Creek and the east fork Gallatin River. Attributes of individual watersheds can be found below in *Table SS-03* and a map of these watersheds in relation to the project area is attached as *Appendix II*.

Descriptive Variable	Watershed Analysis Area		
	Unnamed Trib to Rocky Creek	Timberline Creek	Unnamed Trib to Meadows Creek
Area (acres)	986	3487	1527
Precipitation (in)	32.1	29.5	27.2
Relief (ft)	1160	1946	1540
Proposed Harvest (acres)	269	130	31
Proposed Road Construction (mi)	3.80	1.70	0.13

*Table SS-03; Physical attributes of individual watersheds areas containing the project area*

Due to the low level of activities proposed in the unnamed tributary to Meadow creek and the lack of surface water connectivity to tributary waters, this analysis area will be dismissed from further analysis.

### Analysis Methods

The methods for this watershed analysis will incorporate various data sources to disclose the potential impacts to watershed resources from the proposed actions. A coarse filter approach was first employed to gather pertinent background information from various State agencies including the Department of Environmental Quality, Montana Fish, Wildlife and Parks as well as DNRC. The following effects analysis incorporates this coarse filter analysis into field reconnaissance data as well as information contained in the Soil Resource section to forecast potential effects. Information from field reviews of BMP application and effectiveness on existing roads that will be used for haul routes will also be incorporated into the analysis. The data sources outlined above provide sufficient information to disclose relevant potential direct, indirect and cumulative impacts as a result of implementing the proposed actions.

## Existing Conditions

### *Unnamed Tributary to Rocky Creek*

The unnamed tributary to Rocky Creek on State owned land is a Class I stream supporting a fishery that has moderate channel stability and a typical snowmelt flow regime. One road currently bisects State land and is the only existing road on the parcel. This road is a high standard, gravel surfaced road designed for residential access to private lands surrounding the State section. This road crosses numerous Class I stream channels with corrugated metal culverts that have had various degrees of maintenance since the roads construction with some not meeting BMP's. Sediment delivery at these existing crossings due to undersized culverts was the only road related sediment source identified during field review on State land.

The land use surrounding all of the lower reaches of streams on State land is primarily hay production and tame pasture grazing. These activities have lead to impacts to streamside vegetation and sediment delivery from stream bank alteration.

### *Timberline Creek*

No perennial, class I streams are present on State land in the Timberline Creek watershed analysis area. Due to the headwater position of State ownership in this analysis area, only two Class III, intermittent streams present on State lands. Both of these stream channels have questionable surface connectivity to downstream receiving waters.

All existing roads on State lands are low standard forest roads using native material for road surfaces. All of the existing roads have no public access and motorized use is restricted to administrative access only. Limited use on these roads has resulted in substance vegetative cover on all road prisms and surfaces. Existing roads largely meet BMP's with minor departures in road surface drainage and culvert maintenance. No existing sediment sources were noted during field review.

### *Water Quality Standards*

Both watershed analysis areas are tributary to the larger Rocky Creek. Rocky Creek, which includes all of the watershed analysis areas, is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the *Administrative Rules of Montana (ARM 17.30.609)*. The water-quality standards for protecting beneficial uses in B-1 classified watersheds are located in *ARM 17.30.623*. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. State water-quality regulations limit any increase in sediment above the naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil, and water conservation practices have been applied (*ARM 17.30.602 [17]*). Reasonable land, soil, and water conservation practices include "methods, measures or practices that protect present and reasonably anticipated beneficial uses..." (*ARM 17.30.602 [21]*). The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan as the principle means of meeting the *Water Quality Standards*.

Rocky Creek is listed on the *2012 303(d)* list for partial support of aquatic life, cold-water fishery, industry and primary contact recreation. The listed probable causes for not fully supporting this use include alternation of streamside or littoral vegetative covers, other anthropogenic substrate alterations and physical substrate habitat alterations. Channelization from interstate highway 90 and agricultural

practices are listed as probable sources for this impairment. The 303(d) list is compiled by DEQ as required by Section 303(d) of the Federal Clean Water Act and the EPA Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify waterbodies that do not fully meet water-quality standards, or where beneficial uses are threatened or impaired.

### **Project Mitigation Measures**

- All rules and regulations pertaining to the SMZ Law will be followed. A SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35 percent. A SMZ width of 50 feet is required when the slope is less than 35 percent.
- Harvest activities including felling, skidding and processing will only occur during winter conditions when the soil surface is frozen and/or adequate snowpack is present to provide soil resource protection.
- All roads under State ownership will meet all BMP's during construction, use and after project completion.

### **Environmental Effects**

#### *Direct, Indirect and Cumulative Effects of the no action alternative*

No new road construction or existing road use for forest management activities would occur if the no action alternative was selected. No direct, indirect or cumulative effects of sediment delivery would occur and conditions would remain the same as described in the existing conditions section for both watershed analysis areas.

#### *Direct, Indirect and Cumulative Effects of the action alternative*

A moderate risk of short-term moderate level impacts from sediment delivery during stream crossing construction is expected in all watershed analysis areas. These impacts will be short-term and will occur immediately during and after culvert installation, removal, repair and/or maintenance. BMP application to control road surface drainage has been effective at protecting water resources from sediment delivery (Rashin et al., 2006). A high level of BMP effectiveness can be expected during and after implementation of the proposed actions on roads owned by the State within the project area.

A low risk of moderate cumulative effects from sediment delivery can be expected as a result of implementation of the proposed actions. This level of impact is derived from field review of the water resource and finding from DEQ during water quality reporting. Reasonable land, soil, and water conservation practices outlined in Montana BMP's for forestry applied during and after project activities present a low level of risk for these impacts to occur.

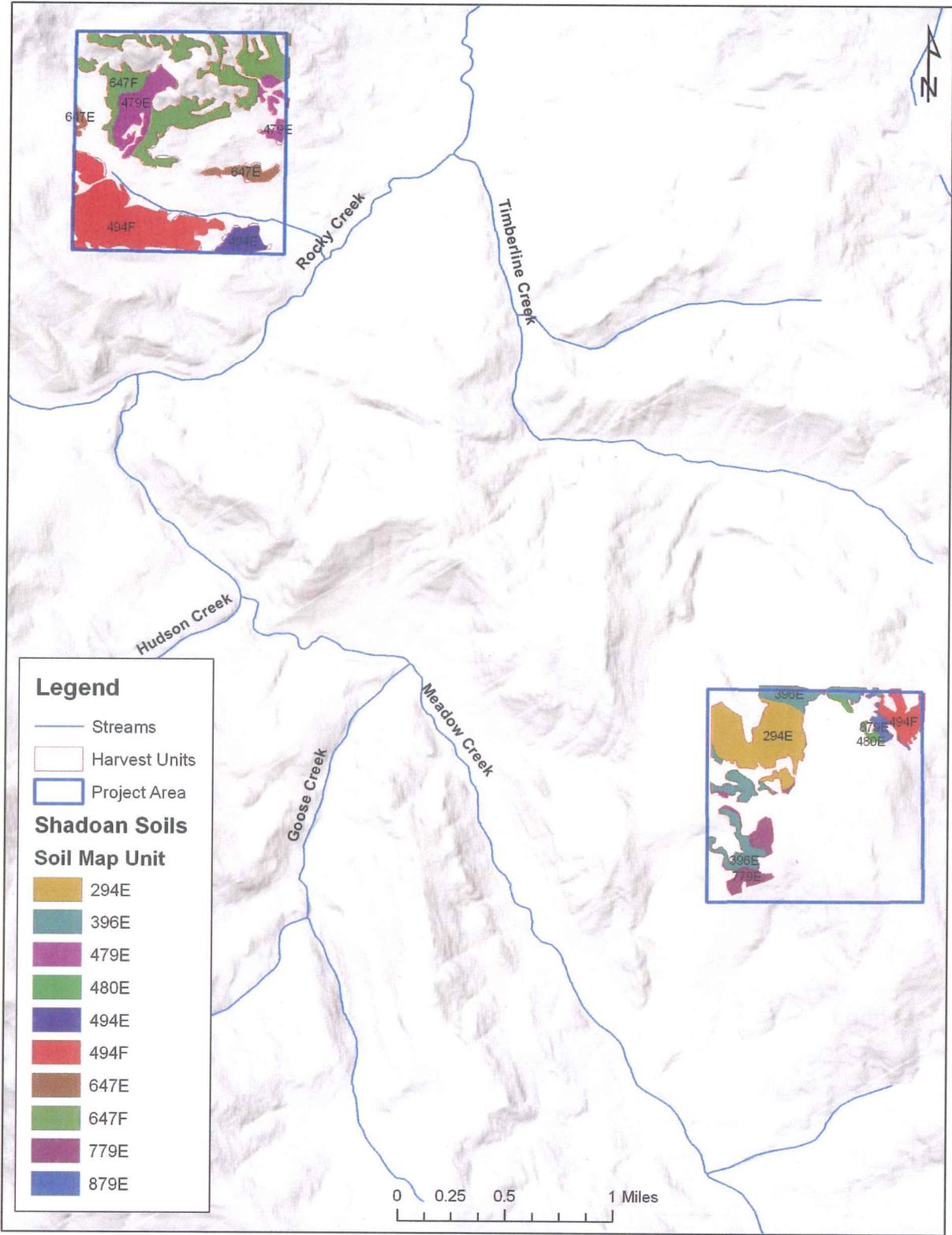
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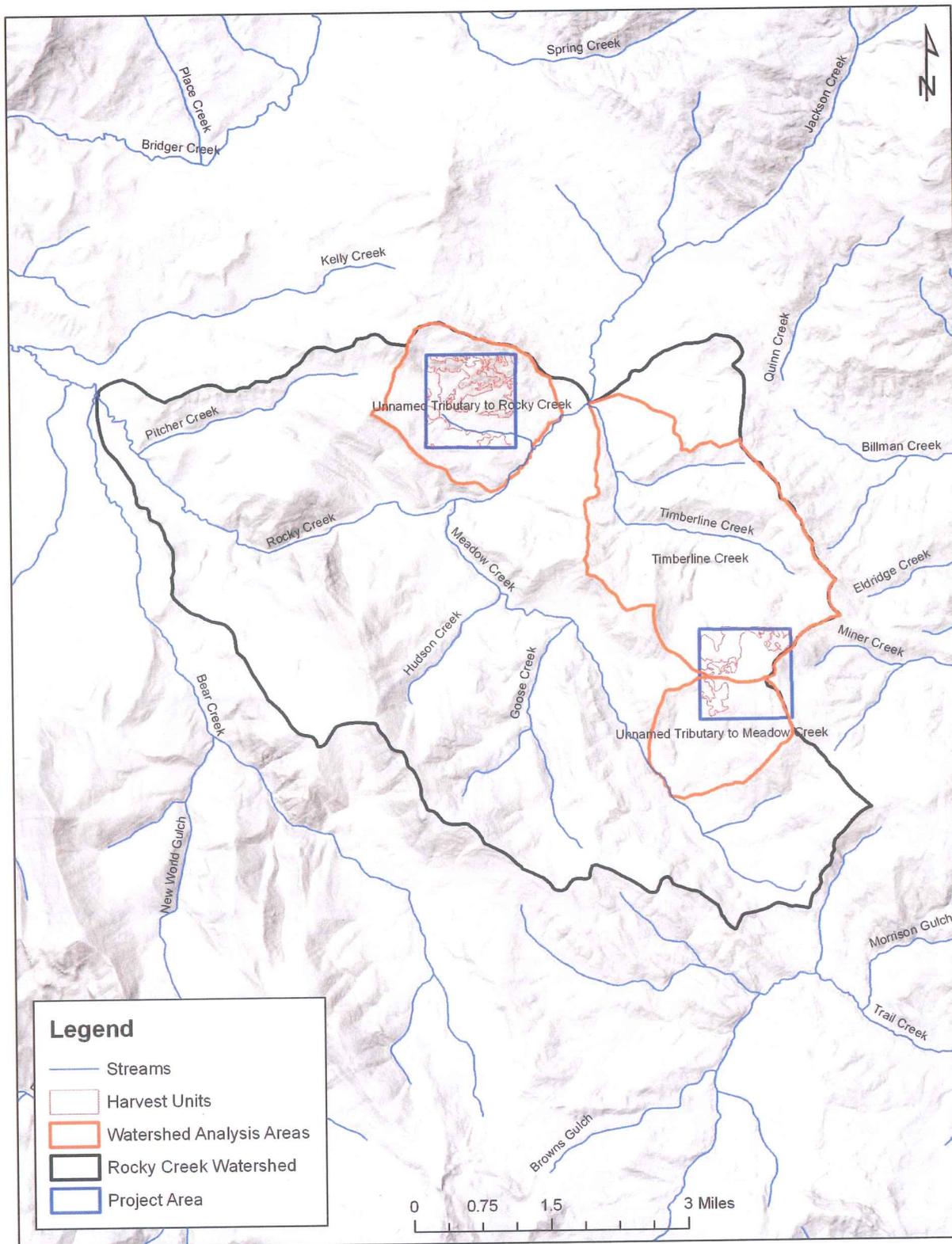
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Appendix I; Soil Map Units within the Shadoan Salvage Project Area



Appendix II; Shadoan Salvage Watershed Analysis Areas



## ATTACHMENT D

### Grizzly Bears Shadaon Salvage Timber Sale

Timber harvesting activities could remove security cover, cause displacement of bears, increase roads, and increase presence of unnatural attractants and bear foods, which could adversely affect grizzly bears.

#### **Affected Environment**

Forest-management activities may affect grizzly bears by altering cover and/or by increasing access to humans into otherwise secure areas by creating roads (Mace et al. 1996). Forest management operations can reduce the ability of vegetation and cover to conceal grizzly bears, which can lower effective bear use of habitat and render bears more vulnerable to human-caused mortality (Servheen et al. 1999). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together, which can increase their risk of being killed. Displacing bears from preferred areas may increase their energetic costs, which may in turn lower their ability to survive and/or reproduce successfully. The greatest sources of grizzly bear mortality in both the GYE and Northern Continental Divide Ecosystem in Montana are attributable to human-related causes -- particularly associated with the acquisition of unnatural foods (Schwartz et al. 2006, Haroldson et al. 2006, Servheen 2009). If people implementing forest management activities on the project area were to possess bear attractants that were stored in a non-secure manner, the risk of creating bear management situations could be elevated -- resulting in the prompt of future removal of a problem bear(s).

The project area lies approximately 25 miles due north of the GYE grizzly bear recovery zone, and occurs at the northerly edge of the occupied habitat boundary described by Wittinger (2002). There have been a number of confirmed grizzly bear sightings in the Bear Canyon/Mount Ellis area (~4.5 miles to the southwest of the project area), 4 of which have occurred during the last 10 years (Kevin Frey, R-3, FWP Biologist, pers. comm., 5/02/11). Given the frequency and types of observations, it is possible that a few grizzly bears may periodically use the general area as part of their home ranges during the non-denning seasons (Kevin Frey, R-3, FWP Biologist, pers. comm., 5/02/11). There are currently low levels of recreational use that occur within the project area due to restricted private access. Proposed project activities would not occur from March 15 - June 15.

#### **Environmental Consequences**

##### *Direct and Indirect Effects -- No Action*

Under this alternative none of the proposed forest management activities would occur, thus no direct or indirect effects to grizzly bears would be anticipated.

## *Direct and Indirect Effects -- Action Alternative*

### Cover, Roads, Attractants

Under the proposed action, cover and habitat connectivity associated with riparian areas would not be appreciably altered.

Following logging, forest patches on the project area would continue to have variable tree density and would continue to provide a mosaic of habitat conditions. Overall, stand density would be reduced on 260 acres of mature forest. Within harvested stands, individual trees and patchy tree retention would remain, which would continue to provide some escape cover and visual screening. Tree density would be reduced most within lodgepole pine stands. Opening sizes would be restricted for these intensively harvested stands, such that hiding cover would remain nearby (within 600 feet) from any point within each unit. Although there would be some minor reductions in the acreage of cover following timber harvest, ample amounts of hiding cover and connected mature forest patches would remain in the project area, which would maintain suitable cover conditions for grizzly bears, should they occasionally use the area. However, on the 260 acres proposed for treatment, existing tree density would be reduced and bears that may wander into such areas would be more detectable by humans, which would result in minor added risk for bears, particularly in fall during the big game general hunting season.

Public access to the State parcel is restricted due to the surrounding private ownership. A private gravel road in the south half of Section 16-T2S-R7E is open to authorized use under specific easements and leases only. The State of Montana has no access rights on the gravel road. All other roads on the State parcel within the proposed project area are administratively closed to motorized vehicle use for recreational purposes.

Under the action alternative, 3.8 miles of new road would be constructed to access harvest units and 3.4 miles of existing road would be used. In total, 7.2 miles of road would be operational and used in conjunction with logging activities for the duration of the project (~1 year). Immediately following project completion, 3.4 miles of the new road miles would be made impassible with slash and debris. Following harvest activities, the gravel road in the south half of Section 16-T2S-R7E would remain open as a private access and for periodic DNRC administrative uses only. During harvest operations disturbance from motorized equipment could disturb and displace bears, and habitat in the project area and nearby vicinity may temporarily be unusable due to the level of noise and human activity. No public motorized access would be allowed in the project area while harvest activities are underway, thus no added risk due to this cause would be present. After project completion essentially no long-term net change from the current condition regarding either total or open road density. There would be short-term added risk of disturbance and displacement of grizzly bears that could result in minor adverse effects associated with logging operations, short term road construction, and road use. However, no long-term measurable impact to grizzly bears attributable to either open or total road density would be expected.

Under the action alternative DNRC field staff and contractors would be required to keep any unnatural bear foods or attractants (such as garbage) in a bear resistant manner. It is unlikely that contractors would request to camp on or near the project area, however, should they choose to do so, they would be required by the operating contract to store any unnatural bear foods and attractants in a bear resistant manner. Compliance with contract terms would frequently be evaluated and would be enforced by a DNRC contract administrator. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal.

## **Cumulative Effects**

### *No Action*

Under this alternative none of the proposed forest management activities would occur, thus no cumulative effects to grizzly bears would be anticipated.

### **Action Alternative**

Under the proposed action, cover and habitat connectivity associated with riparian areas would not be altered. At the landscape level, dense patches of mature forest cover would be represented and well connected, which would provide a suitable network of cover capable of facilitating movements of grizzly bears across the local landscape. Following logging, forest patches on the project area would have variable tree density, but would maintain connectivity of mature forest cover patches across numerous ridges, drainages, saddles and riparian areas. Tree density would be reduced from existing levels. Opening sizes would be restricted for intensively harvested stands on the project area, such that hiding cover would remain nearby (within 600 feet) from any point within each unit. Forest patches on the project area would have variable tree density following logging, but would also maintain connectivity of mature forest cover patches across numerous ridges, drainages, saddles and riparian areas. Openings reducing connectivity of mature forest would be created and could reduce cover amount and quality for grizzly bears. However, habitat connectivity would not likely be substantially altered. Also, of the 260 acres of vegetation that have proposed for treatment, approximately 245 would continue to possess moderately stocked forest conditions post disturbance due to the partial harvest treatment prescriptions being proposed. Within treated stands, individual trees and patchy tree retention would remain, which would continue to provide some lesser amounts of escape cover and visual screening within treatment areas. Although there would be some minor reductions in the acreage of cover following timber harvest, ample amounts of hiding cover and connected mature forest patches would remain in the project area, which would maintain suitable cover conditions for grizzly bears, should they occasionally use the area.

Under the proposed project, short-term (~1 year) cumulative disturbance to grizzly bears associated with roads and logging activities could occur, which could influence their movement patterns and habitat use while projects are active. The new roads would total approximately 3.8 miles and result in a temporary cumulative increase in

open road density. Following project activities, both open and total road density amounts would revert back to their existing levels, as all temporary roads would be quickly and effectively closed after project completion. Additional short-term disturbance associated with forest management activities would be cumulative to existing levels of motorized and non-motorized public recreational use, which occurs within the area. Such disturbance could increase the potential for temporary displacement of grizzly bears sensitive to the increased presence of humans and motorized activities. If present in the area, some bears could be displaced from normal home range areas into places with lower quality habitat, and/or be pressed into nearby areas possessing greater inherent risk of conflict with humans (e.g. areas with high hunter density, subdivisions, home sites, and agricultural lands). Overall, forest management activities associated with the proposed action would have a minor adverse cumulative impact on forest conditions and well-connected mature forest cover, and minor, temporary impacts associated with logging disturbance and displacement of grizzly bears.

Under the action alternative DNRC field staff and contractors would be required to keep any unnatural bear foods or attractants (such as garbage) in a bear resistant manner. It is unlikely that contractors would request to camp on or near the project area, however, should they choose to do so, they would be required by a contract stipulation to store any unnatural bear foods and attractants in a bear resistant manner. Terms of the contract would frequently be evaluated and would be enforced by a DNRC contract administrator. Any added cumulative risk to grizzly bears associated with unnatural bear foods or attractants would be minimal.

## ATTACHMENT E

### SHADOAN SALVAGE TIMBER SALE CHECKLIST FOR ENDANGERED, THREATENED AND SENSITIVE SPECIES CENTRAL LAND OFFICE

Prepared by Chuck Barone

June 10, 2013

<p style="text-align: center;"><b>Threatened and Endangered Species</b></p>	<p style="text-align: center;"><b>Potential for Impacts and Rationale</b></p> <p>[Y/N] Potential Impacts and Mitigation Measures                      N = Not Present or No Impact is Likely to Occur                      Y = Impacts May Occur (Explain Below)</p>
<p>Canada Lynx (<i>Lynx canadensis</i>)                      Habitat: dense spruce/fir forest supporting snowshoe hares.</p>	<p>[ N ] The proposed project area is located along the fringes of preferred lynx habitat. Suitable lynx habitat is potentially present in the Bridger Mountains (MNHP 2012) and Lynx could occasionally use the project area. However, habitats high in coarse woody debris that are preferred for denning, and large acreages of dense conifer regeneration at high elevations that are preferred for foraging are not present in the project area. Lynx habitat is marginal due to naturally induced fragmentation, and the high level of interspersions of native grassland habitat and dry forest types. Habitat within the State parcel would be categorized as "other" (389 ac). There is no young/mature foraging or denning habitat, within the State parcels. Of the ~389 acres of potential lynx habitat ("other habitat") on the State parcel, ~228 acres are proposed for harvest and would be converted to temporary non-habitat. The current forest cover types within the project area are considered non-suitable for use by lynx and most typically do not contain high horizontal cover comprised of subalpine and spruce</p>

	<p>bows. Considering the limited presence of several habitat attributes within the project area that are known to be important for lynx and snowshoe hares (e.g. dense overstory canopy, dense shrubs and downed logs), habitat in this area is likely best suited as travel habitat or matrix habitat that would facilitate movement, linkage, and provide habitat for secondary prey species such as red squirrels. Preferred lynx habitat is marginal within the proposed project area due to the lack of highly desirable habitat conditions for lynx and their primary prey, snowshoe hares. Adverse direct, indirect or cumulative impacts to lynx as a result of this project are not expected.</p>
<p>Grizzly Bear (<i>Ursus arctos</i>) Habitat: recovery areas, security from human activity</p>	<p>[ N ] The proposed project area lies outside of any grizzly bear recovery area. The nearest recovery area is the GYE grizzly bear recovery zone situated ~25 miles south of the project area. Grizzly bear use of the Bridger Mountains may occur, however, the project area is currently considered outside of occupied habitat (Interagency Occupied Habitat Map, September 2002). Potential riparian habitat for grizzly bears is present within the project area but is marginal. Human access levels are presently low area due to the private access. Approximately 3.8 miles of new road would be constructed to minimum standard to access the proposed harvest units. 3.4 miles of the new road would be physically closed at project completion. Proposed project activities would not occur from March 15 - June 15. The potential for any measurable increases in bear-human conflicts following the project activities are expected to be low. Adverse direct, indirect and cumulative impacts</p>

	to bears as a result of this project are expected to be minimal.
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<p><b>DNRC Sensitive Species</b></p>	<p>[Y/N] Potential Impacts and Mitigation Measures  N = Not Present or No Impact is Likely to Occur  Y = Impacts May Occur (Explain Below)</p>
<p>Bald Eagle (<i>Haliaeetus leucocephalus</i>)  Habitat: late-successional forest &lt;1 mile from open water</p>	<p>[ N ] No bald eagle nests, feeding areas, roosting areas or suitable nesting habitat occur within 1 mile of the project area (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). Thus, no direct, indirect or cumulative effects to bald eagles would be anticipated under either of the alternatives considered.</p>
<p>Black-Backed Woodpecker (<i>Picoides arcticus</i>)  Habitat: mature to old burned forest</p>	<p>[ N ] No recent burns within the last 5 years occur on the project area or within 1 mile of the project area. However, stands found within the proposed project area are presently experiencing insect activity and could attract birds (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). Thus, no direct, indirect or cumulative effects to black-backed woodpeckers would be anticipated under either of the alternatives considered.</p>
<p>Black-tailed Prairie Dog (<i>Cynomys ludovicianus</i>)  Habitat: Prairie, shortgrass prairie, badlands</p>	<p>[ N ] Black-tailed prairie dogs have not been documented in the project area or surrounding (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). No grassland habitat suitable for use by black-tailed prairie dogs occurs in or near the project area. Thus, no direct, indirect or cumulative effects to prairie dogs would be anticipated under either of the alternatives considered.</p>
	<p>[ N ] The project area occurs on the</p>

<p>Flammulated Owl (<i>Otus flammeolus</i>)  Habitat: late-successional ponderosa pine and Doug.-fir forest</p>	<p>fringe of the distribution of flammulated owls in Montana, and warm forest types suitable for use by flammulated owls do not occur in or near the project area (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). Thus, no direct, indirect or cumulative effects to flammulated owls would be anticipated under either of the alternatives considered.</p>
<p>Gray Wolf (<i>Canis lupus</i>)  Habitat: ample big game pops., security from human activity</p>	<p>[ N ] No known denning or rendezvous sites occur within 1 mile of the project area. However, wolves may occasionally use the project area and occasional sightings have been noted in the area. Minimal risk of direct, indirect or cumulative effects that would result in harm to wolves would be anticipated under either of the alternatives considered. If wolves or an active den site were detected in the immediate area, operations would cease, and a DNRC biologist would be consulted. Appropriate mitigations would be developed and applied prior to resuming activities.</p>
<p>Greater Sage-grouse (<i>Centrocercus urophasianus</i>)  Habitat: sagebrush semi-desert</p>	<p>[ N ] No occurrence records for greater sage grouse exist for the quarter-latilong containing the project area since 1991 (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). Also, extensive stands of sagebrush community types do not occur within or near the project area. Thus, no direct, indirect or cumulative effects to greater sage grouse would be anticipated under either of the alternatives considered.</p>
<p>Harlequin Duck (<i>Histrionicus histrionicus</i>)  Habitat: white-water streams, boulder and cobble substrates</p>	<p>[ N ] No known streams supporting harlequin ducks occur within or near the project area, and no recent observations (within the last 15 years) have been reported for the general area (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP</p>

	2012). No direct, indirect or cumulative effects to harlequin ducks would be anticipated for either of the alternatives considered.
Mountain Plover ( <i>Charadrius montanus</i> ) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[ N ] No grassland habitat suitable for use by mountain plovers occurs within or near the project area (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). Thus, no direct, indirect or cumulative effects to mountain plovers would be anticipated under either of the alternatives considered.
Northern Bog Lemming ( <i>Synaptomys borealis</i> ) Habitat: sphagnum meadows, bogs, fens with thick moss mats	[ N ] No sphagnum meadows, bogs or fens occur within or near the project area, and the project area occurs outside of the known distribution of northern bog lemmings in Montana (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). No direct, indirect or cumulative effects to bog lemmings would be anticipated for either of the alternatives considered.
Peregrine Falcon ( <i>Falco peregrinus</i> ) Habitat: cliff features near open foraging areas and/or wetlands	[ N ] No cliff features or suitable foraging areas occur within 0.75 miles of the project area, and no known nest sites occur within or near the project area. Thus, no direct, indirect or cumulative effects to peregrine falcons would be anticipated for either of the alternatives considered.
Pileated Woodpecker ( <i>Dryocopus pileatus</i> ) Habitat: late-successional ponderosa pine and larch-fir forest	[ N ] The project area occurs outside of the normal distribution of pileated woodpeckers in Montana (MNHP/FWP Montana Field Guide -- search 6/13, and MNHP 2012). Thus, no direct, indirect or cumulative effects to pileated woodpeckers would be anticipated for either of the alternatives considered.

<p>Townsend's Big-Eared Bat (<i>Plecotus townsendii</i>) Habitat: caves, caverns, old mines</p>	<p>[ N ] No caves, caverns, or old mines suitable for use by bats occur within 1 mile of the project area. No direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated for either of the alternatives considered.</p>
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\*Montana National Heritage Program/ FWP Montana Field Guide 2012. National Heritage Tracker 2013.

# ATTACHMENT F

## Vegetative Analysis/Stand Prescription Shadaon Salvage Timber Sale

### Forest Vegetation:

#### ***Existing Conditions***

The State parcel (Section 16-T2S-R7E) is located in the southern edge of the Bridger Range within what is known as the Bozeman Pass Wildlife Corridor. Lands occur in open, rolling country with generally broad and gentle ridge tops. Vegetation is a complex of grass range with mosaic stands of Douglas fir and lodgepole pine. Varied timber harvesting has occurred on the landscape in the last 100 years.

The proposed project area is located within an unnamed, Class 1 tributary to Rocky Creek. There are ~986 acres within the watershed. Adjacent ownership is predominately private sub-divided lands. Slopes range from 10-60% with an elevation of 5500-6300 feet. The State parcel has 640 acres of which ~420 acres are forested and was lightly harvested approximately 60 years ago, removing the larger Douglas fir to source a small mill located on the State lands. Historically, the section includes use by early pioneers as a route through the foothills to the Bozeman valley. Forested stands occur on northerly and southerly aspects and are predominately even aged, single story Douglas fir and lodgepole pine cover types. North aspects are Douglas fir/Pinegrass habitat type dominated by Douglas fir with lodgepole pine as a seral species. Lodgepole Pine/Pinegrass habitat type occurs on some small isolated sites. Stand composition ranges from dense mature forest to moderate to heavily overstocked and near stagnant forest. Regeneration is sparse with moderate to heavy understory vegetation and coarse woody debris and cattle/wildlife use is heavy in all stands.

The dry south aspects are Douglas fir/Ninebark habitat type. Douglas fir is a major seral species and is present in every stand. These stands are comprised of sparsely to moderately stocked forest. Regeneration is sparse with light understory vegetation and coarse woody debris and cattle/wildlife use is heavy in all stands.

Stand structure is a result of past timber harvesting and stand replacing fire that occurred approximately 135 years ago. Older Douglas fir trees (>150 years) occur in most of the stands as scattered individual trees or small patches of <5 acres. Aspen stands are being overtaken by conifer encroachment. The absence of fire, in combination with encroachment, has resulted in overstocked and suppressed stands. These conditions make the stands more susceptible to fire and attack from insects and disease.

Dominant tree heights: 60-75', co-dominants: 45-55'. Age: 100 to 150 years (LP) and 100 to 215 years (DF). Yield capability: 45-55 cu. ft/ac/yr. Common understory species include: elk sedge, pine grass, ninebark, grouse whortleberry and heartleaf arnica. The predominate management activities are grazing and agriculture.

No rare plants or cover types have been noted by the Montana Natural Heritage Program or observed within the proposed project area.

#### **Environmental Consequences**

##### **Direct, Indirect and Cumulative Effects of the No-Action Alternative**

Under the No Action Alternative, no commercial timber harvest would occur. Over time forest encroachment would continue to occur and forest patches would expand into native rangeland. The risk of fire and additional insect and disease infestation in overstocked and suppressed stands would continue to increase. Estimated loss of mature timber resources to present and impending insect and disease infestation is 85-90% in lodgepole pine cover types and 20-30% in Douglas fir cover types. Furthermore, there is a probability of additional resource losses due to the risk of fire associated with the dead, dying and overstocked timber.

### Direct, Indirect and Cumulative Effects of the Action Alternative

The Action alternative of harvesting 260 acres would alter 62% of the forested acres on the State tract identified for the proposed Shadoan Salvage timber sale. The proposed levels of harvest and subsequent reduction in forest canopy within lodgepole pine cover types would be similar to what would be expected to occur under the present natural conditions. The proposed levels of harvest and subsequent reduction in forest canopy within Douglas fir cover types would be accelerated compared to what would be expected to occur under the present natural conditions, excluding stand replacement fire.

Commercial stand treatments would reduce the risk of fire and additional insect and disease infestation, release overcrowded and suppressed trees, and recover value from resources before it is lost while aiding in the restoration of encroachment threatened aspen stands.

Data summaries (Losensky 1997) for Gallatin County were compared with the inventory of State forested lands and anticipated changes under the Action alternative. The data comparison indicates that for either alternative there would be a higher percentage of the forest in older age classes than anticipated by Losensky.

Harvesting an estimated 1550 MBF of timber would alter the forest cover on approximately 260 acres within the watershed. Harvest design is intended to recover value from resources before it is lost, reduce overstocking, fire hazard, and additional insect and disease while promoting forest health and productivity through the emulation of mixed severity and stand replacing fires. Additionally, harvest would open the stands to encourage natural regeneration of shade tolerant and shade intolerant species; maintain a Douglas fir cover type (and lodgepole pine cover type where applicable) while maintaining a semblance of historic stand conditions; and promote existing aspen stands.

### **Fire History/Ecology:**

#### ***Existing Conditions***

The Douglas fir cover types within the project area fall into fire group six (Fischer and Clayton 1983). The presence of scattered old, open-grown Douglas fir were likely the result of frequent fires burning at lower intensities on gentler slopes and indicate that some of the project area was likely influenced by relatively frequent fire events. Existing trees that are less than 150 years old appear to represent forest encroachment due to forest succession and lack of fire disturbance during the past century. Fire suppression efforts have led to an increase in forest cover over the past 100 years. This is readily seen with comparisons of photographs taken in the late 1800's/early 1900's with photographs taken in the 1980's (Gruell 1983) showing a significant increase in forest cover.

The lodgepole pine cover type is included in fire group seven (Fischer and Clayton 1983) where periodic wildfires tended to recycle the stands before any significant amount of mature lodgepole pine dies out. Lodgepole pine habitats in this elevation range rely on fire to perpetuate and renew the stand with stand-replacing fires playing a large role. The mean fire interval ranges from less than 100 years to 500 years. Low to moderately severe fires may thin the stands periodically in between stand-replacing fires. Fuel loadings are typically 15 tons/acre but can easily exceed this (Fischer and Clayton 1983). Stands >80 years old are more susceptible to severe fire damage due to over crowding and insect and disease infestations. A severe fire burned through the proposed project area approximately 135 years ago.

#### **Environmental Consequences**

##### Direct, Indirect and Cumulative Effects of the No-Action Alternative

The No Action alternative would result in no appreciable change in the forest cover types or stand structures in the near term and current successional patterns would continue unless fire or other disturbances intervened. The lodgepole pine cover types would continue to be dominated by lodgepole pine, with a gradual trend to increase the number of more shade tolerant species, such as Douglas fir, subalpine fir and spruce, in the understory. The Douglas fir cover types would continue to be dominated by Douglas fir. Tree mortality from present and impending insect and disease infestations would

contribute to site factors that would be conducive to stand replacement fires. Such an event would likely revert the forest stands back to a grassland-sage cover type with a few scattered old Douglas fir remnant trees that would have survived due to micro-site conditions or location.

#### Direct, Indirect and Cumulative Effects of the Action Alternative

The Action alternative would change the classification of forest types for the short term due to the removal of the majority of the mature lodgepole pine and selective harvesting of Douglas fir. Harvest treatments for lodgepole pine would be regeneration cuts focusing on developing a younger, more vigorous stand of lodgepole pine and Douglas fir/lodgepole pine in the future. Harvest treatments for Douglas fir would be group selection/selection/seed tree treatments focusing on removing dead, dying, damaged and overstocked trees. These treatments scattered across a landscape would emulate small-scale, moderate to severe disturbance events. Harvest treatments would reduce the likelihood of larger scale stand replacement events from occurring by reducing the fuel loads of the treated stands and reducing stand susceptibility to additional insect and disease infestations. Minor cumulative effects of shifts in age class distribution would be expected at the landscape level.

#### **Insect and Disease:**

##### ***Existing Conditions***

Douglas fir stands and individual Douglas fir are exhibiting moderate to heavy crown defoliation due to repeated, heavy infestations of Spruce Budworm.

All lodgepole pine stands are presently under attack from Mountain Pine Beetle and the majority of the mature trees, >80 years old, have already been infested or are expected to yield to beetle attack within the next two years. Additionally, these numerous stands are moderately infected with Dwarf mistletoe, which can reduce height growth, stand volume, seed production and tree vigor.

Years of regional drought and warm winters combined with high stand densities of mature and over-mature timber have compounded and aggravated the risk of more serious insect and disease outbreak. Mountain Pine Beetle and Spruce Budworm have periodically infested these stands, in varying degrees, over the life of the forest.

##### **Environmental Consequences**

###### Direct, Indirect and Cumulative Effects of the No-Action Alternative

Under the No Action alternative stands would be susceptible to continued insect and disease infestations due to overstocked and suppressed conditions with an increased risk of stand replacing fire.

###### Direct, Indirect and Cumulative Effects of the Action Alternative

The Action alternative would recover value from affected resources while reducing the potential of additional infestation in the harvested units by encouraging the development of young, vigorous stands. Younger stands where tree growth and vigor is encouraged are more resistant to insect and disease infestations.

#### **Successional Stages:**

##### ***Existing Conditions***

The proposed project area falls under Climatic Section 14 (Section M331A) (Losensky 1997), which encompasses the northern portion of Yellowstone Park and north to the Crazy Mountains and includes portions of Gallatin, Madison and Park counties. In this climatic section, forested cover types were historically found on about 77% of the area, with the remainder being grassland and shrubland. At the turn of the century, 10% of the timber in the climatic section was old forest >150 years old.

Current forest inventory data on State lands in Gallatin, Madison and Park counties can be used to compare the current age structure of each forest cover type to Losensky's evaluation of conditions that existed in 1900. A complete stand level inventory of all the forested State lands in Gallatin, Madison and Park County is presently not available. An estimate of age structure is available on approximately 54% of the forested State lands. However, the data available is on the majority of lands that have potential for timber harvest activity and therefore would tend to represent stands that have had human disturbance during the last century and consequently younger age classes are likely represented. Comparison of the data indicates the current age structure of the forested State lands is substantially older than would be expected from Losensky's data. Currently approximately 64% of the forested stands on State lands are greater than 100 years of age. Also, there is currently a greater than expected percentage (16.6%) of old stands on State land when compared to the historic estimate of 8.3% on all lands in 1900. High representation of old stands is consistent with the belief that modern fire suppression policies have limited the natural disturbance role played by fire in this region and that human caused disturbances have not approached historic levels of disturbance.

### **Environmental Consequences**

#### **Direct, Indirect and Cumulative Effects of the No-Action Alternative**

The No Action alternative would result in continued succession toward a climax vegetation condition unless fire or other disturbance, i.e., insect and disease infestations, intervened to move succession back to the non-stocked and seedling/sapling stage.

#### **Direct, Indirect and Cumulative Effects of the Action Alternative**

The Action alternative would move 260 acres of mature Douglas fir and lodgepole pine cover types, distributed over 11 units, to younger successional Douglas fir cover types and to a lesser extent lodgepole pine cover types. By removing the dead, dying, at-risk and overstocked trees, the mature age classes and the current age structure of all commercial timber stands would be converted to a younger age structure.

Utilizing Douglas fir group selection/selection/seed tree harvests and lodgepole pine regeneration cuts, while leaving islands of the smaller submerchantable lodgepole pine, would create different stages of growth and succession. This would allow for some distribution in age classes while leaving a mosaic on the landscape that contributes to forest diversity.

### **Old Growth:**

#### ***Existing Conditions***

The Forest Management Rules state that DNRC shall manage old growth to meet biodiversity and fiduciary objectives, and shall consider the role of all stand age classes in the maintenance of biodiversity when designing harvests and other activities. DNRC defines old growth as forest stands that meet or exceed the minimum number, size, and age of those large trees as noted in "Old-Growth Forest Types of the Northern Region" by P. Green, J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann (1992, USFS Northern Region, internal report).

Old trees do occur within the proposed project area but are generally found as small clumps of old relic trees (<5 acres) and/or scattered individuals that would not meet the minimum criteria for old growth. Historically, these remnants were typically naturally fragmented, open-park like communities maintained by frequent low intensity fires. None of the 260 acres in the proposed project harvest units would meet the DNRC definition of old growth.

### **Environmental Consequences**

#### **Direct, Indirect and Cumulative Effects of the No-Action Alternative**

The No Action alternative would likely result in an appreciable change to the older age structure and the present high representation of older trees over historic levels. As the stands continue to mature, the

older age structure would increase, while the younger age structure would decrease along with tree growth and vigor. These stands, represented by the larger, older age classes, would eventually succumb to the present and future effects of insect and disease. All stands would remain at a higher susceptibility to insect and disease, and possible stand replacing fire.

#### Direct, Indirect and Cumulative Effects of the Action Alternative

The Action alternative would remove dead, dying and at-risk older trees and move some of the older stand structure to younger aged, more open stands where tree growth and vigor is encouraged and are more resistant to fire and insect and disease infestations. None of the 260 acres in the proposed timber sale currently would meet DNRC old growth definition. Where applicable, stands not meeting old growth definition would be treated to retain healthy older trees and stand attributes suitable for old growth development. Large, older trees would be harvested while still retaining many of the "older" characteristics of the existing stand. Large live trees, snags and coarse woody debris, which are important attributes associated with old growth and future development of old growth, would be retained in sufficient quantities to meet or exceed the SFLM Rules where available and applicable. The proposed harvest would have a negligible cumulative effect on the percentage of old growth remaining on State lands in Gallatin, Park and Madison Counties.

#### **Fragmentation and Corridors:**

##### ***Existing Conditions***

The abundance of Douglas fir habitats and scattered lodgepole pine habitats found in the proposed project area indicates that stands were likely influenced by relatively frequent low to moderately severe intensity wildfire events historically.

The presence and absence of forest and non-forest patches would have been dynamic, shifting through time. Periodically, sites where conifers presently occur would have appeared more as non-forest meadows than forest.

Surviving individual trees and clumps of trees in cool areas served as seed sources that would have promoted the periodic regeneration of young-aged stands that may or may not have survived subsequent fire events. Historic fires, climate, land forms, vegetative manipulation and home sites have contributed to the existing patchy distribution of forest habitat. Existing forest cover is predominately located in broken, foothill habitats and generally exhibits a low level of habitat connectivity due to the many homes, low density subdivisions, high density of usable roads and vegetative manipulation within the project area.

The proposed project is located within an area identified as the Bozeman Pass Wildlife Corridor. This area helps to provide linkage between the Gallatin and Madison ranges and the Bridger and Bangtail ranges. Various partners are presently engaged in establishing wildlife monitoring and crossing structures, zoning implementation, weed management and conservation easements to conserve and secure this area.

##### **Environmental Consequences**

#### Direct, Indirect and Cumulative Effects of the No-Action Alternative

Under the No Action alternative, habitat conditions within the Douglas fir cover types would not change dramatically in the near term from their current condition. Forested habitat patches within the project area would remain at their current size and shape and offer the greatest level of habitat security and lower proportional amounts of edge habitat.

Habitat conditions within the lodgepole pine cover types would be expected to change in the near term from their current condition due to present and impending insect and disease infestations and possible post-infestation fire. Current size and shape of forested habitat patches within the project area would be reduced and modified and offer a lower level of habitat security and higher proportional amounts of edge habitat than are currently exhibited. Wildlife species adapted to use larger patches of mature forest would

be expected to benefit from this alternative, albeit slightly as existing forest patches are inherently small. Over time, influences of forest succession would be expected to decrease habitat availability for species that are adapted to thrive in open forest and edge habitats, or for those that use such habitats for meeting their life requisites.

The State parcel would exhibit moderate changes due to insect and disease infestations but would continue to contribute to the Bozeman Pass Wildlife Corridor area at near their present capacity. The remaining tracts within the Bozeman Pass Wildlife Corridor area would likely continue on their present varied course of vegetative manipulation, property subdivision/subdivision construction, management under conservation easements and/or no management.

#### Direct, Indirect and Cumulative Effects of the Action Alternative

Under the Action alternative, there would be no human development that would significantly decrease linkage value and proposed activities would not impede wildlife movements across the landscape, valley or foothill area. The proposed project would harvest a total of 260 acres, over 11 harvest units, and increase the amount of non-forest in the area for the short term. Species of wildlife preferring less dense forest conditions would benefit from the creation of additional habitat, whereas species adversely affected by decreased forest density would not. Endemic species that occur in this area would likely not be affected appreciably, as they most likely evolved with naturally fragmented forest conditions created by natural disturbance events. The proposed levels of harvest and subsequent reduction in forest canopy would be accelerated compared to what would be expected to occur under the present natural conditions. Due to the size of the proposed harvest units and number of acres harvested, expected direct and indirect effects to habitat linkage and use of the area as a movement corridor would be low.

The proposed 3.8 miles of temporary new road construction would have minimal expected adverse impact on fragmentation of habitat or increases in human activity as it would be reclaimed and effectively closed upon completion of the project. Direct, indirect and cumulative effects related to the proposed new road construction in the project area would be minimal due to the small area affected and road reclamation.

Average patch size of existing forested acreage would be reduced within the proposed project area. Stand density and forest canopy structure within the proposed harvest units would be reduced dramatically. Moderate direct and indirect effects to habitat security for wildlife would be anticipated due to the loss of cover. Minor adverse cumulative effects to habitat security, habitat linkage and movement corridors for wildlife would be anticipated.

The State parcel would exhibit moderate changes due to the proposed harvest but would still continue to contribute to the Bozeman Pass Wildlife Corridor area only at a slightly diminished capacity. The remaining tracts within the Bozeman Pass Wildlife Corridor area would likely continue on their present varied course of vegetative manipulation, property subdivision/subdivision construction, management under conservation easements and/or no management.

#### **Noxious Weeds:**

Minor noxious weed infestations of knapweed and houndstoungue have been identified on the State tract.

#### Cumulative Effects

Under the No Action alternative, identified noxious weeds could spread on existing roads and onto dry vegetation sites by vehicle or animal use.

The Action alternative would involve ground-disturbing activities, associated with the timber harvest and road construction, that have the potential to introduce or spread noxious weeds in susceptible habitat types. An Integrated Weed Management (IWM) approach, combined with prevention and revegetation, is considered the most effective weed management treatment. To reduce the possible introduction and

spread of weeds associated with this proposed project, the following mitigation measures would be implemented:

Identified noxious weed infestations would be aggressively treated. Soil scarification would be kept to a minimum to limit potential noxious weed impacts. All newly disturbed soils on road cuts and fills and obliteration measures would be promptly seeded to site adapted grasses. All road construction and logging equipment would be power washed and inspected prior to being brought on site. DNRC would monitor the project area for two years after the completion of the harvest activities to identify if noxious weeds occur on the site. If noxious weeds do occur, a weed treatment plan would be developed and implemented.

### **Transportation/Roads:**

The main access road for the timber sale originates on private lands located to the north of the State parcel. Access is limited and restricted to a one year time frame with harvest and hauling activities allowed from November through March (weather dependent) to preserve the integrity of the paved road system (~3 miles). Segments of unpaved access road have inadequate drainage and would be improved to reduce erosion, sediment delivery and provide adequate drainage to meet BMP's.

Existing roads on the State parcel vary from maintained gravel road to secondary logging roads to more primitive two-track, range type roads that historically have been used for ranching purposes and during the hunting season. A private gravel road in the south half of Section 16-T2S-R7E is open to authorized use under specific easements and leases. The State of Montana has no access rights on the gravel road. All other roads on the State parcel within the proposed project area are administratively closed to motorized vehicle use for recreational purposes. Roads on adjacent ownerships may be open, have seasonal restrictions or closed to motorized use.

### Cumulative Effects

Under the No Action alternative, roads would remain in their present conditions. Lower standard roads not meeting BMP's would continue to degrade due to erosion.

The Action alternative would construct ~3.8 miles of temporary, minimum standard road. Standard drainage features would be implemented to stabilize roads and control erosion concurrent with the proposed operations. After completion of project, all of the new road construction on State lands would be effectively closed after project completion by placing slash and debris on the road surface. All roads would have long-term drainage features installed and reseeded with site-adapted grass. This closure process would result in no net increase of open roads on the State parcel. Selected segments of the existing access roads would be improved through implementation of mitigation measures. The existing roads on State lands administered by the State would remain administratively closed to motorized vehicle use for recreational purposes to meet departmental management objectives for resource protection and assist with FWP management goals.

### **Stand Prescriptions for Commercial Harvest:**

Treatments for lodgepole pine cover types would target all dead, dying and at-risk lodgepole pine and other shade intolerant species exhibiting signs of insect/disease, poor health and/or poor tree form characteristics for removal and overall stand density reduction, utilizing regeneration harvests. Older, large shade tolerant trees would be harvested to cull out defective or damaged trees, where applicable.

Treatments for Douglas fir cover types would target dead, dying, at-risk and overstocked trees for removal. Trees of all age classes exhibiting signs of insect/disease, poor health and/or poor tree form characteristics would be designated for harvest. Additionally, overall stand density would be reduced by 50-60% of the merchantable volume, targeting shade tolerant species and trees exhibiting

overstocked/suppressed conditions, while favoring younger age classes for the residual stand, utilizing group selection/selection/seed tree harvests. Large live trees, live cull trees, snags, cull snags, and coarse woody debris and fine materials would be protected and retained in sufficient quantities where applicable. In general, submerchantable trees and shrubs would be protected and retained for visual screening.

Stand cover type and severity of stand conditions would dictate harvest method used, emulating moderately to severe ground fire to stand replacing fire. Harvest prescription would recover value from resources before it is lost, reduce overstocking, fire hazard, and additional insect and disease while promoting forest health, vigor and productivity. Additionally, harvest would open the stands to encourage natural regeneration of shade intolerant species; maintain a Douglas fir cover type (and lodgepole pine cover type where applicable) while maintaining a semblance of historic stand conditions; and promote existing aspen stands where applicable.

Aspen Areas - A regeneration harvest of all conifer sawtimber within 75-100 feet of the aspen clone would be used to reduce conifer encroachment into aspen stands and promote aspen regeneration. Submerchantable conifer and aspen would not be protected during harvest operations to further reduce conifer encroachment and induce suckering of aspen. Post harvest treatment to fell and lop any remaining submerchantable conifer trees is recommended.

Excess slash would be consolidated at landings and burned. Natural regeneration would be expected. No rare plants or cover types have been noted by the Montana Natural Heritage Program or observed within the proposed project area.

#### Section 16-T2S-R7E:

Unit 1 (82.5 ac/602 MBF), Unit 2 (13.5 ac/105 MBF) and Unit 3 (10.5 ac/71 MBF): Units are dominated by Douglas fir mixed with patches and scattered lodgepole pine. Spruce, subalpine fir and small pockets of aspen are also represented within the moister/ riparian sites. Sawtimber size ranges from 6-30" dbh, heights for dominants/co-dominants from 50-75' and an age range from 125-215 years. The stands are moderate to overstocked and suppressed and exhibiting moderate to heavy infestations Spruce Budworm and heavy infestations of Mountain Pine Beetle. Additionally, moderate infestations of Dwarf Mistletoe are present in the stands. Encroachment Douglas fir is found along the edges of the main stands and old relic trees are scattered through the units.

A regeneration harvest would remove all merchantable lodgepole pine sawtimber and all conifers within 75-100' of aspen colonies for aspen restoration. Group selection, selection and seed tree harvests would be utilized to harvest Douglas fir, spruce and subalpine fir  $\leq 30$ " dbh targeting dead, dying, at-risk, defective or damaged trees and for stand density reduction. Desirable dominate/co-dominate trees would be left for seed source. One large snag or snag recruit ( $\geq 21$ " dbh) per acre would be left where available.

Retain all fine litter and 5-10 tons/acre of large woody debris  $>3$ " diameter as feasible. Consolidate remaining slash at landings for burning. Conduct regeneration survey in 5-7 years and a thinning survey in 15 years after harvest.

Unit 4 (39.5 ac/252 MBF), Unit 5 (79 ac/324 MBF), Unit 6 (10 ac/65 MBF), Unit 7 (6 ac/39 MBF), Unit 8 (7 ac/41 MBF), Unit 9 (5 ac/30 MBF), Unit 10 (2.5 ac/10 MBF) and Unit 11 (2 ac/11 MBF): Units are composed of Douglas fir. Some small pockets of aspen and hawthorn are found along moister sites and riparian areas. Sawtimber size ranges from 8-30" dbh, heights for co-dominants/dominants from 55-75' and an age range from 100-170 years. The stands are moderate to overstocked exhibiting moderate to heavy infestations of Spruce Budworm.

A regeneration harvest would remove all merchantable lodgepole pine sawtimber and all conifers within 75-100' of aspen colonies for aspen restoration. Group selection, selection and seed tree harvests would be utilized to harvest Douglas fir  $\leq 30$ " dbh targeting dead, dying, at-risk, defective or damaged trees and

for stand density reduction. Desirable dominate/co-dominate trees would be left for seed source. One large snag or snag recruit ( $\geq 21$ " dbh) per acre would be left where available.

Retain all fine litter and 5-10 tons/acre of large woody debris  $>3$ " diameter as feasible. Consolidate remaining slash at landings for burning. Conduct regeneration survey in 7-9 years and a thinning survey in 20-25 years after harvest.

There is currently more total forest cover in Gallatin County than in prior historical conditions. The proposed Action Alternative commercial harvest represents ~62% of the total forested acres within the State tract of the proposed Shadoan Salvage timber sale. Harvesting a total estimated 1550 MBF of timber would alter the forest cover on approximately 260 total acres. The proposed levels of harvest and subsequent reduction in forest canopy within lodgepole pine cover types would be similar to what would be expected to occur under the present natural conditions. The proposed levels of harvest and subsequent reduction in forest canopy within Douglas fir cover types would be accelerated compared to what would be expected to occur under the present natural conditions, excluding stand replacement fire.

Due to the size, duration and harvest method of the proposed project, road closures and additional recommended mitigation measures, any impacts to vegetative communities and cover from commercial harvesting are expected to be minor and temporary.

#### MEASURES RECOMMENDED TO MITIGATE POTENTIAL IMPACTS:

- 1) Compliance with Forestry Best Management Practices (BMP's), Streamside Management Zone (SMZ) laws, the Montana Stream Protection Act (124 Permit) and applicable DNRC Forest Management Administrative Rules.
- 2) Limit equipment operations to periods when soils are dry (less than 20% soil moisture), frozen or snow covered (12 inches packed or 18 inches unconsolidated) to minimize soil compaction, rutting, vegetative disturbance and maintain drainage features. Control erosion by installing adequate drainage on roads and skid trails.
- 3) The Forest Officer shall approve a plan for felling, yarding and landing location in each harvest unit prior to the start of operations in the unit. The locations and spacing of skid trails and landings shall be designated and approved by the Forest Officer prior to operations and skid trails will not be spaced less than 50 feet. Retain all fine litter as feasible and 5-10 tons/acre of large woody debris  $>3$ " diameter. Minimize soil disturbance by general skid trail planning and limit sustained tractor skidding to slopes  $\leq 45\%$  throughout the entire project. Limit scarification to 30-40% of the harvest area. Slash would be left in the harvest units where feasible, and distributed on skid trails upon completion of use, for nutrient cycling, to control erosion and to provide shade and protection for seedlings.
- 4) For slope stability on the road construction segments, construct cutslopes at 1:1 (run/rise) in common material and 1/4:1 for rock. Install adequate road drainage to control erosion concurrent with harvest activities and road opening and new construction. Provide effective sediment filtration along drainage features near crossing sites. New construction and major skid trails on State lands would be closed with slash and debris and/or barriers, and adequate drainage provided.
- 5) All road and logging equipment would be power washed and inspected prior to being brought on site. Sale area would be monitored for weeds following harvest and a treatment plan would be developed should noxious weeds occur.
- 6) At sale closure, grass seed roads, skid trails (where needed) and landings with an appropriate weed free seed mixture.
- 7) One snag and one snag recruit per acre, of the largest diameter class, would be retained where applicable. Cull live trees and cull snags would be retained where applicable.

- 8) Retain live, healthy older trees and stand attributes suitable for old growth development where available and applicable.
- 9) Contact DNRC wildlife biologist should any threatened or endangered species be encountered within the proposed project area.

#### Literature Cited

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Gruell, G.E. 1983. Fire and vegetative trends in the Northern Rockies: Interpretations from 1971-1982 Photographs. USDA. Intermountain Forest and Range Experiment Station. General Technical Report INT-148. Ogden, Utah.

Losensky, J.B. 1997. Historical vegetation of Montana. DNRC Intern. Rept. 100pp.

**ATTACHMENT H**  
**Shadaon Salvage Timber Sale**  
**List of Individual Scoping Notices**

STEVEN MERMELL, BOZEMAN, MT  
THOMAS & PATRICIA P LANG, SAEGERTOWN, PA  
DONALD P RICHARD, BOZEMAN, MT  
JOHN S & DOLORES M PHILLIPS, BOZEMAN, MT  
DOROTHY M GLASGOW, SHEPHERD, MT  
BRIDGER PARKS MASTER, BOZEMAN, MT  
GENE S BROOKS, BOZEMAN, MT  
NORTH PASS LLC, BOZEMAN, MT  
RONALD D & PENNY L GRAY, LIVINGSTON, MT  
WYNN S JESSUP, BOZEMAN, MT  
KATHERINE V STEVENSON, BOZEMAN, MT  
JEFF D MCGUIRE, BOZEMAN, MT  
EDWARD E ANGWIN, BOZEMAN, MT  
JON F MOHOLY, BOZEMAN, MT  
JOE S MCLENDON, BOZEMAN, MT  
JAMES W BREEN SR, BOZEMAN, MT  
JERRY F POGUE, BOZEMAN, MT  
GERALD H WOOSLEY, BOZEMAN, MT  
RANDY J LAFERR, BOZEMAN, MT  
WILLIAM L HENRY, BOZEMAN, MT  
SWINSON FAMILY PARTNERSHIP LP, BLYTHEWOOD, SC  
SHERRI LYNN MCWILLIAMS, BOZEMAN, MT  
FISH, WILDLIFE, & PARKS, BOZEMAN, MT  
BOZEMAN RANGER DISTRICT, BOZEMAN, MT  
GALLATIN COUNTY COMMISSIONERS, BOZEMAN, MT  
CONFEDERATED SALISH AND KOOTENAI TRIBES, RONAN, PABLO & POLSON, MT  
STUART LEWIN, GREAT FALLS, MT  
WILDWEST INSTITUTE, MISSOULA, MT  
ALLIANCE FOR THE WILD ROCKIES, HELENA, MT  
GREATER YELLOWSTONE COALITION, BOZEMAN, MT  
CRAIGHEAD INSTITUTE, BOZEMAN, MT  
R-Y TIMBER, INC., TOWNSEND, MT  
PLUM CREEK TIMBER CO., COLUMBIA FALLS, MT  
F.H. STOLTZE LAND & LUMBER, COLUMBIA FALLS, MT  
SUN MOUNTAIN LUMBER, INC., DEER LODGE, MT  
DNRC, HELENA, MT  
DNRC FOREST MANAGEMENT BUREAU, MISSOULA, MT  
FRIENDS OF THE WILD SWAN, BIGFORK, MT  
MT WOOD PRODUCTS ASSN., HELENA, MT  
GALLATIN WILDLIFE ASSOCIATION, BOZEMAN, MT  
DEFENDERS OF WILDLIFE, BOZEMAN, MT  
ROCKY MOUNTAIN ELK FOUNDATION  
NOEL WILLIAMS  
NOREEN AND ROGER BREEDING, BOZEMAN, MT  
BLACKFEET TRIBE, BROWNING, MT  
MONTANA ASSOCIATION OF COUNTIES