

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Bauer Lodgepole Pine Salvage
Proposed Implementation Date:	Upon Signature
Proponent:	Joe Kanduch of Kanduch Logging Inc.
Location:	T5N, R15W, Secs. 17&20; T5N, R16W Sec. 23
County:	Granite

I. TYPE AND PURPOSE OF ACTION

Joe Kanduch of Kanduch Logging Inc., LLC, is requesting an Alternative Practice to allow the salvage of mountain pine beetle infested lodgepole pine along the Middle Fork of Rock Creek (see attached map). There is approximately 3 miles of streamside property in the project area. Of these 3 miles, the project would be expected to impact approximately 1 lineal mile total. This area has been significantly affected by mountain pine beetle in the lodgepole pine stands and this Alternative Practice would facilitate safe removal of dead and dying trees that would become a safety hazard near homes, cabins, roads, recreational areas and other improvements.

According to MCA 77-5-301 through 307, DNRC is authorized to administer and enforce the provisions of the SMZ Law. This Law was developed to protect the public interest of water quality and quantity within forested areas; provide for standards, oversights and penalties to ensure forest practices conserve the integrity of SMZ's; provide guidelines for wildlife management within SMZ's; and allow operators necessary flexibility to use practices appropriate to site-specific conditions in the SMZ. ARM 36.11.301 through 313 further specify the design of SMZ boundaries, allowable activities and prohibitions within the SMZ, penalties and other related provisions.

According to MCA 77-5-304 and ARM 36.11.310, DNRC may approve alternative practices that are different from practices required by the SMZ Law only if such practices would be otherwise lawful and continue to conserve or not significantly diminish the integrity and function of the SMZ. The proximity of the beetle infested trees to homes, cabins, roads and recreation areas has created safety issues that will require treatments outside of the allowances of the SMZ law. Treatments would include operation of a feller-buncher inside the 50 foot SMZ. Allowable distance of operation inside the SMZ would be dependent on ground conditions. When ground conditions are frozen to a depth of four inches, covered with eight inches of snow, or dry to less than 20% moisture content, the feller-buncher would be allowed to travel to within 15 feet of the ordinary high water mark (OHWM). These treatments would be conducted on slopes less than 15% and would allow removal of lodgepole pine to below minimum retention standards as identified under Rules 4 and 5 in the *Montana Guide to the Streamside Zone Law and Rules 2006* (ARM 36.11.310-313). Additional stipulations of this request would include:

- Only operation of the feller-buncher would be allowed inside the SMZ; and this operation would be in a straight-in and straight-out manner to minimize disturbance inside the 50 foot boundary.
- Operation would only occur during periods when soil disturbance can be minimized under conditions of frozen ground to a depth of four inches, snow to a depth of eight inches, or periods when ground moisture is less than 20%.
- If operations take place during periods of dry ground conditions, mitigation measures would include grass seeding and slash filter windrows placed on disturbed areas to prevent run-off and sediment from reaching water.
- Felled trees would be placed outside of the 50 foot SMZ boundary for skidding.

- Small, un-infested lodgepole pine, in addition to other species of trees such as Douglas-fir, Engelmann spruce, quaking aspen and all brush species, would be retained and protected to the greatest extent possible.

- When practical, and as directed by either the DNRC Hydrologist or DFWP Fisheries Biologist, a tree or trees would be placed across streams to provide for shading and woody debris.

II. PROJECT DEVELOPMENT

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

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

MT DNRC Anaconda Unit Manager, DNRC Fisheries Biologist, Granite County Conservation Districts.

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

N/A

3. ALTERNATIVES CONSIDERED:

Alternative A –No Action.

This alternative would not operate machinery inside the fifty foot buffer. Beetle-killed trees would be hand-felled to minimum retention standards, left standing or removed in a non-commercial manner, such as by an arborist. In instances when the trees are removed non-commercially, the DNRC has no jurisdiction over operations and excessive disturbance or increased risks to safety may occur.

Alternative B – Action.

Please see *Type and Purpose of Action* for a full description of this alternative.

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.

Alternative A - No Action

No equipment operation would be allowed inside the 50 foot SMZ. Minimum retention standards would be recognized. Trees would be hand-felled and skidded by cable through the SMZ. Felling and skidding may occur on various types of soils and on various degrees of slopes. Cable skidding each tree out of the SMZ would likely create more soil disturbance than a feller-buncher carrying multiple trees out of the SMZ for skidding.

Alternative B – Action

Equipment operation would be limited to soils that are described as "moderately or well suited" for timber harvest in the Web Soil Survey. Equipment operation would be limited to areas where slope is less than 15%. Mitigation measures would include operating season restrictions that require frozen ground to a depth of four inches, snow depth of eight inches or ground moisture of 20% or less. In addition, grass-seeding and installation of erosion control measures such as a slash-filter windrow on any disturbed area would be required upon completion of activity. Minimal direct, indirect or cumulative impacts to soil stability and compaction are anticipated due to the soil rating restrictions, operation restrictions and mitigation measures.

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.

Alternative A - No Action

No equipment operation would be allowed inside the 50 foot SMZ. Minimum retention standards would be recognized. Trees would be hand-felled and skidded by cable through the SMZ or left standing. Hand-felling operations may introduce low levels of sediment delivery to adjacent waterbodies. Sedimentation delivery from existing roads, other land treatments and developments would continue. Minimal direct, indirect, and cumulative impacts to water quality and quantity would be expected.

Alternative B – Action

The harvest of trees within the first 15 feet of the SMZ may introduce low levels of sediment delivery to adjacent waterbodies. However, the 15 foot equipment exclusion zone would be expected to provide adequate filtration for any displaced soils or increased runoff due to compacted soils in the 15 to 50 foot AP zone. Increases in sedimentation would be expected to be minimal and temporary due to operations only occurring on slopes less than 15% and application of mitigation measures. Mitigation measures include imposing seasonal operating restrictions that require frozen ground to a depth of four inches, snow depth of eight inches or ground moisture of 20% or less; and requiring grass seeding and installation of erosion control measures such as a slash-filter windrow on any disturbed area upon completion of operations. DNRC may monitor AP sites to verify effectiveness. Minimal direct, indirect, and cumulative impacts to water quality and quantity are expected due to operation restrictions and mitigation measures.

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.

N/A

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.

Alternative A - No Action

If no action is taken the dead trees will fall over, potentially causing damage to improvements and people. Trees may be hand-felled to minimum retention standards, but it would be expected that as retention trees fell the landowner would remove them anyway. Hand-felling and skidding hand-felled trees have the potential to be more damaging to the residual stand than the directional felling of a feller buncher. This is due to trees being pulled through the residual stand with less maneuverability, potentially removing bark and pulling over the residual stand.

Alternative B – Action

Vegetative communities would be affected to the extent that lodgepole pine would be reduced to below minimum retention standards as outlined in Rule 5 of the *Montana Guide to the Streamside Management Zone Law and Rules* handbook. Other species of trees such as Douglas-fir, Engelmann spruce and quaking aspen would be retained where present and understory vegetation would be protected to the greatest extent possible. Removal of the dead trees would expedite natural regeneration and cumulative effects to vegetative communities would decrease as trees regenerate and replace those that are harvested.

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.

Alternative A – No Action

Minimum retention standards would be adhered to as well as equipment restrictions. Due to the areas being heavily used for recreation and their proximity to roads and cabins, the suitability of the proposed sites would continue to be marginal at best for terrestrial and avian habitat. Dead lodgepole pine would eventually fall over and/or be removed in a non-commercial manner.

Alternative B – Action

Due to the areas being heavily used for recreation and their proximity to roads and cabins, the suitability of the proposed sites would continue to be marginal at best for terrestrial and avian habitat. Operating restrictions and mitigation measures would minimize sedimentation impacts to fish habitat where present. The AP would reduce recruitable woody debris in a bull trout and westslope cutthroat trout stream. In areas of pure lodgepole pine stands, stream shading would be reduced and peak seasonal stream temperatures may see an increase in July and August. All other species of trees and brush would be retained and protected to the greatest extent possible. When practical, and as directed by either the DNRC Hydrologist or DFWP Fisheries Biologist, a tree or trees would be placed across streams to provide for shading and woody debris. Cumulative impacts would be expected to be short term.

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.

Alternative A – No Action

A query of the Montana Natural Heritage Program identifies the area as being possible habitat for gray wolf, Canada lynx, wolverine and fisher. Due to the proximity of heavy recreational activities and access to cabin sites, this area is not ideal habitat for grey wolf, Canada lynx, wolverine or fisher. Minimum retention standards would be adhered to as well as equipment restrictions. Dead lodgepole pine would eventually fall over and/or be removed in a non-commercial manner.

Alternative B - Action

Due to the proximity of heavy recreational activities and access to cabin sites, this area would continue to not be ideal habitat for gray wolf, Canada lynx, wolverine or fisher. If a sighting of any of the listed species of concern (or evidence such as nests, dens etc...) occurs, operations would be halted, or not allowed, until further assessment can take place.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

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

Although no cultural or paleontological resources are known to exist in the project APE, a systematic inventory of such resources has not occurred. Because none of the projects are located on state land, the DNRC has no jurisdiction to require private landholders to conduct professional level inventories to identify, or develop treatment plans for, privately owned National Register eligible 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.

Alternative A – No Action

Minimum retention standards would be adhered to as well as equipment restrictions. Dead lodgepole pine would eventually fall over and/or be removed in a non-commercial manner. Aesthetics would be degraded as green trees transitioned to red and eventually fell over.

Alternative B - Action

Potential impacts may be perceived as adverse by recreationists, landowners and travelers. The removal of beetle killed lodgepole pine would look unsightly in the short term, but would encourage regeneration. This regeneration would eventually soften and replace aesthetic quality damaged by mountain pine beetle infestation.

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.

N/A

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.

There have been six SMZ AP's issued in the last two years in this area. All of them have required similar operating restrictions and mitigation measures and have proved beneficial with minimal impacts.

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.

Cabins and recreational sites would become unsafe as beetle killed trees begin to fall over and improvements such as culverts and bridges would be put in jeopardy as falling trees impede water movement. The removal of beetle killed trees would improve safety to homeowners and those that use the area for recreation.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

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

N/A

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.

Project would be allowed for a period of two years. Harvest of trees may generate 10 mbf per site and would employ one logging crew over the entire area. In addition this project would provide raw material for local mill operations.

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.

Negligible amounts.

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

N/A

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.

This project, under this Alternative Practice, would allow timber salvage in an area considered at high risk for wildfire under Granite Counties Community Wildfire Protection 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.

N/A

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.

N/A

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

N/A

23. CULTURAL UNIQUENESS AND DIVERSITY:

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

N/A

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.

N/A

EA Checklist Prepared By:	Name: Sean Steinebach	Date: 10/27/10
	Title: Service Forester	

V. FINDING

25. ALTERNATIVE SELECTED:

Alternative B - Action

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

No significant impacts to the integrity and function of the SMZ will occur with the implementation of operating restrictions and mitigation measures.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

EIS

More Detailed EA

No Further Analysis

EA Checklist Approved By:	Name: Fred Staedler
	Title: Anaconda Unit Manager
Signature: /S/ Fred Staedler	Date: 10/27/10

November 15, 2010

Kanduch Logging Inc.
48 Woodland Lane
Philipsburg, MT 59858

Ref: Bauer Lodgepole Pine Salvage SMZ AP

Dear Mr. Kanduch,

This letter is in reference to a request made by Joe Kanduch of Kanduch Logging Inc. to the Department of Natural Resources and Conservation for an Alternative Practice. This AP is located on private land along the Middle Fork of Rock Creek in T5N, R15W, Secs. 17&20; T5N, R16W Sec. 23 (see attached map) in Granite County. After a visit to the proposed Alternative Practice site this request has been approved. Approval is subject to the following conditions:

- 1) Only a feller-buncher may enter the 50 foot buffer and will be done in a straight-in and straight-out manner.
- 2) Feller-buncher will operate no closer than 15 feet to the ordinary high water mark and only on slopes less than 15%.
- 3) Trees will be placed outside of 50 foot buffer for skidding.
- 4) All trees other than lodgepole pine will be retained inside the Streamside Management Zone.
- 5) Operations only occur when ground is <20% moisture content; or frozen to four inches or snow covered to eight inches.
- 6) Disturbed areas inside the SMZ will be grass seeded.
- 7) All SMZ's will be marked prior to harvest.

Approved Alternative Practices, including any additional conditions required by DNRC, shall have the same force and authority as the standards contained in 77-5-303, MCA, and shall be enforceable by DNRC under 77-5-305, MCA, to the same extent as such standards.

It is your responsibility to ensure that your operators understand that an Alternative Practice has been issued for their operations in this area, and that these conditions must be fully met to achieve compliance with the SMZ Law.

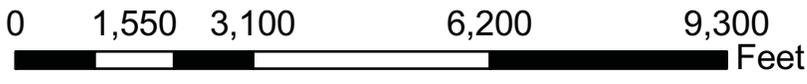
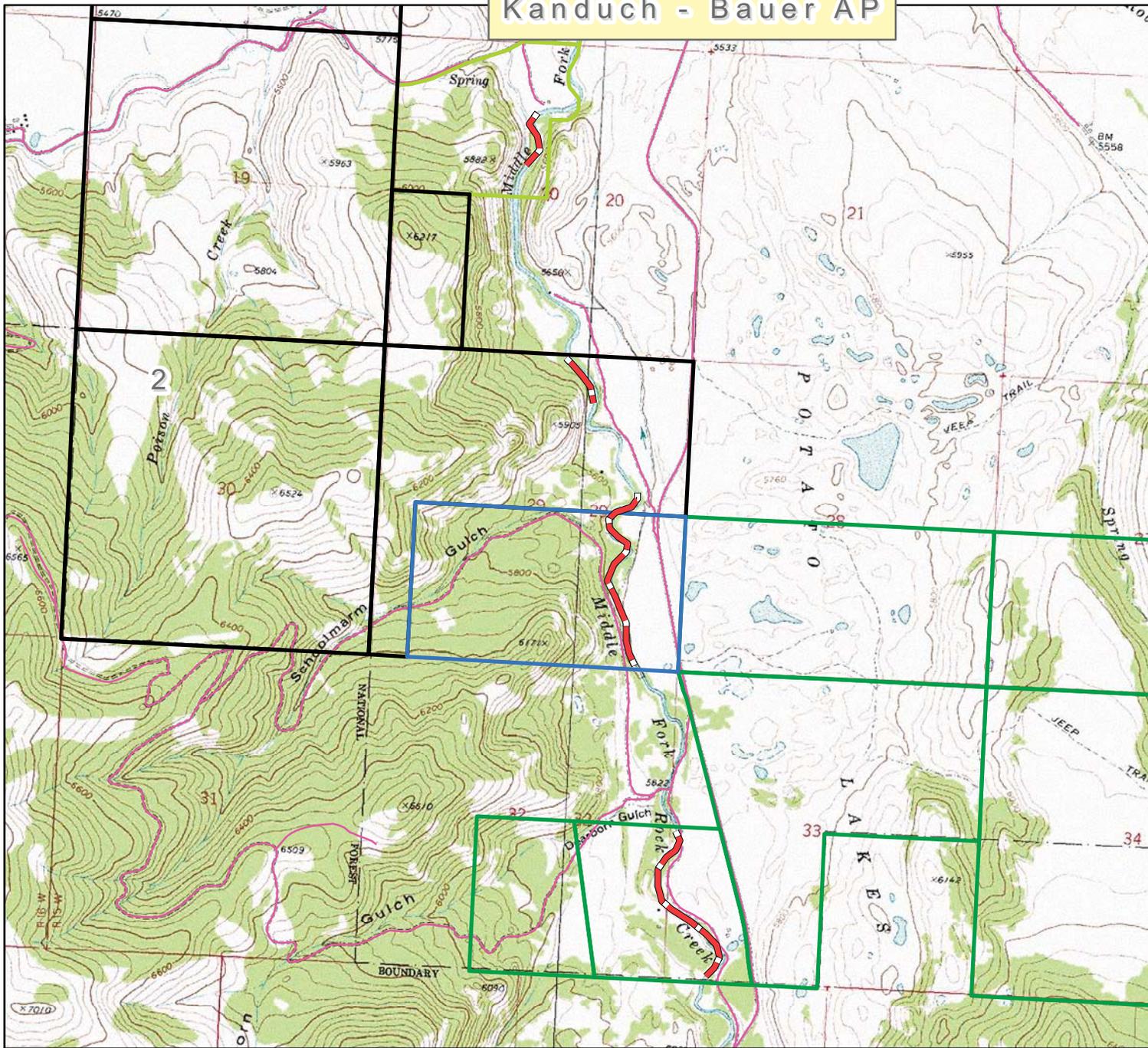
Thank you for your cooperation in this matter. Please call me if you have any questions.

Sincerely,

Sean Steinebach
Service Forester

cc: HRA file, Landowner, Applicant,
Unit Office, Land Office,
Service Forestry Bureau

Kanduch - Bauer AP



Forestland Planting and Harvesting

This table can help forestland owners or managers plan the use of soils for wood crops. Interpretive ratings are given for the soils according to the limitations that affect planting and harvesting on forestland. The ratings are both verbal and numerical.

Rating class terms indicate the degree to which the soils are suited to a specified aspect of forestland management. *Well suited* indicates that the soil has features that are favorable for the specified management aspect and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified management aspect. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified management aspect. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified management aspect or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service, [National forestry manual](#).

Report—Forestland Planting and Harvesting

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Forestland Planting and Harvesting— Deer Lodge National Forest Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
71ND3—Evaro-Holloway-Elvick families, complex, high relief mountain slopes and ridges							
Evaro	45	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
Holloway	25	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
Elvick	15	Moderately suited		Poorly suited		Well suited	
		Rock fragments	0.50	Rock fragments	0.75		
				Slope	0.50		
71UA3—Elve-Gambler families-Rock outcrop complex, high relief mountain slopes and ridges							
Elve	45	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		
Gambler	30	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
Rock outcrop	15	Not rated		Not rated		Not rated	
342E—Braziel stony loam, 15 to 35 percent slopes							
Braziel	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50

Forestland Planting and Harvesting— Deer Lodge National Forest Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
596D—Worock-Loberg complex, 8 to 15 percent slopes							
Worock	50	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
				Rock fragments	0.50		
Loberg	35	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Rock fragments	0.50		
				Stickiness; high plasticity index	0.50		
696E—Worock gravelly loam, dry, 15 to 35 percent slopes							
Worock	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
844A—Bandy-Blossberg complex, 0 to 2 percent slopes, rarely flooded							
Bandy	45	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Blossberg	40	Well suited		Well suited		Moderately suited	
						Low strength	0.50

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18B—Lone Rock cobbly loam, 0 to 4 percent slopes							
Lone rock	85	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18C—Lone Rock cobbly loam, 4 to 8 percent slopes							
Lone rock	85	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
				Slope	0.50		
19E—Shanley gravelly loam, 15 to 35 percent slopes							
Shanley	85	Moderately suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
				Stickiness; high plasticity index	0.50		
28B—Donald loam, 2 to 4 percent slopes							
Donald	85	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
28C—Donald loam, 4 to 8 percent slopes							
Donald	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
				Rock fragments	0.50		
54B—Libeg channery loam, 2 to 4 percent slopes							
Libeg	85	Moderately suited		Poorly suited		Well suited	
		Rock fragments	0.50	Rock fragments	0.75		
54C—Libeg channery loam, 4 to 8 percent slopes							
Libeg	85	Moderately suited		Poorly suited		Well suited	
		Rock fragments	0.50	Rock fragments	0.75		
				Slope	0.50		
54D—Libeg channery loam, 8 to 15 percent slopes							
Libeg	85	Moderately suited		Poorly suited		Well suited	
		Rock fragments	0.50	Rock fragments	0.75		
				Slope	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54E—Libeg channery loam, 15 to 35 percent slopes							
Libeg	85	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Slope	0.75	Slope	0.50
				Rock fragments	0.75		
54F—Libeg channery loam, 35 to 60 percent slopes							
Libeg	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.75		
82E—Elve gravelly loam, 15 to 35 percent slopes							
Elve	85	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Slope	0.75	Slope	0.50
				Rock fragments	0.50		
82F—Elve gravelly loam, 35 to 60 percent slopes							
Elve	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50		
86E—Winkler gravelly loam, 15 to 35 percent slopes							
Winkler	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
86G—Winkler gravelly loam, 60 to 80 percent slopes							
Winkler	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		
95E—Yreka gravelly loam, 15 to 35 percent slopes							
Yreka	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
95F—Yreka gravelly loam, 35 to 60 percent slopes							
Yreka	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		
97D—Evaro gravelly ashy loam, 8 to 15 percent slopes							
Evaro	85	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
				Slope	0.50		
97E—Evaro gravelly ashy loam, 15 to 35 percent slopes							
Evaro	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
97F—Evaro gravelly loam, 35 to 60 percent slopes							
Evaro	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
98E—Trapps gravelly loam, 15 to 35 percent slopes							
Trapps	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
98F—Trapps gravelly loam, 35 to 60 percent slopes							
Trapps	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
124B—Lone Rock-Sarbo complex, 2 to 4 percent slopes							
Lone rock	50	Moderately suited		Poorly suited		Well suited	
		Rock fragments	0.50	Rock fragments	0.75		
Sarbo	35	Well suited		Well suited		Moderately suited	
						Low strength	0.50
135D—Baggs loam, 8 to 15 percent slopes							
Baggs	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
142E—Shanley-Brazil-Water complex, 8 to 25 percent slopes							
Shanley	55	Moderately suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	0.50
				Rock fragments	0.50		
				Stickiness; high plasticity index	0.50		
Brazil	20	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50		
Water	10	Not rated		Not rated		Not rated	
195E—Yreka gravelly loam, cool, 15 to 35 percent slopes							
Yreka	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
195F—Yreka gravelly loam, cool, 35 to 60 percent slopes							
Yreka	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
200E—Braziel-Tolbert-Rock outcrop complex, 15 to 35 percent slopes							
Braziel	40	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Tolbert	30	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Rock outcrop	15	Not rated		Not rated		Not rated	
200F—Braziel-Tolbert-Rock outcrop complex, 35 to 60 percent slopes							
Braziel	40	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
Tolbert	30	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
Rock outcrop	15	Not rated		Not rated		Not rated	
224B—Sarbo-Lone Rock complex, 2 to 4 percent slopes							
Sarbo	50	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Lone rock	35	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
242C—Braziel gravelly loam, 4 to 8 percent slopes							
Braziel	85	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
				Slope	0.50		
338F—Perma cobbly loam, 35 to 60 percent slopes							
Perma	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
342D—Braziel stony loam, 8 to 15 percent slopes							
Braziel	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
				Rock fragments	0.50		
342E—Braziel stony loam, 15 to 35 percent slopes							
Braziel	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
382D—Elve gravelly loam, warm, 8 to 15 percent slopes							
Elve	85	Moderately suited		Moderately suited		Moderately suited	
		Rock fragments	0.50	Rock fragments	0.50	Low strength	0.50
				Slope	0.50		
382E—Elve gravelly loam, warm, 15 to 35 percent slopes							
Elve	85	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
442D—Braziel-Tolbert gravelly loams, 8 to 15 percent slopes							
Braziel	50	Well suited		Moderately suited		Well suited	
				Slope	0.50		
				Rock fragments	0.50		
Tolbert	35	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
				Slope	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
442E—Braziel-Tolbert complex, 15 to 35 percent slopes							
Braziel	60	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Tolbert, very stony	25	Moderately suited		Poorly suited		Moderately suited	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	0.50
				Slope	0.75	Slope	0.50
446B—Danvers-Roy complex, 0 to 4 percent slopes							
Danvers	50	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	0.50
Roy	35	Moderately suited		Poorly suited		Well suited	
		Stickiness; high plasticity index	0.50	Rock fragments	0.75		
		Rock fragments	0.50	Stickiness; high plasticity index	0.50		
542C—Braziel-Shanley gravelly loams, 4 to 8 percent slopes							
Braziel	50	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
				Slope	0.50		
Shanley	35	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Rock fragments	0.50	Low strength	0.50
				Stickiness; high plasticity index	0.50		
				Slope	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
542E—Braziel-Shanley gravelly loams, 15 to 35 percent slopes							
Braziel	50	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
Shanley	35	Moderately suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
				Stickiness; high plasticity index	0.50		
596D—Worock-Loberg complex, 8 to 15 percent slopes							
Worock	50	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
				Rock fragments	0.50		
Loberg	35	Moderately suited		Moderately suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	0.50
				Rock fragments	0.50		
				Stickiness; high plasticity index	0.50		
596E—Worock-Loberg complex, 15 to 35 percent slopes							
Worock	50	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Loberg	35	Moderately suited		Poorly suited		Moderately suited	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
				Stickiness; high plasticity index	0.50		

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
624B—Nirling-Bandy complex, 0 to 4 percent slopes, rarely flooded							
Nirling	45	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
Bandy	40	Well suited		Well suited		Moderately suited	
						Low strength	0.50
696E—Worock gravelly loam, dry, 15 to 35 percent slopes							
Worock	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
696F—Worock gravelly loam, dry, 35 to 60 percent slopes							
Worock	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
786E—Winkler gravelly loam, cool, 15 to 35 percent slopes							
Winkler	85	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
786F—Winkler gravelly loam, cool, 35 to 60 percent slopes							
Winkler	85	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		
814B—Bandy loam, 0 to 4 percent slopes, rarely flooded							
Bandy	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50

Forestland Planting and Harvesting— Granite County Area, Montana							
Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
844A—Bandy-Blossberg complex, 0 to 2 percent slopes, rarely flooded							
Bandy	45	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Blossberg	40	Well suited		Well suited		Moderately suited	
						Low strength	0.50
924B—Nirling cobbly loam, 0 to 4 percent slopes							
Nirling	85	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
983E—Crow-Bignell complex, 15 to 35 percent slopes							
Crow	45	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
						Slope	0.50
Bignell	40	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Slope	0.50
				Rock fragments	0.50		
995F—Yreka-Rock outcrop complex, 35 to 60 percent slopes							
Yreka	50	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50		
Rock outcrop	35	Not rated		Not rated		Not rated	

Data Source Information

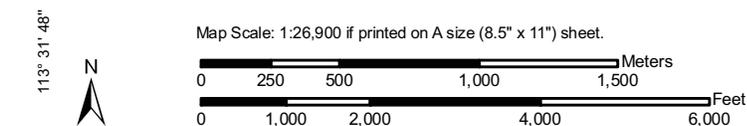
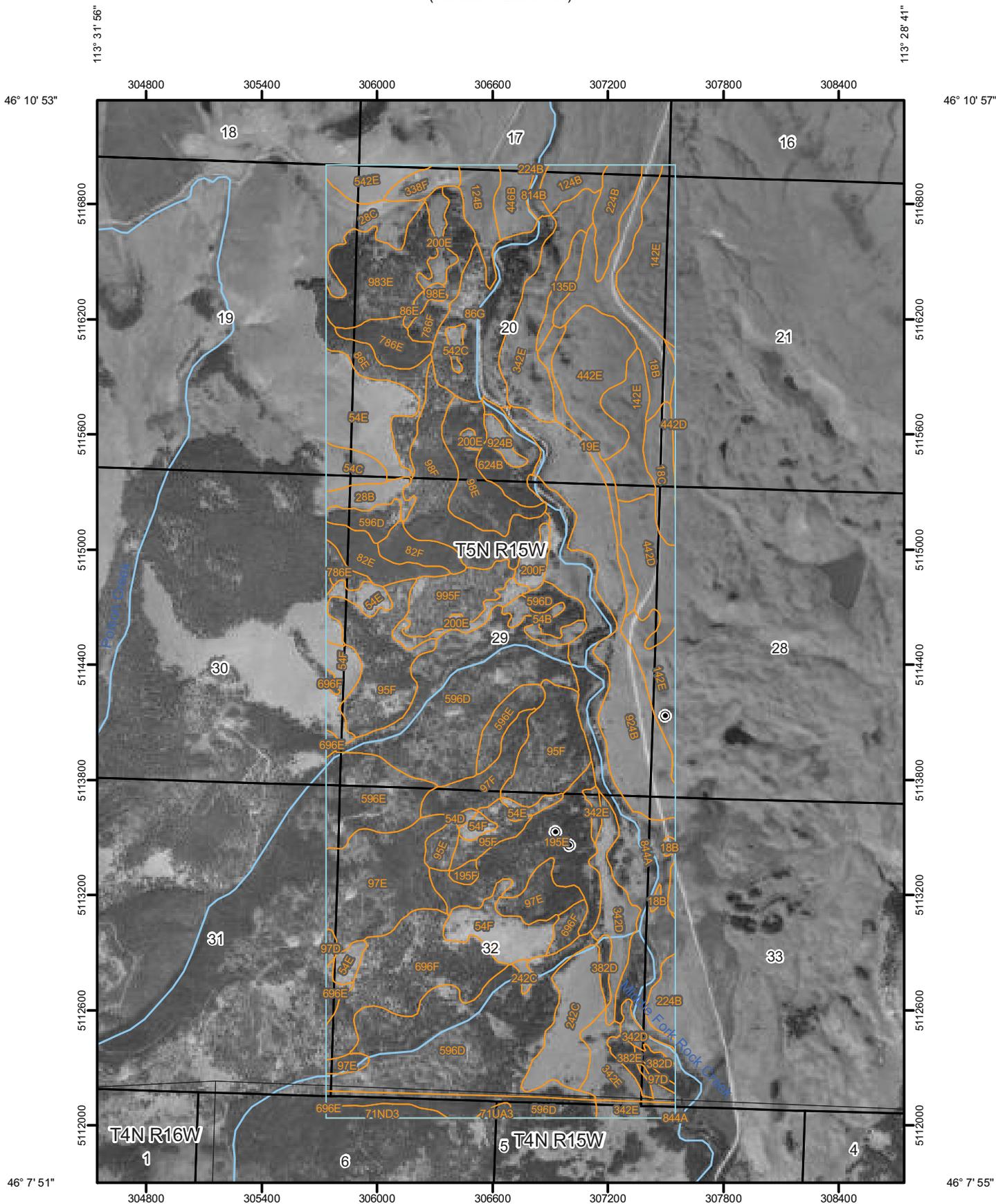
Soil Survey Area: Deer Lodge National Forest Area, Montana

Survey Area Data: Version 10, Feb 25, 2010

Soil Survey Area: Granite County Area, Montana

Survey Area Data: Version 11, Dec 2, 2009

Soil Map—Deer Lodge National Forest Area, Montana, and Granite County Area, Montana
(Kanduch - Bauer AP)



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot

 Wet Spot

 Other

Special Line Features

-  Gully
-  Short Steep Slope
-  Other

Political Features

-  Cities
-  PLSS Township and Range
-  PLSS Section

Water Features

-  Oceans
-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size paper

The soil surveys that comprise your area of interest (AOI) are:

Please rely on the bar scale on each map sheet for distance measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.sc.egov.usda.gov>

Coordinate System: UTM Zone 12N

This product is generated from the USDA National Cooperative Soil Survey, the version date(s) listed below.

Soil Survey Area: Deer Lodge National Forest

Survey Area Data: Version 10, Feb 2000

Soil Survey Area: Granite County Area

Survey Area Data: Version 11, Dec 2000

Your area of interest (AOI) includes more detail than the map. These survey areas may have been mapped for a different land use in mind, at different times, or with a different level of detail. This may result in map unit symbols that do not completely agree with the boundaries shown on the map.

Date(s) aerial images were photographed: 1994

The orthophoto or other base map on which this map is compiled and digitized probably differs from the aerial imagery displayed on these maps. As a result, some of map unit boundaries may be evident.



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

Map Unit Legend

Deer Lodge National Forest Area, Montana (MT635)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
71ND3	Evaro-Holloway-Elvick families, complex, high relief mountain slopes and ridges	9.3	0.4%
71UA3	Elve-Gambler families-Rock outcrop complex, high relief mountain slopes and ridges	2.4	0.1%
342E	Braziel stony loam, 15 to 35 percent slopes	8.9	0.4%
596D	Worock-Loberg complex, 8 to 15 percent slopes	29.7	1.3%
696E	Worock gravelly loam, dry, 15 to 35 percent slopes	0.1	0.0%
844A	Bandy-Blossberg complex, 0 to 2 percent slopes, rarely flooded	0.0	0.0%
Subtotals for Soil Survey Area		50.4	2.3%
Totals for Area of Interest		2,228.3	100.0%

Granite County Area, Montana (MT621)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
18B	Lone Rock cobbly loam, 0 to 4 percent slopes	51.4	2.3%
18C	Lone Rock cobbly loam, 4 to 8 percent slopes	20.8	0.9%
19E	Shanley gravelly loam, 15 to 35 percent slopes	18.5	0.8%
28B	Donald loam, 2 to 4 percent slopes	13.3	0.6%
28C	Donald loam, 4 to 8 percent slopes	26.5	1.2%
54B	Libeg channery loam, 2 to 4 percent slopes	10.9	0.5%
54C	Libeg channery loam, 4 to 8 percent slopes	13.5	0.6%
54D	Libeg channery loam, 8 to 15 percent slopes	1.6	0.1%
54E	Libeg channery loam, 15 to 35 percent slopes	68.0	3.1%
54F	Libeg channery loam, 35 to 60 percent slopes	48.2	2.2%
82E	Elve gravelly loam, 15 to 35 percent slopes	20.7	0.9%
82F	Elve gravelly loam, 35 to 60 percent slopes	14.9	0.7%
86E	Winkler gravelly loam, 15 to 35 percent slopes	26.0	1.2%

Granite County Area, Montana (MT621)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
86G	Winkler gravelly loam, 60 to 80 percent slopes	69.6	3.1%
95E	Yreka gravelly loam, 15 to 35 percent slopes	8.1	0.4%
95F	Yreka gravelly loam, 35 to 60 percent slopes	111.7	5.0%
97D	Evaro gravelly ashy loam, 8 to 15 percent slopes	4.3	0.2%
97E	Evaro gravelly ashy loam, 15 to 35 percent slopes	93.8	4.2%
97F	Evaro gravelly loam, 35 to 60 percent slopes	25.4	1.1%
98E	Trapps gravelly loam, 15 to 35 percent slopes	37.8	1.7%
98F	Trapps gravelly loam, 35 to 60 percent slopes	61.2	2.7%
124B	Lone Rock-Sarbo complex, 2 to 4 percent slopes	33.8	1.5%
135D	Baggs loam, 8 to 15 percent slopes	10.6	0.5%
142E	Shanley-Brazil-Water complex, 8 to 25 percent slopes	101.4	4.6%
195E	Yreka gravelly loam, cool, 15 to 35 percent slopes	67.0	3.0%
195F	Yreka gravelly loam, cool, 35 to 60 percent slopes	3.2	0.1%
200E	Brazil-Tolbert-Rock outcrop complex, 15 to 35 percent slopes	25.1	1.1%
200F	Brazil-Tolbert-Rock outcrop complex, 35 to 60 percent slopes	9.2	0.4%
224B	Sarbo-Lone Rock complex, 2 to 4 percent slopes	31.4	1.4%
242C	Brazil gravelly loam, 4 to 8 percent slopes	44.6	2.0%
338F	Perma cobbly loam, 35 to 60 percent slopes	11.1	0.5%
342D	Brazil stony loam, 8 to 15 percent slopes	35.5	1.6%
342E	Brazil stony loam, 15 to 35 percent slopes	78.3	3.5%
382D	Elve gravelly loam, warm, 8 to 15 percent slopes	9.2	0.4%
382E	Elve gravelly loam, warm, 15 to 35 percent slopes	6.3	0.3%
442D	Brazil-Tolbert gravelly loams, 8 to 15 percent slopes	38.2	1.7%
442E	Brazil-Tolbert complex, 15 to 35 percent slopes	51.6	2.3%

Granite County Area, Montana (MT621)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
446B	Danvers-Roy complex, 0 to 4 percent slopes	16.0	0.7%
542C	Brazil-Shanley gravelly loams, 4 to 8 percent slopes	3.7	0.2%
542E	Brazil-Shanley gravelly loams, 15 to 35 percent slopes	16.8	0.8%
596D	Worock-Loberg complex, 8 to 15 percent slopes	282.7	12.7%
596E	Worock-Loberg complex, 15 to 35 percent slopes	62.5	2.8%
624B	Nirling-Bandy complex, 0 to 4 percent slopes, rarely flooded	21.0	0.9%
696E	Worock gravelly loam, dry, 15 to 35 percent slopes	6.2	0.3%
696F	Worock gravelly loam, dry, 35 to 60 percent slopes	84.8	3.8%
786E	Winkler gravelly loam, cool, 15 to 35 percent slopes	24.5	1.1%
786F	Winkler gravelly loam, cool, 35 to 60 percent slopes	22.0	1.0%
814B	Bandy loam, 0 to 4 percent slopes, rarely flooded	4.6	0.2%
844A	Bandy-Blossberg complex, 0 to 2 percent slopes, rarely flooded	120.5	5.4%
924B	Nirling cobbly loam, 0 to 4 percent slopes	123.1	5.5%
983E	Crow-Bignell complex, 15 to 35 percent slopes	55.0	2.5%
995F	Yreka-Rock outcrop complex, 35 to 60 percent slopes	31.4	1.4%
Subtotals for Soil Survey Area		2,177.9	97.7%
Totals for Area of Interest		2,228.3	100.0%