USDA Natural Resources
Conservation Service

Ecological site F047XA531UT
High Mountain Stony Loam (quaking aspen)

Last updated: 2/05/2025
Accessed: 05/11/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

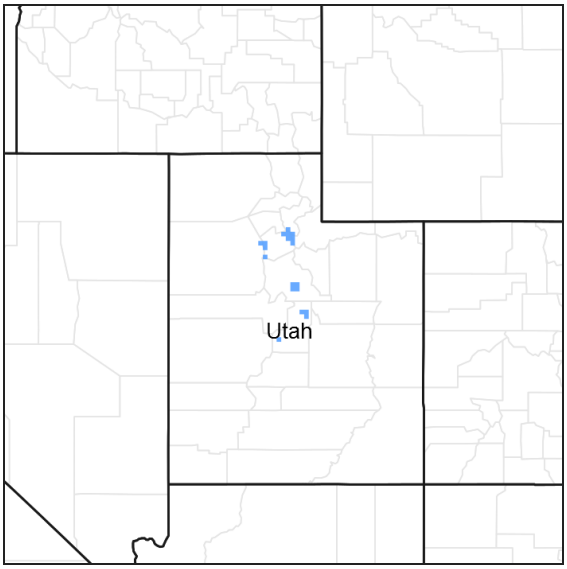


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 047X–Wasatch and Uinta Mountains

MLRA 47 occurs in Utah (86 percent), Wyoming (8 percent), Colorado (4 percent), and Idaho (2 percent). It encompasses approximately 23,825 square miles (61,740 square kilometers). The northern half of this area is in the Middle Rocky Mountains Province of the Rocky Mountain System. The southern half is in the High Plateaus of the Utah Section of the Colorado Plateaus Province of the Intermontane Plateaus. Parts of the western edge of this MLRA are in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The MLRA includes the Wasatch Mountains, which trend north and south, and the Unita Mountains, which trend east and west. The steeply sloping, precipitous Wasatch Mountains have narrow crests and deep valleys. Active faulting and erosion are a dominant force in controlling the geomorphology of the area. The Uinta Mountains have a broad, gently arching, elongated shape. Structurally, they consist of a broadly folded anticline that has an erosion-resistant quartzite core. The Wasatch and Uinta Mountains have an elevation of 4,900 to about 13,500 feet (1,495 to 4,115 meters).
The mountains in this area are primarily fault blocks that have been tilted up. Alluvial fans at the base of the mountains are recharge zones for the basin fill aquifers. An ancient shoreline of historic Bonneville Lake is evident on the foot slopes along the western edge of the area. Rocks exposed in the mountains are mostly Mesozoic and Paleozoic sediments, but Precambrian rocks are exposed in the Uinta Mountains. The Uinta Mountains are one of the few ranges in the United States that are oriented west to east. The southern Wasatch Mountains consist of Tertiary volcanic rocks occurring as extrusive lava and intrusive crystalline rocks.

The average precipitation is from 8 to 16 inches (203 to 406 mm) in the valleys and can range up to 73 inches (1854 mm) in the mountains. In the northern and western portions of the MLRA, peak precipitation occurs in the winter months. The southern and eastern portions have a greater incidence of high-intensity summer thunderstorms; hence, a significant amount of precipitation occurs during the summer months. The average annual temperature is 30 to 50 degrees F (-1 to 15 C). The freeze-free period averages 140 days and ranges from 60 to 220 days, generally decreasing in length with elevation.
The dominant soil orders in this MLRA are Aridisols, Entisols, Inceptisols, and Mollisols. The lower elevations are dominated by a frigid temperature regime, while the higher elevations experience cryic temperature regimes. Mesic temperature regimes come in on the lower elevations and south facing slopes in the southern portion of this MLRA. The soil moisture regime is typically xeric in the northern part of the MLRA, but grades to ustic in the extreme eastern and southern parts. The minerology is generally mixed and the soils are very shallow to very deep, generally well-drained, and loamy or loamy–skeletal.

Ecological site concept

This ecological site occurs in the Wasatch Mountains Unit of the Middle Rocky Mountains Province of the Rocky Mountain System and evolved under all the ecological conditions and the natural influences of native herbivory, fire and climate associated with that province. This site occurs on moderate to steep slopes (10 to 60 percent). It is usually found on high elevation mountain slopes. Species composition is generally dominated by an canopy of stable Aspen. A minor shrub layer may be present with mountain big sagebrush and mountain snowberry most often found. Mountain brome, Geyer sedge, Columbia needlegrass and bluegrass species are common herbaceous species. A wide diversity of perennial forbs are also present.

This sites high elevations, short growing season, and cobbly or gravelly soils, combined with its steep slopes limit its availability for livestock grazing. Grazing is usually limited to mid and late season cattle grazing and to bands of sheep that quickly move through the site during the summer months.

Evidence indicates that this site historically maintained a fairly short burn cycle (80 to 100 years). Following a fire, aspen regeneration and herbaceous species may dominate the site for a period of years. Over time, aspen typically moves through several seral communities including that of seedling, sapling, pole, immature forest, mature forest and eventually to an old or over-mature forest type. Mature aspen are susceptible to pathogen and/or insect buildups, and if fire does not occur, they will eventually kill mature trees. Logging has been observed in some locations, but it is usually restricted to flatter slopes and easily accessible locations. Following logging events, the remaining young aspen will again move through the immature, mature and over-mature community stages.

As vegetative communities respond to changes caused by natural or man made events that cause them to cross ecological thresholds, a return to previous states may not be possible. The amount of effort needed to affect desired vegetative shifts depends on a sites present biotic and abiotic features and the desired results.

Associated sites

R047XA557UT	**High Mountain Gravelly Loam (tall forb)**

Similar sites

F047XA508UT	**High Mountain Loam (quaking aspen)**

Table 1. Dominant plant species

Tree	(1) *Populus tremuloides*
Shrub	(1) *Symphoricarpos*
Herbaceous	(1) *Bromus carinatus*

Physiographic features

Mountainsides and Lateral Moraines

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Moraine
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	8,000–10,800 ft
Slope	10–60%
Aspect	Aspect is not a significant factor

Climatic features

The climate is characterized by cold, snowy winters and cool summers. The average annual precipitation ranges from 24 to 34 inches. October thru April, are typically the wettest months with June thru August being the driest. The most reliable sources of moisture for plant growth are the snow that accumulates over the winter and spring rains. Summer thunderstorms are intermittent and sporadic in nature, and thus, are less reliable sources of moisture to support vegetative growth on this site. The typical mean annual air temperature ranges from 31 to 45 degrees Fahrenheit.

Table 3. Representative climatic features

Frost-free period (characteristic range)	50-90 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	25-35 in
Frost-free period (average)	70 days
Freeze-free period (average)	
Precipitation total (average)	30 in

Influencing water features

No water features associated with this upland feature.

Wetland description

N/A

Soil features

The soils of this site formed mostly in slope alluvium and colluvium derived from sandstone and quartzite. Surface soils are mostly channery loam, stony slightly decomposed organic matter and extremely bouldery loam in texture. Rock fragments may be present on the soil surface and throughout the profile, and make up more than 50 percent of the soil volume. These soils are deep, well-drained, and have moderately slow to moderate permeability. Available water-holding capacity ranges from 1.5 to 5 inches of water in the upper 60 inches of soil. The soil moisture regime is mostly udic and the soil temperature regime is cryic.

Table 4. Representative soil features

Parent material	(1) Colluvium–limestone and sandstone (2) Colluvium–quartzite
Surface texture	(1) Gravelly loam (2) Loam

Family particle size	(1) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	40–60 in
Soil depth	40–60 in
Surface fragment cover <=3"	11–25%
Surface fragment cover >3"	0–3%
Available water capacity (0-40in)	2.6–4.9 in
Subsurface fragment volume <=3" (0-40in)	18–35%
Subsurface fragment volume >3" (0-40in)	15–25%

Ecological dynamics

The following state-and-transition model diagram depicts the most common plant communities found on this ecological site. It does not necessarily depict all the plant communities that can occur, but does show the most prevalent and repeatable. As more data are collected, some of these plant communities may be revised or removed, and new ones added. These descriptions capture the current knowledge and experience at the time of this revision.

State 1
Reference State
This Reference State describes the biotic communities that may become established on this ecological site if all successional sequences are completed under natural disturbance conditions. Species composition is generally dominated by mature or seral aspen community types. Shrubs are of minor importance in this state.

Several seral communities are described in this reference state including those of open canopy, seedling, sapling, pole, immature forest, mature forest, and eventually to an old or over-mature forest type if fire is excluded for very long periods of time.
The primary disturbance mechanisms in this state are overstory canopy density, weather fluctuations, and fire, or lack of fire. The reference state is self-sustaining and resistant to change beyond it's normal seral community types due to a good adaptation to natural disturbances and a high resilience following those disturbances. When natural disturbances such as fire do occur, the rate of recovery can be quite variable.

Feedbacks: Natural fluctuations in weather patterns that allow for a self-sustaining mix of a aspen, shrubs and native grass and grass-like community. Insect herbivory, more frequent fires, or other disturbances that may allow for the establishment of invasive species.
At-risk Community Phase: All communities are at risk when native plants are stressed and nutrients become available for non-native plants to establish.
Trigger: The establishment of non-native plant species.

Community 1.1
Mature Aspen Community Phase.
This community phase is dominated by an overstory canopy of mature aspen that have reached or are near maximal heights for the site. Average age is 80 to 120 years. Trees have developed tall, straight, clear stems with short, high rounded crowns. Tree canopy cover ranges from 20 to 40 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. A few seedlings and/or saplings of quaking aspen occur in the understory. Shade tolerant plants dominate the understory.

The species composition table in this description provides an example of the typical vegetative floristics of a community phase 1.1 plant community.

Community 1.2

Aspen Seedling/ Herbaceous Community Phase.
This community phase is dominated by aspen sprouts and seedlings, and by perennial grasses and forbs under nearly full sunlight. This stage is experienced after a major disturbance such as crown fire, insect damage or disease. Any skeleton forest (dead trees) remaining have little or no affect on the composition and production of the herbaceous vegetation. Various amounts of tree seedlings 1 to 25 years old are present up to the point where they are obviously a major component of the vegetal structure.

Air dry composition of this site is approximately 30 percent grasses, 15 percent forbs, 10 percent shrubs and and 55 aspen reproduction. Thick duff layers are present on some sites, completely covering the forest floor with needles and twigs.

Community 1.3
Immature Aspen Forest/ Herbaceous Community Phase.
This community phase is characterized by a growing canopy of pole sized and/or immature aspen. Trees are developing tall, straight, clear stems with narrow pointed crowns. Average age is 25 to 80 years. Tree canopy cover ranges from 10 to 20 percent. Understory vegetation is somewhat influenced by tree competition, overstory shading, duff accumulation, etc. Seedlings and/or saplings of quaking aspen are common in the understory. Shade tolerant plants dominate the understory.

Air dry composition of this site is approximately 20 percent grasses, 10 percent forbs, 10 percent shrubs and and 60 mature aspen. Thick duff layers are present on some sites, completely covering the forest floor with needles and twigs.

Community 1.4
Decadent Aspen Community Phase.
This community phase is dominated by an overstory canopy of very mature and decadent aspen that have reached maximal heights for the site. Average age is 120 plus years. Trees have developed tall, straight, clear stems with high, very rounded crowns. This phase typically develops in the absence of wildfire or other naturally occurring disturbances including disease and insect damage. Tree canopy cover is at a maximum for the site and is commonly greater than 50 percent. Very old trees often show signs of disease and/or insect damage. Understory vegetation is somewhat sparse due to tree competition, overstory shading, duff accumulation, etc.

Pathway 1.1B
Community 1.1 to 1.2
This community pathway occurs when wildfire removes the aspen overstory. This event can be exacerbated by drought, insect damage or disease.

Pathway 1.1A
Community 1.1 to 1.4
This community pathway occurs when fire is excluded from the plant community for long periods of time.

Pathway 1.2A
Community 1.2 to 1.3
This community pathway occurs when fire is excluded from the plant community for long periods of time.

Pathway 1.3A
Community 1.3 to 1.1
This community pathway occurs when fire is excluded from the plant community for long periods of time.

Pathway 1.3B
Community 1.3 to 1.2
This community pathway occurs when wildfire removes the growing aspen overstory. This event can be exacerbated by drought, insect damage and/or disease.

Pathway 1.4A
Community 1.4 to 1.1
This community pathway occurs when insect damage or disease kills old trees and allows the community to return to a community phase 1.1 type with snags present.

Pathway 1.4B
Community 1.4 to 1.2
This community pathway occurs when wildfire removes the aspen overstory. This event can be exacerbated by drought, insect damage or disease.

State 2
Current Potential State
The current potential state is similar to the reference state, however minor amounts of non-native species may now be present in all community phases. This condition has not been well documented and so community phases in this state are based on possible community dynamics and not documented facts. This state describes the biotic communities that may become established on this ecological site if all successional sequences are completed under natural disturbance conditions. Species composition is generally dominated by mature or seral aspen community types. Shrubs are of minor importance in this state.
Several seral communities are described in this reference state including those of open canopy, seedling, sapling, pole, immature forest, mature forest, and eventually to an old or over-mature forest type if fire is excluded for very long periods of time.
The primary disturbance mechanisms in this state are overstory disturbance, canopy density, weather fluctuations, and fire, or lack of fire. The current potential state is still self-sustaining and resistant to change beyond it's normal seral community types due to a good adaptation to natural disturbances and a high resilience following those disturbances. When disturbances such as fire do occur, the rate of recovery can be quite variable.
Current Potential State: Plant communities influenced by Aspen canopy density, long term weather fluctuations, and periodic fire.

Feedbacks: Natural fluctuations in weather patterns that allow for a self-sustaining mix of a aspen, shrubs and native grass and grass-like community. Insect herbivory, more frequent fires, or other disturbances that may allow for the increase of non-native species.
At-risk Community Phase: All communities are at risk when native plants are stressed and nutrients become available for non-native plants to increase.
Trigger: The increase of non-native plant species.

Community 2.1
Mature Aspen, Non-Native Herbaceous Community Phase.
Community Phase 2.1
This community phase is dominated by an overstory canopy of mature aspen that have reached or are near maximal heights for the site. Trees have developed tall, straight, clear stems with short, high rounded crowns. Tree canopy cover ranges from 20 to 40 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. A few seedlings and/or saplings of quaking aspen occur in the understory. Shade tolerant plants dominate understory species. Non-native species including smooth brome, orchardgrass, and Kentucky bluebrass may now be present in the community.
Air dry composition of this site is approximately 25 percent grasses, 10 percent forbs, 10 percent shrubs and aspen reproduction and 65 mature aspen. Thick duff layers are present on some sites, completely covering the forest floor with needles and twigs.

Community 2.2
Aspen Seedling/ Non-Native Herbaceous Community Phase.
Community Phase 2.2
This community phase is dominated by aspen sprouts and seedlings, and by perennial grasses and forbs under nearly full sunlight. This stage is experienced after a major disturbance such as crown fire, insect damage or disease. Any skeleton forest (dead trees) remaining have little or no affect on the composition and production of the herbaceous vegetation. Various amounts of tree seedlings 1 to 25 years old are present up to the point where they are obviously a major component of the vegetal structure. Non-native including smooth brome, orchardgrass, and Kentucky bluegrass may also occur on the site.
Air dry composition of this site is approximately 30 percent grasses, 15 percent forbs, 10 percent shrubs and and 55 aspen reproduction. Thick duff layers are present on some sites, completely covering the forest floor with needles and twigs.

Community 2.3

Immature Aspen Forest/Non-Native Herbaceous Community Phase.
Community Phase 2.3
This community phase is characterized by a growing canopy of pole sized and/or immature aspen. Trees are developing tall, straight, clear stems with narrow pointed crowns. Average age is 25 to 80 years. Tree canopy cover ranges from 10 to 20 percent. Understory vegetation is somewhat influenced by tree competition, overstory shading, duff accumulation, etc. Seedlings and/or saplings of quaking aspen are common in the understory. Shade tolerant plants dominate understory. Non-native species including smooth brome. orchardgrass and Kentucky bluegrass are present in the community
Air dry composition of this site is approximately 20 percent grasses, 10 percent forbs, 10 percent shrubs and and 60 mature aspen. Thick duff layers are present on some sites, completely covering the forest floor with needles and twigs.

Community 2.4
Decadent Aspen, Non-Native Herbaceous Community Phase.
Community Phase 2.4
This community phase is dominated by an overstory canopy of very mature and decadent aspen that have reached maximal heights for the site. Average age is 120 plus years. Trees have developed tall, straight, clear stems with high, very rounded crowns. This phase typically develops in the absence of wildfire or other naturally occurring disturbances including disease and insect damage. Tree canopy cover is at a maximum for the site and is commonly greater than 50 percent. Very old trees often show signs of disease and/or insect damage. Understory vegetation is somewhat sparse due to tree competition, overstory shading, duff accumulation, etc. Minor amounts of non-native species including smooth brome, orchardgrass and Kentucky bluegrass may be present on the community.
Air dry composition of this site is approximately 5 percent grasses, 5 percent forbs, 10 percent shrubs and 70 aspen. Bare ground is variable (5-30%) depending on litter and biological crust cover, which are also variable (10-40%) and surface rock fragments (0-50%). Thick duff layers are often present, completely covering the forest floor with needles and twigs.

Pathway 2.1B
Community 2.1 to 2.2
This community pathway occurs when wildfire removes the growing aspen overstory. This event can be exacerbated by drought, insect damage and/or disease.

Pathway 2.1A
Community 2.1 to 2.4
This community pathway occurs when fire is excluded from the plant community for long periods of time.

Pathway 2.2A
Community 2.2 to 2.3
This community pathway occurs when fire is excluded from the plant community for long periods of time.

Pathway 2.3A
Community 2.3 to 2.1
This community pathway occurs when fire is excluded from the plant community for long periods of time.

Pathway 2.3B
Community 2.3 to 2.2
This community pathway occurs when wildfire removes the growing aspen overstory. This event can be exacerbated by drought, insect damage and/or disease.

Pathway 2.4B
Community 2.4 to 2.1
This community pathway occurs when insect damage or disease kills old trees and allows the community to return to a community phase 2.1 type with snags present.

Pathway 2.4A
Community 2.4 to 2.2
This community pathway occurs when wildfire removes the growing aspen overstory. This event can be

exacerbated by drought, insect damage and/or disease.

State 3
Logged/Disturbed State

The logged or disturbed state is similar to the current potential state, however merchantable timber composed mostly of mature and old aspen have been removed. Various amounts of invasive species may also now be present in all community phases. This condition has not been well documented and so community phases in this state are based on possible community dynamics and not documented facts. Species composition is generally dominated by an immature canopy of aspen. Shrubs are of minor importance in the understory. A wide diversity of perennial forbs and grasses are also present. Non-native species including orchard grass, Kentucky bluegrass and smooth brome may also be present. These species could have been seeded as part of the site rehabilitation following the logging process.

Logging will release younger aspen trees and will give the site the look of an immature forest. Site will return to a mature, and finally an old or over-mature forest type if fire is excluded for very long periods of time.
The primary disturbance mechanisms are logging, road building or other man caused activities, weather fluctuations and fire or lack of fire. The logged state is still self sustaining but has a lower resistant to change due to a reduced resistance to disturbances. When disturbances do occur, the rate of recovery can be highly variable.
Logged/disturbed State: Plant communities influenced by man caused activities, wildlife browsing, insect herbivory, weather fluctuations, fire periods and surface disturbances.
Indicators: A community dominated by immature aspen with an understory of aspen reproduction, shrubs, grasses and forbs. The density of the overstory canopy determines the amount and composition of the other native perennial grasses, grass-likes and forbs that may be present.
Feedbacks: Natural fluctuations in weather patterns that allow for a self-sustaining mix of a aspen, shrubs and native grass and grass-like community. Insect herbivory, more frequent fires, or other disturbances that may allow for the increase of non-native species.
At-risk Community Phase: All communities are at risk when native plants are stressed and nutrients become available for non-native plants to increase.
Trigger: The increase of non-native plant species.

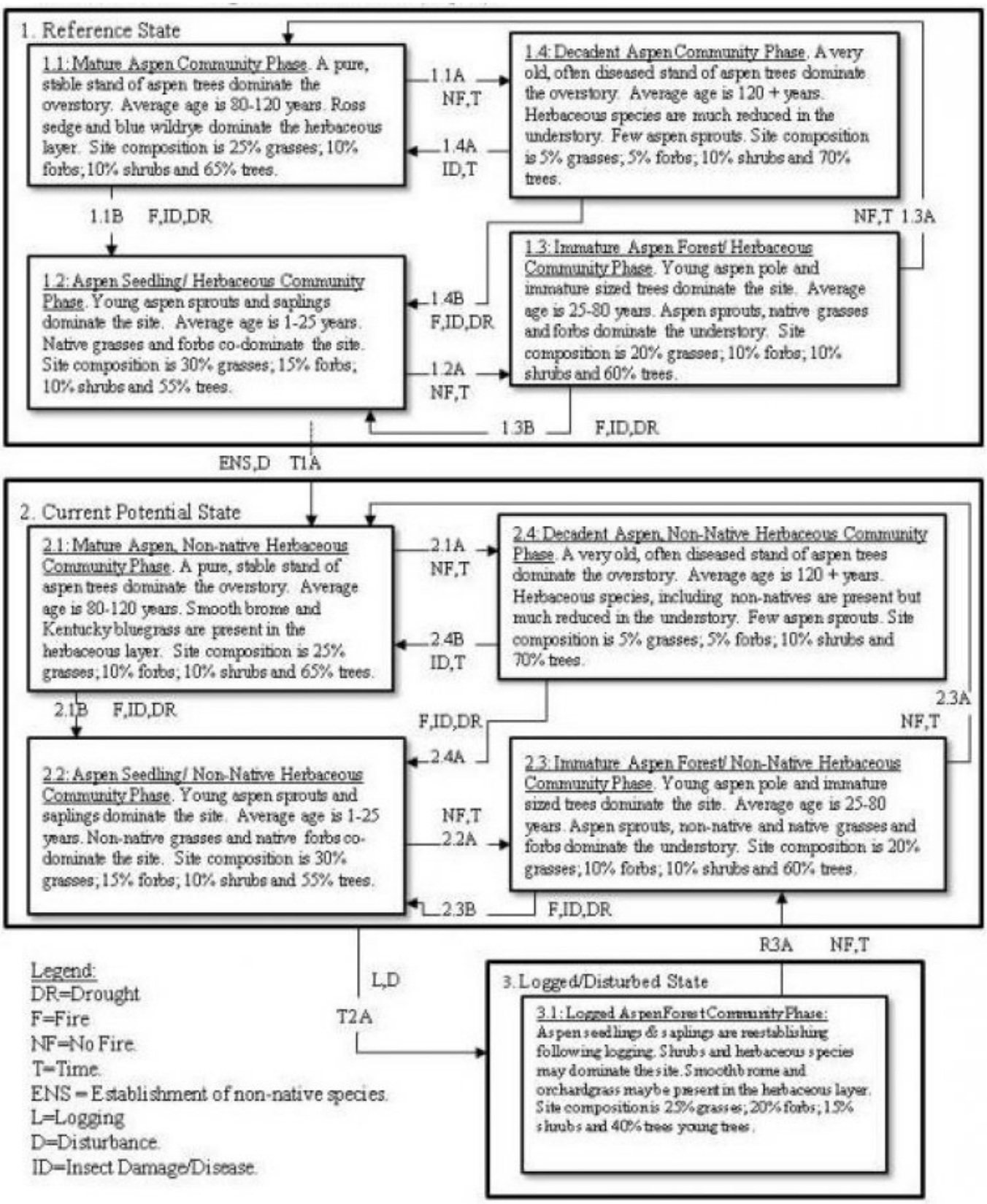
Community 3.1
Logged Aspen Forest Community Phase.
Community Phase 3.1
This community phase is typically found following logging or other man caused activity such as road building or pipeline construction. It is characterized by a partial canopy of aspen. Pole and/or immature sized trees are present and are beginning to once again dominant the community. Shrubs are a minor component in the understory as well as native perennial grasses and forbs. Non-native species including orchard grass, Kentucky bluegrass and smooth brome may potentially also be found on the site. Understory vegetation is somewhat influenced by tree competition, overstory shading, duff accumulation, etc. Seedlings and/or saplings of quaking aspen are common in the understory.
Air dry composition of this site is approximately 25 percent grasses, 20 percent forbs, 15 percent shrubs and and 40 mature aspen. Thick duff layers are present on some sites, completely covering the forest floor with needles and twigs.

Transition T1A
State 1 to 2
This transitional pathway occurs when various disturbances such as road building, pipeline construction or fence line clearing provides and opportunity for non-native species to become established. Seeding of these species could be a normal part of these activities. Once non-native species are established, a threshold has been crossed.

Transition T2A
State 2 to 3
This transitional pathway occurs when timber logging and its associated activities, including road building and skid trail development, removes mature and over-mature aspen trees from the site and provides an opportunity for non-native species to increase. Seeding species such as orchardgrass and smooth brome would often be a normal part of these activities. Once the site is logged, a threshold has been crossed.

Restoration pathway R3A
State 3 to 2
This restoration pathway occurs following logging activities when the site is allowed to recover naturally. Pole sized and immature aspen trees are increasing in dominance. Seeded, non-native herbaceous species where present, are will established.

State and transition model



State 1

Reference State

Community 1.1
Reference State

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	220	330	440
Forb	120	180	240
Shrub/Vine	60	90	120
Total	**400**	**600**	**800**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
0	**Shrubs**			60–120	
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	48–96	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	6–12	–
	quaking aspen	POTR5	*Populus tremuloides*	6–12	–
Grass/Grasslike					
0	**Grasses**			220–440	
	nodding bluegrass	PORE	*Poa reflexa*	66–132	–
	California brome	BRCA5	*Bromus carinatus*	66–132	–
	Geyer's sedge	CAGE2	*Carex geyeri*	44–88	–
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	22–44	–
Forb					
0	**Forbs**			120–240	
	sticky purple geranium	GEVI2	*Geranium viscosissimum*	72–144	–
	Fendler's meadow-rue	THFE	*Thalictrum fendleri*	48–96	–

Animal community

a. Livestock Grazing

This site is suited to cattle and sheep grazing during the summer and fall. Livestock will often concentrate on this site taking advantage of the shade and shelter offered by the tree overstory. Grazing management should allow aspen saplings to attain a minimum height of 55 to 60 inches before use to prevent destructive browsing by livestock. Harvesting trees under a sound management program for fuelwood or other products can open up the tree canopy to allow increased production of understory species desirable for grazing while rejuvenating the aspen forest.

b. Initial Stocking Rates

Stocking rates vary in accordance with such factors as kind and class of grazing animal, season of use, and fluctuation in climate. Actual use records for individual sites, together with a determination of the degree to which the sites have been grazed and an evaluation of trend in site condition, offer the most reliable basis for developing initial stocking rates.

Selection of initial stocking rates for given grazed units is a planning decision. This decision should be made only after careful consideration of the total resources available, evaluation of alternatives for use and treatment, and establishment of objectives by the decisionmaker.
Wildlife species seeking food and cover in this forest site include moose, elk, mule deer, bear, porcupine, snowshoe hare, owl, and woodpecker.

Wood products

a. Harvest cut selectively or in small patches (size dependent upon site conditions) to enhance forage production.

1. Thinning and improvement cutting – removal of poorly formed, diseased, and low vigor trees for fuelwood.

2. Harvest cutting – selectively harvest surplus trees to achieve desired spacing. Harvest stands in small blocks of 1/5 to 1/2 acre with slash left in place to shelter emerging aspen suckers from browsing.

3. Spacing guide: A spacing of about 15 X 15 feet is considered desirable for multiple use management during period of stand maturity.

b. Selective tree removal on suitable sites to enhance forage production and manage site reproduction.

Fuelwood Production:

8 to 10 cords per acre per year. Firewood is commonly measured in cords, or a stacked unit equivalent to 128 cubic feet. Assuming an average of 90 cubic feet of solid volume wood per cord, there are about 196,400 British thermal units (BTU's) per cubic foot or about 17 million BTU's of heat value in a cord of quaking aspen.

Saw Timber: 200 to 300 board-feet per acre per year

Other information

4. Limitations and Considerations

a. Potential for sheet and rill erosion is moderate to severe depending on slope.

b. Moderate to severe equipment limitations on steeper slopes and on sites having extreme surface stoniness.

c. Proper spacing is the key to a well managed multiple use and multi-product aspen forest.

5. Essential Requirements

a. Adequately protect from high intensity wildfire.

b. Protect soils from accelerated erosion.

c. Apply proper grazing management practices (see management guides)

Table 7. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
quaking aspen	*POTR5*	40	50	16	21	–	–	–	

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used.

Other references

Meuggler, Walter F., 1988 Aspen Community Types of the Intermountain Region, General Technical Report, INT-250, page 42, POTR/SYOR/BRCA

Nevada Soil Conservation Service Forest Suitability Group Description 028BY067NV

Contributors

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Approval

Kendra Moseley, 2/05/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/11/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state**

for the ecological site:

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17. **Perennial plant reproductive capability:**
