

Ecological site R012XY041ID Gravelly 7-10 PZ ATCO/SPCR

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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.

MLRA notes

Major Land Resource Area (MLRA): 012X–Lost River Valleys and Mountains

Land Resource Region: B (Northwestern Wheat and Range)
MLRA: 12 (Lost River Valleys and Mountains)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

012X-Lost River Valleys and Mountains

Precipitation or Climate Zone: 7-10" P.Z.
<https://soils.usda.gov/survey/geography/mlra/index.html>

Ecological site concept

Site does not receive additional water.

Soils are:

Not saline or saline-sodic.

Moderately deep to very deep, with >35% (by volume) coarse fragments, skeletal within 20" of the soil surface, coarse fragments increase with depth.

Not strongly or violently effervescent in the to 20" of the soil profile.

textures usually range from loam to silt loam in surface mineral 4".

Slope is < 30%.

Clay content is = <35% in surface mineral 4".

Site does not have an argillic horizon with > 35% clay.

Associated sites

R012XY004ID	Gravelly Loam 8-12 PZ ARTRW8/PSSPS
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Similar sites

R012XY040ID	Cold Gravelly 8-12 PZ ARNO4/HECOC8
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i>

Physiographic features

This site occurs on northwest, north, and northeast facing outwash fans, fan terraces, and lower foothill slopes. Slopes generally range from 1-10 percent. Elevation ranges from 4500-6500 feet (1350-2000 meters).

Table 2. Representative physiographic features

Landforms	(1) Fan
Elevation	4,500–6,500 ft
Slope	1–10%
Aspect	N, NE, NW

Climatic features

MLRA 12 is dominated by dramatic changes in elevation which, in turn, influence local weather patterns. The intermontane valleys have elevations as low as 3800 feet, while the adjacent mountains may reach more than 12,600 feet. The average annual precipitation for the entire MLRA, based on 10 long term climate stations located throughout the MLRA, is approximately 9.38 inches. However, the dry valleys may have averages as low as 6 inches, while the upper peaks may have averages that exceed 46 inches per year.

Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees.

In the summer the sun shines 78% of the time, but drops to 40% in the winter. The prevailing wind is location-dependent, and generally flows parallel to the orientation of the dominant valleys. In the summer localized afternoon upslope winds and evening downslope winds are common. The average windspeed is greatest in the spring and early summer.

The frost free period ranges from 102 to 107 days while the freeze free period ranges from 134 to 139 days across the MLRA.

Table 3. Representative climatic features

Frost-free period (average)	107 days
Freeze-free period (average)	139 days
Precipitation total (average)	11 in

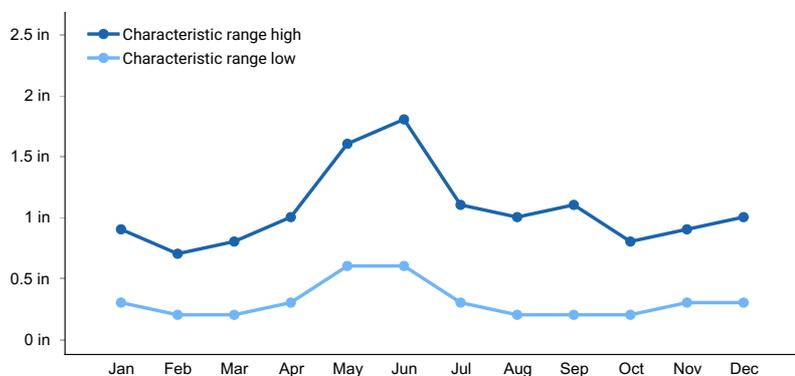


Figure 1. Monthly precipitation range

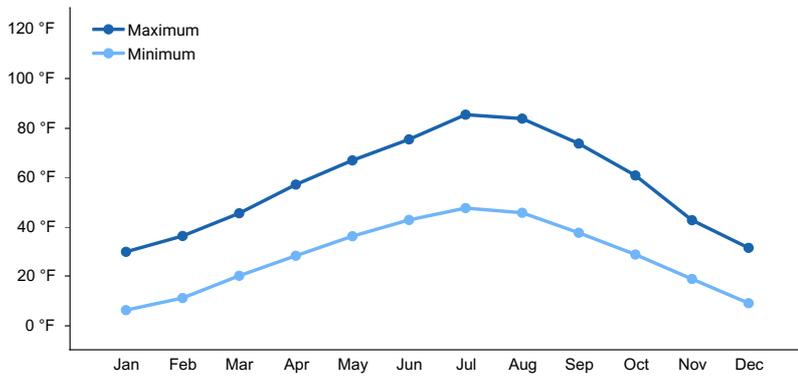


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is not influenced by adjacent wetlands, streams or run on.

Soil features

The soils on this site have gravelly loam, very gravelly loam or stony silt loam surface layers. The subsoil is extremely gravelly or extremely cobbly sandy loam or loamy coarse sand. Available water capacity is very low to low and permeability is moderate to moderately rapid. Soils are formed in alluvium from limestone and /or volcanic rock. Organic matter content is low in these soils. These soils contain more than 60 percent coarse fragments by volume below 20 inches in depth. The soils have an aridic soil moisture regime. The soil temperature regime is frigid.

Table 4. Representative soil features

Surface texture	(1) Gravelly silt loam (2) Very gravelly loam (3) Stony
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	10–60 in
Surface fragment cover ≤3"	15–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	1.9–3.2 in
Calcium carbonate equivalent (0-40in)	5–30%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume ≤3" (Depth not specified)	40–60%
Subsurface fragment volume >3" (Depth not specified)	40–60%

Ecological dynamics

The dominant visual aspect of this site is low growing vegetation dominated by shadscale saltbush and sand

dropseed. Composition by weight is approximately 35-45% grass, 5-10% forbs and 50-60% shrubs.

During the last few thousand years, this site has evolved in an arid climate characterized by dry summers and cold winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include pronghorn antelope, mule deer and lagomorphs.

Fire has historically occurred on the site at intervals of 100-125 years. Fire only occurs in favorable years.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community Phase is Phase A. This plant community is dominated by shadscale saltbush and sand dropseed. Indian ricegrass, Swallen ricegrass and bud sagebrush are often present in the community in smaller amounts. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 225 pounds per acre (252 Kg/ha) in a normal year. Production in a favorable year is 400 pounds per acre (448 Kg/ha). Production in an unfavorable year is 150 pounds per acre (168 Kg/ha). Structurally, medium height shrubs are dominant followed by warm and cool season grasses being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is suited for grazing by domestic livestock in late spring and early summer. Natural water supplies are short or absent; however, natural water is generally available on adjacent sites. Heavy use by sheep or cattle in late winter or very early spring can damage the site through trampling or pull-up.

This site provides year-long range for pronghorn antelope. Mule deer make use of the site in the winter. Some use is made of the site by lagomorphs and small rodents. Raptors use the site for food gathering.

The soils have moderately low runoff potential. Due to the relatively flat slopes and low rainfall, this site is easily degraded.

Pronghorn antelope hunting is the major recreational use of the site. The site is open space with generally smooth terrain, varied slopes and low growing vegetation.

Impacts on the Plant Community.

Influence of fire:

This site historically had a very low fire frequency, approximately every 100-125 years. Most of the shrubs, especially shadscale saltbush and bud sagebrush, evolved in the absence of fire; therefore, they can be severely damaged or killed when burned at a high intensity. Cheatgrass can be a troublesome invader at lower elevations on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency.

Influence of improper grazing management:

Bud sagebrush, shadscale saltbush, sand dropseed, Indian ricegrass and Swallen ricegrass can all be impacted by improper grazing management. Relatively low levels of utilization by cattle and sheep are needed to maintain the shrub component.

Weather influences:

Extended periods of drought reduce the vigor of the perennial grasses and palatable shrubs. Extreme drought may cause plant mortality.

Influence of insects and disease:

Mormon crickets and grasshopper outbreaks occur occasionally. Since defoliation usually occurs only once during the growing season, little mortality occurs.

Shadscale saltbush can be heavily impacted by the scale insect, *Orthezia annae*. It is also called "mealy bug". This insect is moved by ants from one plant to another and feeds on the roots of shadscale saltbush. It can cause stand mortality, especially following a series of drought years.

Influence of noxious and invasive plants:

Annual and perennial invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory. Cheatgrass can be invasive on this site, especially after fire. Once it becomes established the fire frequency increases. As a result, the shrub component can be lost or severely reduced.

Influence of wildlife:

Relatively low numbers of wildlife use this site and have little impact on it. Pronghorn antelope is the dominant large herbivore using the site. They use the site yearlong but prefer it in the spring, fall, and early winter. Winter use by mule deer occurs occasionally.

Watershed:

Decreased infiltration and increased runoff occurs when shadscale saltbush and bud sagebrush are removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill erosion. The long-term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management and no fire.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing and no fire.

Phase C to A. Develops with prescribed grazing and no fire.

State 1 Phase C to State 2. Develops through frequent fire and continued improper grazing management. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

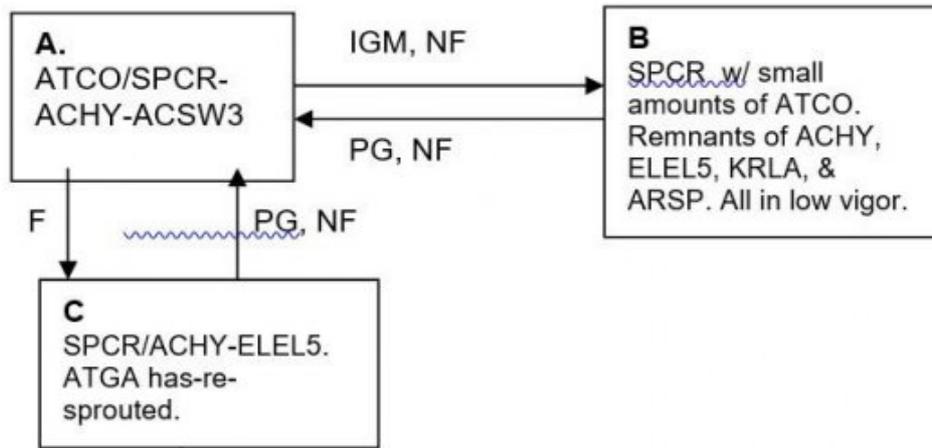
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to return this plant community to State 1 with accelerating practices.

Practice Limitations.

Only slight limitations exist on this site for implementing facilitating practices. This site is not well suited to seeding due to the low precipitation and coarse textured soils. Brush management is normally not needed or useful on this site.

State and transition model

STATE 1. Plant Community Phases



FF
IGM

STATE 2. BRTE-ANNUALS-OPPO

IGM &/or FF

UNKNOWN
AND NEW SITE

LEGEND

IGM- Improper grazing management
 PG- Prescribed grazing
 FF- Frequent fire
 NF- No fire
 F- Fire

→ Community pathway (within states)
 - - - - - Reversible transition
 ——— Threshold
 ——— Irreversible transition

PLANT LEGEND STATES 1 & 2

ATCO - Shadscale Saltbush
 KRLA - Winterfat
 ARSP5 - Bud Sagebrush
 SPCR - Sand Dropseed
 ACHY - Indian Ricegrass
 ACSW3 - Swallen's Ricegrass
 ELEL5 - Bottlebrush Squirreltail
 ATGA - Gardner's Saltbush
 BRTE - Cheatgrass
 OPPO - Plains Pricklypear

State 1

State 1, Phase A, Reference Plant Community Phase

Community 1.1

State 1, Phase A, Reference Plant Community Phase

This plant community has shadscale saltbush in the overstory with sand dropseed, Indian ricegrass and Swallen ricegrass dominating the understory. Bud sagebrush, fringed sagebrush and plains pricklypear are often present in the community in smaller amounts. Natural fire frequency is 100-125 years.

State 2
State 1, Phase B

Community 2.1
State 1, Phase B

This plant community is dominated by sand dropseed with small amounts of shadscale saltbush remaining. This state has developed due to improper grazing management and lack of fire. There are remnants of Indian ricegrass, bottlebrush squirreltail, winterfat and bud sagebrush. These deep-rooted perennial bunchgrasses and shrubs are typically in low vigor. Shrubs are normally hedged.

State 3
State 1, Phase C

Community 3.1
State 1, Phase C

This plant community is dominated by sand dropseed, Indian ricegrass and bottlebrush squirreltail. Forbs remain about in the same proportion as Phase A. Gardner saltbush has re-sprouted. This state is a result of wildfire.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by cheatgrass and other annuals. Plains pricklypear is increasing. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices. This state has developed due to frequent fires and improper grazing management.

State 5
Unknown new site

Community 5.1
Unknown new site

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires. It is economically impractical to return this plant community to State 1 with accelerating practices.

Additional community tables

Animal community

Wildlife Interpretations
Animal Community – Wildlife Interpretations

This rangeland ecological site provides a sparse plant community for select native wildlife species. Mule deer and pronghorn antelope are the large herbivores using the site. The site provides seasonal habitat for resident and migratory animals including sagebrush lizard, shrews, ground squirrels, mice, coyote, red fox, badger, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Encroachment of noxious and invasive plant species (cheatgrass, kochia, and Russian thistle) in isolated areas can replace native plant species which provide food, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal runoff, artificial water catchments, and springs.

State 1 Phase 1.1 – Shadscale Saltbush/ Sand Dropseed/ Indian Ricegrass/ Swallen’s Ricegrass Reference Plant Community (RPC) This plant community provides a diversity of grasses, forbs, and shrubs used throughout the growing season by native insect communities that assist in pollination. The reptile community is represented by sagebrush lizard, leopard lizard, and short horned lizard. The plant community provides forage throughout the year for mule deer and pronghorn. Bud sagebrush provides good spring forage and shadscale saltbush good spring and winter forage. Bud sagebrush and shadscale are utilized extensively by rodents, rabbits, birds, and pronghorn. Small mammal populations including deer mice, jackrabbits, and Great Basin kangaroo rats can be high and provide an excellent prey base for raptors.

State 1 Phase 1.2 – Sand Dropseed/ Shadscale Saltbush/ Winterfat/ Bud Sagebrush Plant Community: This phase has developed due to improper grazing management and a lack of fire. The plant community, dominated by herbaceous vegetation would provide less vertical structure for animals. Patches of shadscale, bud sagebrush, and winterfat remain to provide limited vertical structure and diversity for wildlife. Insect diversity would be reduced with the reduction of shadscale, winterfat, and bud sagebrush. Native forbs are still present and support select pollinators. Reptiles including short horned lizard and sagebrush lizard would be limited or excluded on site due to low brush cover. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). The reduced amounts of shadscale, winterfat, and bud sagebrush would reduce the quality of spring and winter forage for mule deer and pronghorn. The diversity and populations of small mammals would be dominated by open grassland species. Predator (coyote, fox, and raptors) hunting success may increase due to the reduction of cover for small mammals.

State 1 Phase 1.3- Sand Dropseed/ Indian Ricegrass/ Bottlebrush Squirreltail/ Gardner’s Saltbush Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation would provide less vertical structure for animals. Patches of root sprouting shrubs (Gardner saltbush) may begin to provide limited vertical structure for wildlife over time. Diversity of insects would be reduced with the reduction of shadscale, winterfat, and bud sagebrush. Native forbs are still present and will support select pollinators. Reptiles including short horned lizard and sagebrush lizard would be limited or excluded on sites with low brush cover. The herbaceous vegetation improves habitat for grassland bird species (horned lark and western meadowlark). The loss of shadscale, bud sagebrush, and winterfat would prevent the use of the site for winter feeding for mule deer and pronghorn. The populations of small mammals would be dominated by open grassland species. Hunting success by predators may increase due to the reduction of cover for small mammals.

State 2 - Cheatgrass / Annuals/ Plains Prickly-pear Cactus Plant Community:

This state has developed due to frequent fires and continued improper grazing management. The reduced forb and shrub components in the plant community would support a very limited population of pollinators. Prickly-pear cactus would add summer pollinator habitat. Most reptilian species are not supported with food, water, or cover. Diversity of grassland avian species is reduced due to poor cover and available food. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Predator (coyotes, fox, and raptors) hunting success may increase due to poor cover provided for small mammals and grassland bird species. Large mammals may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) are more palatable. At other times of the year, large mammals would not regularly utilize these areas due to poor food and cover conditions. Pronghorn may eat prickly-pear cactus after fires. The diversity and populations of small mammals would be dominated by open grassland species. Prickly-pear cactus would provide limited habitat for reptiles and small mammals.

Grazing Interpretations

This site is suited for grazing by domestic livestock in late spring and early summer. Natural water supplies are typically short or absent; however, natural water is generally available on adjacent sites. Heavy use by sheep or cattle in late winter or very early spring can damage the site through trampling or pull-up.

Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

The soils on this site are in hydrologic group B. They have moderately low runoff potential.

Recreational uses

Pronghorn antelope hunting is the major recreation use of the site. The site is open space with generally smooth terrain, varied slopes and low growing vegetation.

Wood products

None.

Other products

None.

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used.

Those involved in developing this site description include:

Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC

Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC

Jim Cornwell, Range Management Specialist, IASCD

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Kristen May, Resource Soil Scientist, NRCS, Idaho

Other references

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USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

Kendra Moseley, 9/22/2020

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)	
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Date	01/18/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills rarely occur on this site. They are most likely to occur immediately following a wildfire. Gravels on the surface reduce erosion.

2. **Presence of water flow patterns:** Water flow patterns are rare on this site. When they do occur, they are short, disrupted by cool season perennial grasses, medium shrubs and gravels and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** Erosional pedestals or terracettes are rare on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 25-40 percent.

5. **Number of gullies and erosion associated with gullies:** Gullies do not occur on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Blowouts and depositional areas are usually not present.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move up to 2-3 feet or further following a significant run-off event. Coarse litter generally does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 3 to 5 but need to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure ranges from weak thin platy to weak medium, coarse or moderate very fine, fine subangular blocky. The A or A1 horizon is typically 3 to 9 inches thick. Soil organic matter (SOM) ranges from 0.5 to 1 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses, especially deep-rooted, slow run-off and increase infiltration.
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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):** Compaction layer is not present.
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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: Medium shrubs>>
- Sub-dominant: Warm season deep-rooted perennial bunchgrasses>cool season bunchgrasses >perennial forbs> shallow rooted bunchgrasses
- Other:
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little decadence is expected to occur on this site. Mortality can occur following a mealy bug infestation and extended drought.
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14. **Average percent litter cover (%) and depth (in):** Annual litter cover in the interspaces will be 5-10 percent to a depth of <0.1 foot. Under the mature shrubs, litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production is 225 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 35-45 percent of the total, forbs 5-10percent and shrubs 50-60 percent.
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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:** Invasive species include cheatgrass, annual kochia, annual mustards, Russian thistle and halogeton.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in normal years.
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