

# Major Land Resource Area 034A

## Cool Central Desertic Basins and Plateaus

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### Ecological site keys

#### MLRA 34A Rangeland Ecological Site Key

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I. Site in a low lying position (drainageway, flood plain, adjacent alluvial fan or concave position) with simple<sup>1</sup> and nearly level (0-3%) slopes that receives additional moisture from runoff of adjacent slopes or intermittent/perennial streams or a water table (HIGH productivity potential, >1,200 lb/ac)

A. Soils moderately to strongly saline (EC >8mmhos/cm), sodic (SAR >13, EC <4mmhos/cm), or saline-sodic (SAR >13, EC >4mmhos/cm) within 15" (38cm) and dominated by salt tolerant species species (i.e. greasewood, Nutall's alkaligrass, inland saltgrass, alkali sacaton)

1 Site typically in drainageway or floodplain and has a water table within rooting depth of herbaceous species, 12-36" (30-90cm), during most of the growing season; grasses such as alkali sacaton, basin wildrye, Nutall's alkaligrass common (typically few shrubs present) SALINE SUBIRRIGATED

i. If in Green River and Great Divide Basin ... R034AY142WY – Saline Subirrigated Green River and Great Divide Basins (SS)

ii. If in Foothills and Basins West ... R034AY242WY – Saline Subirrigated Foothills and Basins West (SS)

iii. If in High Plains Southeast ... R034AY342WY – Saline Subirrigated High Plains Southeast (SS)

2 Soils not like 1. above

i. Site typically in or adjacent to perennial or intermittent stream or ephemeral drainage, receives overland flow from adjacent slopes; moderately well-drained; water table within 48" (122cm) during some of the growing season; greasewood, inland saltgrass, alkali sacaton, basin wildrye, and western wheatgrass common SALINE LOWLAND

a. If in Green River and Great Divide Basin ... R034AY138WY – Saline Lowland Green River and Great Divide Basins (SL)

b. If in Foothills and Basins West ... R034AY238WY – Saline Lowland Foothills and Basins West (SL)

c. If in High Plains Southeast ... R034AY338WY – Saline Lowland High Plains Southeast (SL)

ii. Site in or adjacent to perennial or intermittent stream or ephemeral drainage, receives periodic overflow from adjacent slopes; well-drained; water table >60" (150cm); gullies present; shallow-rooted plants not receiving benefit from additional moisture; greasewood and Gardner's saltbush common, big sagebrush may be present SALINE LOWLAND, DRAINED

a. If in Green River and Great Divide Basin ... R034AY140WY – Saline Lowland Drained Green River and Great Divide Basins (SLDr)

b. If in Foothills and Basins West ... R034AY240WY – Saline Lowland Drained Foothills and Basins West (SLDr)

B. Soils not like A above

1 Site typically in drainageway or floodplain and has a high water table for most of the growing season and redox features in upper 12" (30cm); frequent flooding; Nebraska sedge, northern reedgrass, tufted hairgrass common, occasionally willows WETLAND

i. If in Green River and Great Divide Basin ... R034AY178WY – Wetland Green River and Great Divide Basins (WL)

ii. If in Foothills and Basins West ... R034AY278WY – Wetland Foothills and Basins West (WL)

iii. If in High Plains Southeast ... R034AY378WY – Wetland High Plains Southeast (WL)

## 2 Soils not like 1 above

i. Site adjacent to perennial stream and a water table within 12-24" (30-60cm) during most of the growing season with occasional to frequent flooding during runoff events; basin wildrye, tufted hairgrass, slender wheatgrass, shrubby cinquefoil, sedges, rushes, and willows common SUBIRRIGATED

a. If in Green River and Great Divide Basin ... R034AY174WY – Subirrigated Green River and Great Divide Basins (Sb)

b. If in Foothills and Basins West ... R034AY274WY – Subirrigated Foothills and Basins West (Sb)

c. If in High Plains Southeast ... R034AY374WY – Subirrigated High Plains Southeast (Sb)

ii. Soils not like i. above

a. Site adjacent to perennial stream, well drained to excessively well-drained and fluctuating water table, 24-60" (60- 150cm), but within 36" (90cm) during some of the growing season, rooting depth of woody plants, but not herbaceous plants; cottonwood or remnants may be present; gravelly with gravel bars often present; basin wildrye, needleandthread, western wheatgrass, woods rose and other woody species common LOWLAND

1) If in Green River and Great Divide Basin ... R034AY128WY – Lowland Green River and Great Divide Basins (LL)

2) If in Foothills and Basins West ... R034AY228WY – Lowland Foothills and Basins West (LL)

3) If in High Plains Southeast ... R034AY328WY – Lowland High Plains Southeast (LL)

b. Soils not like a. above

1) Site drier than perennial stream site, more likely on intermittent or ephemeral drainage or floodplain terrace, without gravel bars and high water table during growing season

a) Clay loam, silty clay loam, or silty clay surface textures (>32% clay) at least 5" (13cm) thick; if redox features are present they, are below 40" (100cm); heavy presence of western wheatgrass, slender wheatgrass, basin wildrye, basin big sagebrush or silver sagebrush  
CLAYEY OVERFLOW

(1) If in Foothills and Basins West ... R034AY206WY – Clayey Overflow Foothills and Basins West (CyO)

(2) If in High Plains Southeast ... R034AY306WY – Clayey Overflow High Plains Southeast (CyO)

b) Surface textures range from sandy loam to light silty clay loam (<32% clay); if redox features are present, they are below 40" (100cm); basin big sagebrush, silver sagebrush, slender wheatgrass, and/or Canby's bluegrass common (Loamy Overflow only occurs east of Continental Divide) OVERFLOW/LOAMY OVERFLOW

(1) If in Foothills and Basins West ... R034AY230WY – Overflow Foothills and Basins West (Ov)

(2) If in High Plains Southeast ... R034AY326WY – Loamy Overflow High Plains Southeast (LyO)

## II. Upland site that does not receive additional moisture

A. Soil depth very shallow, <10" (25cm); shallow, 10-20" (25-50cm); OR moderately deep to deep, >20" (>50cm) and skeletal, >35% coarse fragments by volume in upper 20" (50cm"), OR with low Available Water-holding Capacity (AWC) OR a root limiting layer which reacts like shallow soils (VERY LOW to MODERATE productivity potential, 150-1,200 lb/ac)

1 Soils moderately to strongly saline (EC >8mmhos/cm), sodic (SAR >13, EC <4mmhos/cm), or saline-sodic (SAR >13, EC >4mmhos/cm) within 15" (38cm) and dominated by salt tolerant species (i.e. Gardner's saltbush)

i. Soils very shallow; clay loam surface texture, bedrock soft or hard shale bedrock that is typically saline, sodic, or saline- sodic, occurs in upland position on moderate to steep sloping land (5-25% slope); Gardner's saltbush and western wheatgrass common, with VERY LOW productivity potential (<350 lb/ac)  
SHALE

a. If in Green River & Great Divide Basin ... R034AY154WY – Shale Green River and Great Divide

## Basins (Sh)

b. If in Foothills & Basins West ... R034AY254WY – Shale Foothills and Basins West (Sh)

c. If in High Plains Southeast ... R034AY354WY – Shale High Plains Southeast (Sh)

ii. Soils moderately deep or deep and skeletal; surface textures variable; chemistry occurs above or within same horizon as rock fragments; site nearly level and gently sloping. Go to Saline Upland

## 2 Soils not like 1 above

i. Soils very shallow, <10" (25cm), often on steep (30-60%) slopes with LOW productivity potential (<500 lb/ac)

a. Cobbly, stony, or bouldery loamy sand or sandy loam surface textures over igneous bedrock; black sagebrush, bluebunch wheatgrass common IGNEOUS

1) If in Foothills & Basins West ... R034AY216WY – Igneous Foothills and Basins West (Ig)

b. Variable surface textures; commonly interbedded sandstone, shale, or siltstone, on ridges and simple<sup>1</sup>, steep, slopes (>35%) productivity low (if productivity not low, go to 9b); bluebunch wheatgrass common, a variety of shrub species may be present, commonly with scattered juniper VERY SHALLOW

1) If in Green River & Great Divide Basins ... R034AY176WY – Very Shallow Green River and Great Divide Basins (VS)

2) If in Foothills & Basins West ... R034AY276WY – Very Shallow Foothills and Basins West (VS)

3) If in High Plains Southeast ... R034AY376WY – Very Shallow High Plains Southeast (VS)

ii. Soils shallow, 10-20" (25-50cm), but may include soils moderately deep to deep, 20-60" (50-150cm) and skeletal within upper 20" (50cm)

a. Soils highly calcareous (violently effervescent, CCE >15%, or secondary carbonates covering rock fragments on all sides) within 6-15" (15-38cm), typically skeletal OR shallow to lithic contact, parent material consisting of soft, calcareous material

1) Shallow and skeletal OR moderately deep to deep and skeletal, highly calcareous (violent effervescence, 15% CCE, or secondary carbonates covering rock fragments on all sides) soils within 6-15" (15-38cm); typically high amounts of gravels and skeletal at or near the soil surface; black sagebrush dominant shrub SHALLOW LOAMY, CALCAREOUS

a) If in Foothills & Basins West ... R034AY263WY – Shallow Loamy Calcareous Foothills and Basins West (SwLyCa)

2) Shallow sandy or loamy soils, 10-20" (25-50cm) to lithic contact, often cobbly or channery with steep, simple slopes >35%, underlain by soft calcareous parent material with outcrops of calcareous sedimentary parent material; true mountain mahogany, bluebunch wheatgrass, Indian ricegrass common ROCKY HILLS

a) If in Foothills & Basins West ... R034AY234WY – Rocky Hills Foothills and Basins West (RH)

b) If in High Plains Southeast ... R034AY334WY – Rocky Hills High Plains Southeast (RH)

b. Soils not like a above

1) Soil is typically skeletal within upper 10" (25%) with high amounts of gravels and/or cobbles up to 10" (25cm) diameter covering 50-75% of the soil surface with gravelly sandy loamy or loam surface textures; strong effervescence may occur below 10" (25cm); occurring on summit and shoulder landform positions with simple, moderately steep to steep slopes 10-45%; bluebunch wheatgrass and winterfat common, Wyoming big sagebrush on leeward slopes GRAVEL

a) If in Green River & Great Divide Basins ... R034AY112WY – Gravelly Green River and Great Divide Basins (Gr)

b) If in Foothills & Basins West ... R034AY212WY – Gravelly Foothills and Basins West (Gr)

c) If in High Plains Southeast ... R034AY312WY – Gravelly High Plains Southeast (Gr)

2) Soils not like 1 above

a) Fractured sedimentary bedrock at 10-20" (25-50cm) with outcropping sandstone bedrock and rock fragments on the surface and throughout soil profile; slopes complex<sup>1</sup> with very shallow to deep pockets of soil, loamy well-drained soils, commonly on south & west facing

slopes (productivity potential higher than Very Shallow site); juniper common with Wyoming big sagebrush and bluebunch wheatgrass SHALLOW BREAKS

- (1) If in Green River & Great Divide Basin ... R034AY156WY – Shallow Breaks Green River and Great Divide Basins (SwBr)
- (2) If in Foothills & Basins West ... R034AY256WY – Shallow Breaks Foothills and Basins West (SwBr)
- (3) If in High Plains Southeast ... R034AY356WY – Shallow Breaks High Plains Southeast (SwBr)

b) Soils without high amounts of rock fragments on the soil surface, but may have occasional outcropping bedrock and are shallow to lithic contact or skeletal within 10-20" (25-50cm)

(1) Gravelly, cobbly, or very cobbly sandy loam to loam soil surface textures over igneous parent material, typically granite or schist; antelope bitterbrush dominant with black sagebrush and bluebunch wheatgrass common SHALLOW IGNEOUS

- (a) If in Foothills & Basins West ... R034AY260WY – Shallow Igneous Foothills and Basins West (Swlg)
- (2) Soils not like 1 above

(a) Loamy sand or sandy loam surface textures, at least 5" (13cm) thick, over sandstone that restricts rooting depth; carbonates (strong effervescence) may be present; Indian ricegrass, needleandthread common, Wyoming big sagebrush usually present SHALLOW SANDY

- (1) If in Green River & Great Divide Basin ... R034AY166WY – Shallow Sandy Green River and Great Divide Basins (SwSy)
- (2) If in Foothills & Basins West ... R034AY266WY – Shallow Sandy Foothills and Basins West (SwSy)
- (3) If in High Plains Southeast ... R034AY366WY – Shallow Sandy High Plains Southeast (SwSy)

(b) Soils not like a above

(1) Sandy clay loam, clay loam, or silty clay loam surface textures (>32% clay), at least 5" (13cm) thick, over fractured shale bedrock, winterfat and Wy big sage common east of Continental Divide; OR fine sandy loam, loam, sandy clay loam, or clay loam surface (<32% clay) over a root limiting heavy argillic horizon (35-50% clay) with slow to very slow permeability within upper 20" (50cm), early sagebrush dominant west of Continental Divide SHALLOW CLAYEY

- (a) If in Green River & Great Divide Basin ... R034AY158WY – Shallow Clayey Green River and Great Divide Basins (SwCy)
- (b) If in Foothills & Basins West ... R034AY258WY – Shallow Clayey Foothills and Basins West (SwCy)
- (c) If in High Plains Southeast ... R034AY358WY – Shallow Clayey High Plains Southeast (SwCy)

(2) Fine sandy loam, loam, silt loam, sandy clay loam or light clay loam surface textures (<32% clay) over sedimentary bedrock or skeletal; Wyoming big sagebrush dominant shrub SHALLOW LOAMY

- (a) If in Green River & Great Divide Basin ... R034AY162WY – Shallow Loamy Green River and Great Divide Basins (SwLy)
- (b) If in Foothills & Basins West ... R034AY262WY – Shallow Loamy Foothills and Basins West (SwLy)
- (c) If in High Plains Southeast ... R034AY362WY – Shallow Loamy High Plains Southeast (SwLy)

B. Soil depth moderately deep to deep, 20-60" (50-150cm) with moderate to high AWC and without root limiting layers that inhibit the productivity potential (productivity potential variable)

1 Site affected by significant soil chemistry (strongly alkaline with pH >8.5) within 15" (38cm); typically moderately to strongly saline (EC >8mmhos/cm), sodic (SAR >13, EC <4mmhos/cm), saline-sodic (SAR

>13, EC >4mmhos/cm), OR high in calcium carbonates, violently effervescent with CCE >15%; Note: loamy sand and sandy loam surface textures at least 5" (13cm) thick must have SAR >13 within 10" (25cm)

i. Soil saline, sodic, or saline-sodic; may or may not have 5-15%, by weight, gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ); may or may not be highly calcareous

a. Clay loam, silty clay, or clay surface textures (>35% clay), sometimes with thin sandy loam cap up to 3" (8cm), that are slightly saline (4-8mmhos/cm), but strongly alkaline (pH >8.5) with 0-15% gypsum, very slow permeability; birdfoot sagebrush dominates (found in Great Divide Basin and 10-14E Foothills and Basins East) IMPERVIOUS CLAY

1) If in Green River and Great Divide Basin ... R034AY118WY – Impervious Clay Green River and Great Divide Basins (IC)

2) If in High Plains Southeast ... R034AY318WY – Impervious Clay High Plains Southeast (IC)

b. Soils not like a. above

1) Surface textures include fine sandy loam, loam, silt loam, and sandy clay loam (<32% clay); sodic or saline-sodic within 10-20" (25-50cm) of the soil surface, could be calcareous throughout, but slightly effervescent at surface and increasing with depth, permeability moderately slow to slow due to excess sodium (Laramie Basin LRU only) SALINE LOAMY

a) If in Laramie Basin ... R034AY336WY – Saline Loamy High Plains Southeast (SnLy)

2) Surface textures include sandy loam, loam, silt loam, sandy clay loam, and clay loam, moderately saline or greater (>8mmhos/cm), or sodic (SAR >13, EC <4mmhos), with 0-15% gypsum; gently sloping (1-10%); Gardner's saltbush, winterfat, bud sagebrush, Indian ricegrass, and bottlebrush squirreltail common; SALINE UPLAND Note: if root limiting layer present, moderate to steep sloping, or productivity potential very low, go to SHALE

a) If in Green River and Great Divide Basin ... R034AY144WY – Saline Upland Green River and Great Divide Basins (SU)

b) If in Foothills and Basins West ... R034AY244WY – Saline Upland Foothills and Basins West (SU)

c) If in High Plains Southeast ... R034AY344WY – Saline Upland High Plains Southeast (SU)

ii. Soil highly calcareous, violently effervescent (>15% CCE) within upper 15" (38cm), but not saline, sodic, saline-sodic or gypsic

a. Soils very fine sandy loams to sandy clay loams with violent effervescence (>15% CCE) within 6-15" (15-38cm) of the soil surface; Wyoming big sagebrush dominant shrub LOAMY CALCAREOUS Note: if conditions found outside GRB or PP LRU, go to Shallow Loamy, Calcareous

1) If in Green River Basin ... DX034A01X126 – Loamy Calcareous Green River Basin (LyCa GRB)

2) If in Pinedale Plateau ... DX034A02X126 – Loamy Calcareous Pinedale Plateau (LyCa PP)

b. Soils very fine sandy loams to sandy clay loams with violent effervescence (>15% CCE) at the soil surface; winterfat dominant shrub with Indian ricegrass and bottlebrush squirreltail common; Note: if conditions found outside PP LRU, make note "site not developed" LIMY

1) If in Pinedale Plateau ... DX034A02X120 – Limy Pinedale Plateau (Li PP)

2 Soils not like 1. above

i. Site with rock fragments on soil surface, >50% cover gravels and cobbles on summit or shoulder landform positions OR stony or bouldery surfaces in glacial till, slopes simple or complex and variable

a. Soil is typically skeletal within upper 10" (25cm) with high amounts of gravels and/or cobbles up to 10" (25cm) diameter covering 50-75% of the soil surface with gravelly sandy loamy or loam surface textures; strong effervescence may occur below 10" (25cm); occurring on summit and shoulder landform positions with simple, moderately steep to steep slopes, 10-45%; bluebunch wheatgrass and winterfat common, Wy big sage on leeward slope, go to SHALE

b. Sandy loam or loam surface textures with stony or bouldery surface associated with glacial till with complex, strongly sloping to very steep slopes COARSE UPLAND

1) If in Foothills and Basins West ... R034AY208WY – Coarse Upland Foothills and Basins West (CU)

- 2) If in High Plains Southeast ... R034AY308WY – Coarse Upland High Plains Southeast (CU)
- ii. Site without significant rock fragments on soil surface
- a. Soil surface or subsurface textures have high clay content (>32% clay) at least 5" (13cm), slight to severe soil cracking in dry conditions may occur and vertic properties are common
- 1) Surface texture with high clay content (>40% clay), at least 5" (13cm) thick; severe soil cracking in dry conditions may occur, very sticky when wet; low sage dominant; Note: site not common and typically does not occur with less than 15" (380mm) ppt; for eroded early (alkali) sagebrush dominated sites missing surface layer, see Loamy Argillic. DENSE CLAY
- a) If in Foothills and Basins West ... R034AY210WY – Dense Clay Foothills and Basins West (DC)
- 2) Soil surface not as above
- a) Loamy surface textures (<32% clay) over a root limiting argillic subsurface horizon (35-50% clay) starting within 2-15" (5-30cm) depth; strongly contrasting surface and subsurface textures (e.g. sandy loam over heavy clay loam or clay loam over clay); early (alkali) sage dominant. LOAMY ARGILLIC Note: if found outside PP LRU, go to Shallow Clayey
- (1) If in Pinedale Plateau ... R034AY124WY – Loamy Calcareous Green River and Great Divide Basins (LyCa)
- b) Clay loam surface textures (32-40% clay), at least 5" (13cm) thick; cracking common during dry summer months, though not severe (<40% clay in subsurface); Wyoming big sagebrush dominant with western wheatgrass (green needlegrass east of the Cont. Divide) CLAYEY
- (1) If in Green River and Great Divide Basin ... R034AY104WY – Clayey Green River and Great Divide Basins (Cy)
- (2) If in Foothills and Basins West ... R034AY204WY – Clayey Foothills and Basins West (Cy)
- (3) If in High Plains Southeast ... R034AY304WY – Clayey High Plains Southeast (Cy)
- (4) If in Pinedale Plateau ... DX034A02X104 – Clayey Pinedale Plateau (Cy PP)
- b. Soil surface texture <32% clay at least 5" (13cm) thick, but without strongly contrasting surface and subsurface textures
- 1) Sand to loamy sand surface texture, at least 5" (13cm) thick, on nearly level to rolling (0-16% slope) uplands or dunes, dark or light colored; basin big sagebrush dominant with needle and thread, Indian ricegrass, and thickspike wheatgrass; spiny hopsage common in 7-9GR zone SANDS
- a) If in Green River and Great Divide Basin ... R034AY146WY – Sands Green River and Great Divide Basins (Sa)
- b) If in Foothills and Basins West ... R034AY246WY – Sands Foothills and Basins West (Sa)
- c) If in High Plains Southeast ... R034AY346WY – Sands High Plains Southeast (Sa)
- 2) Soil surface texture not as above
- a) Loamy fine sand to fine sandy loam surface texture, at least 5" (13cm) thick, predominantly sandy loam; Wyoming big sagebrush, needle and thread & Indian ricegrass dominant SANDY
- (1) If in Green River and Great Divide Basin ... R034AY150WY – Sandy Green River and Great Divide Basins (Sy)
- (2) If in Foothills and Basins West ... R034AY250WY – Sandy Foothills and Basins West (Sy)
- (3) If in High Plains Southeast ... R034AY350WY – Sandy High Plains Southeast (Sy)
- b) Very fine sandy loam, loam, silt loam, sandy clay loam, or light clay loam surface texture, at least 5" (13cm) thick, predominantly loam or sandy clay loam
- (1) Slopes >15% (east of Continental Divide only, if west go to 13b); Wyoming big sagebrush dominant shrub STEEP LOAMY
- (a) If in High Plains Southeast ... R034AY368WY – Steep Loamy High Plains Southeast (SLy)

(2) Slopes <15%; Wy big sagebrush dominant; (Note: if loam surface overlays a heavy argillic layer (>35% clay) within 2-15" (5-30cm) with early (alkali) sagebrush dominant, go to Loamy Argillic) LOAMY

- (a) If in Green River Basin ... DX034A01X122 – Loamy Green River Basin (Ly GRB)
- (b) If in Pinedale Plateau ... DX034A02X122 – Loamy Pinedale Plateau (Ly PP)
- (c) If in Beaver Rim ... DX034A05X122 – Loamy Beaver Rim (Ly BR)
- (d) If in Platte Valley ... DX034A07X122 – Loamy Platte Valley (Ly PV)
- (e) If in Green River and Great Divide Basin ... R034AY122WY – Loamy Green River and Great Divide Basins (Ly)
- (f) If in Foothills and Basins West ... R034AY222WY – Loamy Foothills and Basins West (Ly)
- (g) If in High Plains Southeast ... R034AY322WY – Loamy High Plains Southeast (Ly)