Major Land Resource Area 032X
Northern Intermountain Desertic Basins

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Ecological site keys

MLRA 32 Big Horn Basin Core (LRU 01 Subset A) Ecological Site Key

I. Site receives additional effective moisture[1] (If No, Go to II.)

A. Site with a water table present for at least part of the growing season, site dominated by hydrophytic plants (ie. Wetland sedges, bulrushes, willows, tufted hairgrass, etc)

1 Site has water above soil surface for part of the growing season, and a water table present within 0-12” (0-30 cm) annually ... DX032X01W178 – Wetland (WL) Big Horn Basin Wet

2 Site has a seasonal water table

i. Soil is saline, saline-sodic, or sodic[5] (SAR ≥ 13, or an EC ≥ 4 dS/m) in the upper 4” (10 cm)) of mineral soil; salt tolerant plants dominate site (i.e. greasewood, alkali sacaton, Nuttall’s alkaligrass, alkli bluegrass, alkali cordgrass, inland saltgrass, etc)[2]

a. Seasonal water table is between 12-40” (30-100 cm) below the soil surface ... DX032X01W142 – Saline Subirrigated (SS) Big Horn Basin Wet

b. Seasonal water table > 40” (100 cm) below mineral soil surface; site regularly receives higher than normal soil moisture because of run in or stream overflow ... DX032X01W138 – Saline Lowland (SL) Big Horn Basin Wet

ii. Soil is non-saline, non-saline-sodic, or non-sodic

a. Seasonal water table is between 12-40” (30-100 cm) below the soil surface ... DX032X01W174 – Subirrigated (Sb) Big Horn Basin Wet

b. Seasonal water table > 40” (100 cm) below the mineral soil surface; site regularly receives higher than normal soil moisture because of run in or stream overflow ... DX032X01W128 – Lowland (LL) Big Horn Basin Wet

B. Site receives periodic overflow from adjacent slopes, but no water table within 78” (200 cm)

1 Soil is saline, saline-sodic, or sodic[5]; site typically occurs on stream terraces along incised channels, and is dominated by greasewood[2] and other salt tolerant plants (i.e. Gardner’s saltbush, alkali sacaton)[2] ... DX032X01W140 – Saline Lowland Drained (SLDr) Big Horn Basin Wet

2 Soil is non-saline, non-saline-sodic, or non-sodic, occur on floodplain steps, terraces, concave landscape positions, and positions lower in the landscape

i. Soil has ≥ 35% clay in the upper 8” (20 cm) of mineral soil surface ... DX032X01W106 – Clayey Overflow (CyO) Big Horn Basin Wet

ii. Soil has < 35% clay in the upper 8” (20 cm) of mineral soil surface ... DX032X01W130 – Overflow (Ov) Big Horn Basin Wet

II. Site does not receive additional effective moisture[1]

A. Soil is saline, saline-sodic, or sodic[5] (SAR ≥ 13, or an EC ≥ 4 dS/m) in the upper 20” (50 cm) of the mineral soil surface; site is dominated by salt tolerant plants (i.e. Gardner’s saltbush, greasewood, alkali sacaton, alkali seepweed, etc)[2]

1 Soil is very shallow (< 10” (25 cm) to shale (lithic or paralithic contact)); productivity very low ... DX032X01A154 – Shale (Sh) Big Horn Basin Core

2 Soil is shallow to very deep (≥10” (25 cm) to bedrock (lithic or paralithic contact))

i. Soil has ≥ 35% clay starting within 4” (10 cm) of the mineral soil surface ... DX032X01A143 – Saline

Upland Clayey (SUC) Big Horn Basin Core

ii. Soil has < 18% clay starting within 4” (10 cm) of the mineral soil surface ... DX032X01A145 – Saline Upland Sandy (SUS) Big Horn Basin Core

iii. Soil has ≥ 18% but < 35% clay starting within 4” (10 cm) of the mineral soil surface ... DX032X01A141 – Saline Upland Loamy (SUL) Big Horn Basin Core

B. Soil is non-saline, non-saline-sodic, or non-sodic

1 Soil is very shallow (< 10” (25 cm) or shallow (< 20” (50 cm) to bedrock (lithic or paralithic contact)

i. Soil is very shallow to bedrock, commonly on windswept ridges and escarpments, productivity very low (if productivity is higher than expected and > 35% rock fragments are present use II.B.2i.a.1) Gravelly (Gr) ... DX032X01A176 – Very Shallow (VS) Big Horn Basin Core

ii. Soil is shallow to bedrock

a. Soil has ≥ 35% clay ... DX032X01A158 – Shallow Clayey (SwCy) Big Horn Basin Core

b. Soil has < 18% clay ... DX032X01A166 – Shallow Sandy (SwSy) Big Horn Basin Core

c. Soil has ≥ 18% but < 35% clay ... DX032X01A162 – Shallow Loamy (SwLy) Big Horn Basin Core

2 Soil is moderately deep to very deep (≥ 20” (50 cm) to bedrock (lithic or paralithic contact)

i. Soil is skeletal (≥ 35% rock fragments[7]) in the upper 20” (50 cm) of mineral soil surface

a. Soil is skeletal throughout the majority of the upper 20” (50 cm) of mineral soil surface

1) Soil has < 18% clay; surface fragments and fragments in the soil profile are dominantly < 3” (76mm) in diameter, but may range in size ... DX032X01A112 – Gravelly (Gr) Big Horn Basin Core

2) Soil has ≥ 18% but < 60% clay; surface fragments and fragments in the soil profile are dominantly ≥ 3” (76mm) in diameter but < 10” (250 mm), but may range in size

a) Violent[3] effervescence starting within 4” (10 cm) of the mineral soil surface, calcium carbonate increases with depth[4] ... DX032X01B121 – Limy Skeletal (LiSk) Big Horn Basin Rim

b) None to strong[3] effervescence in the upper 4” (10 cm) of mineral soil surface ... DX032X01A175 – Skeletal (Sk) Big Horn Basin Core

b. Soil is skeletal starting within 8-20” (20-50 cm) of the mineral soil surface

1) Soil has ≥ 18% but < 60% clay in the upper 10” (25 cm) of mineral soil, decreasing to < 18% clay within 10-20” (25-50 cm) of the mineral soil surface

a) Violent[3] effervescence starting within 4” (10 cm) of the mineral soil surface, calcium carbonate increases with depth[4] ... DX032X01B172 – Stony Upland (StU) Big Horn Basin Rim

b) None to strong[3] effervescence in the upper 4” (10 cm) of the mineral soil surface ... DX032X01A167 – Shallow To Gravel (SwGr) Big Horn Basin Core

2) Soil has ≥ 18% but < 60% clay throughout the upper 20” (50 cm) of the mineral soil surface

a) Fragments typically consisting of stones and boulders (fragments > 10" (250 mm) in diameter), surface fragments (5-15%) are dominantly stones and boulders (specific to glacial outwash by Clark, WY; for other correlations use b) cobbly upland) - ... DX032X01B120 – Limy Upland (LiU) Big Horn Basin Rim

b) Fragments typically consisting of cobbles (fragments are dominantly > 3” (76 mm) but < 10” (250 mm) in diameter); few stones and boulders (0-5%) are present ... DX032X01A109 – Cobbly Upland (CoU) Big Horn Basin Core

ii. Soil is not skeletal in the upper 20” (50 cm) of the mineral soil surface

a. Soil has ≥ 35% clay throughout the upper 20” (50 cm) of the mineral soil – may have a lighter textured cap or may decrease lower in the profile

1) Abrupt clay increase[6] to > 40% clay present within 4-8” (10-20 cm) of the mineral soil surface, severe surface cracking during dry conditions; plant dominated by birdfoot sagebrush ... DX032X01A110 – Dense Clay (DC) Big Horn Basin Core

2) Soil has ≥ 35% clay starting within the upper 4” (10 cm) and continues throughout the upper 20” (50 cm) of mineral soil surface ... DX032X01A104 – Clayey (Cy) Big Horn Basin Core

b. Soil has < 35% clay throughout the upper 20” (50 cm) of the mineral soil – may see individual horizons that are above 35% clay, but on average, the soil profile is less than 35% clays

1) Soil has < 18% clay throughout the upper 20” (50 cm) of mineral soil surface; may see clay increase below 8" (20 cm) of mineral soil surface

a) Soil has < 15% clay starting within the upper 4” (10 cm) from the mineral soil surface and lacks structure; soil textures include coarse sands to loamy fine sand ... DX032X01A146 – Sands (Sa) Big Horn Basin Core

b) Soil has < 18% clay starting within the upper 4” (10 cm) from the mineral soil surface; soil textures include loamy very fine sands to loams ... DX032X01A150 – Sandy (Sy) Big Horn Basin Core

2) Soil has ≥ 18% but < 35% clay starting within the upper 8” (20 cm) of mineral soil surface[4]

a) Soil is calcareous (violent effervescence[3]) within 20” (50 cm) of the mineral soil surface

(1) Soil is calcareous within the upper 4” (10 cm) of mineral soil surface; calcium carbonate increases with depth[4] (for soils between 4 and 8 inches start of calcareous layer, use STM to assist decision) ... DX032X01B120 – Limy Upland (LiU) Big Horn Basin Rim

(2) Soil is calcareous starting within the upper 8-20” (20 to 50 cm) of the mineral soil surface[4] ... DX032X01B123 – Loamy Calcareous (LyCa) Big Horn Basin Rim

b) Soil is non-calcareous within 20” (50 cm) of the mineral soil surface ... DX032X01A122 – Loamy (Ly) Big Horn Basin Core

[1] 1. For areas that receive additional moisture through snow trapping, consider adjusting to a wetter LRU or Subset consistent with the vegetation observed for the site keyed. It is anticipated that most snow-trap sites will not have a water table.

[2] 2. Specific plant species listed in the key are not to be used as the only determining factor. Management or disturbance may have removed or altered the plant composition that could reflect the wrong ecological site.

[3] 3. Soils derived from Dolomite or similar geology may not react as “violently” as other calcareous parent materials; dolomite site may be limy or loamy calcareous with only a strong effervescence. Soils with <18% clays only need a CCE of 5% to be calcic or calcareous, while soils with >18% clays need a CCE of 15%.

[4] 4. Ecological site does not fit within one LRU, written to encompass Subset A and B, labeled as 032X01B or 032XB in the BHB.

[5] 5. Saline, saline sodic, and sodic soils have a pH of 7.9 to 9.0 and an EC (electrical conductivity) > 4 dS/m [dS/m = mmhos/cm]. Salts, including gypsum will lower the pH without affecting the EC, but may still fit into the salt effected sites. Soils that are sodic generally have a SAR of ≥ 13 typically have a pH of 8.8 or higher.

[6] 6. The Dense Clay ecological site will have a lighter textured cap or “A” horizon with an abrupt clay increase, commonly the clay percent will then decrease as move lower in the profile. The abrupt increase in the upper portion of the profile with significant cracking is the key for this site. The Clayey ecological site may have a lighter textured cap but typically maintains or increases in clay as move through the profile. The presence of birdfoot sagebrush and lack of Wyoming sagebrush is a plant indicator for the Dense Clay ecological site.

[7] 7. When calculating percent rock fragments in the profile to determine if a site is skeletal, pararock fragments (parachanners) are not considered, however, channers are. The difference between a parachanner and a channer is how “hard” the rock is. Soft flat fragments (ruptured by hand) are parachanners, while harder flat fragments are channers.