

# Major Land Resource Area 035X

## Colorado Plateau

Accessed: 05/02/2024

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### Description

MLRA 35 covers approximately 60 percent of the Colorado Plateau Province. It generally consists of flat-lying to gently tilted Mesozoic and Paleozoic sedimentary formations that have been uplifted, allowing the Colorado River and its tributaries to cut deep canyons through the formations' layers. The major landforms include gently sloping to strongly sloping plains, volcanic plugs, steep scarps, and deeply incised canyons. The Colorado Plateau demonstrates the power of wind and water to erode soil and rock over time. Not only are deeply incised canyons evidence of erosion, but also isolated mesas and buttes testify to the enormous amount of material removed by the Colorado River and its tributaries. MLRA 35 is bounded to the south by the Mogollon Rim and associated volcanic landforms of the Mogollon Transition area (MLRA 39). The Mogollon Rim is a long, erosional escarpment stretching diagonally across Arizona and into New Mexico. It marks the boundary where the horizontal stratigraphy of the Colorado Plateau falls into the faulted and broken landscape of the Mogollon Transition. Volcanic landforms, such as the San Francisco Peaks and White Mountains, are in MLRA 39 while horizontal sedimentary formations, such as the Kaibab and Chinle Formations, are in MLRA 35. Part of the western boundary of MLRA 35 is shared with MLRA 30, the Mohave Basin and Range. A principal difference is the change from flat-lying sedimentary beds of the Colorado Plateau region to faulted, block mountains and valleys of the Basin and Range Province. The boundary with MLRA 30 lies at the base of the Grand Wash Cliffs and the Music Mountains to the south, the entrance to the Grand Canyon in the central area, and the base of the Shivwits Plateau in the north. It is marked by the lower alluvial Hualapai Valley and has a drier climate with thermic temperatures. In contrast, MLRA 35 lacks thermic temperatures except within the Grand Canyon. The northwest boundary is shared with the southern part of MLRA 47, which is dominated by fault-bounded, lava-capped plateaus, such as the Markagunt and Paunsaugunt, with the exception of the Table Cliffs Plateau, which is limestone capped. The underlying sedimentary strata in MLRA 47 are the same geologic units as the Colorado Plateau but elevations are mostly higher and temperatures cooler. The eastern boundary of 35 is shared with MLRA 42B, the Southern Rio Grande Rift. The boundary of MLRAs 35 and 42B lies near the base of various ridges that roughly parallel the rift. MLRA 42B has Quaternary and Tertiary geology associated with the rifting and filling of large tectonic basins along the Rio Grande Valley. MLRA 35 is in Arizona (56 percent), Utah (22 percent), New Mexico (21 percent), and Colorado (1 percent). It makes up about 71,735 square miles (185,885 square kilometers) and 46 million acres.

### Geographic subunits

**Land Resource Unit 1.** The Central Colorado Plateau LRU can be considered the heart of MLRA 35. It is dominated by Mesozoic sedimentary geology, mostly sandstone and shale. It begins to the north with the canyons and plateaus surrounding the confluence of the Green and Colorado Rivers in Utah and extends south to the Little Colorado River Basin in Arizona. It includes the sand sheet of the Green River Desert; the mesas and benches of the Blue Hills; the structural anticlines, monoclines, and structural benches of the Circle Cliffs; a large laccolith thrust through a shallow syncline called the Henry Mountains; the Kaiparowits Plateau with its cretaceous sandstones overlying escarpments of soft marine shales; The Chinle Valley, a broad basin; the Grand Staircase with its series of cliffs and structural benches; Black Mesa Navajo Mountain, a series of broad mesas with one large laccolith; and the Paria and Kaibeto Plateaus. The soils are continually stripped of their cover and, due to uplift forces most positions, are erosional in nature. The overwhelmingly shallow soils are predominantly an exudium, continually being uplifted, weathered from rock, and transported regionally from the MLRA.

**Land Resource Unit 2.** The western Colorado Plateau LRU is strongly characterized by its limestone and dolomite cap, known as the Kaibab formation. Physiographically, this subdivision is affected by the combination of regional uplift and the deeply incised Colorado River at the Grand Canyon. The Grand Canyon is surrounded by adjacent plateaus: the Kaibab Plateau on the North Rim, the Arizona Strip with the Shivwits Plateau to the northwest, and the Coconino Plateau on the South Rim. Marble Canyon is a narrow northerly extension of the Grand Canyon. The Coconino Transition represents a northwesterly extension of the Mogollon Rim that is more protected from

monsoonal moisture. The Coconino Transition is largely Redwall Limestone and has isolated volcanic and granitic soils.

**Land Resource Unit 3.** The Northwest New Mexico Highlands LRU is primarily non-marine sedimentary hills and mountains that have been affected by regional uplift of the Colorado Plateau. Physiographically, it represents higher elevations than the Central Colorado Plateau subdivision to the west and lower elevations than the volcanic mountains of MLRA 39 to the south. The highlands include Nacimiento sediments derived from Cenozoic relict lakebeds; the Chuska Mountains, a mountain ridge of upturned sedimentary beds and sandstone; the Defiance Plateau with its uplifted sedimentary beds of Permian sandstone and Triassic shale; the Zuni Mountains, an area of tilted ridges of mountains and various structurally contorted sedimentary formations; Bidahochi sediments with broadly scattered low mesas and hills; and a diverse collection of small basins, mountains, and valleys. Parent material is nonmarine sediments and mixed sedimentary rock in the southeast. The highlands have shallow soils and rock outcrops on structural benches and mesas.

**Land Resource Unit 4.** The San Juan Basin LRU is almost exclusively marine shale sediments, including Menefee Shale and Lewis Shale. Physiographically, it represents lower elevations than the New Mexico Highlands at the Chuska Mountains to the west, the Nacimiento Mountains to the east, and Mount Taylor and the Zuni Mountains to the south. This subdivision includes the San Juan River corridor, the Bisti Lowlands with the Chaco River Valley and surrounding shale basin, and Chaco Mesa with its extension of Menefee Shale. This subdivision has shallow soils and, near the Chaco River and major rivers to the north, deeper alluvial soils. The expanse is affected by regional uplift of the Colorado Plateau.

## Ecological site group keys

### MLRA 35 Key to the LRUs

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#### 1 Central Colorado Plateau LRU

This is the heart of the MLRA, it is characterized by Mesozoic aged geology.

#### 2 Western Colorado Plateau LRU

This western portion of the MLRA is characterized by Permian aged geology, especially the Kaibab formation

#### 3 Northwestern New Mexico Highlands LRU

This LRU is characterized by higher elevations and non-marine sedimentary formations.

#### 4 San Juan Basin LRU

This LRU is mostly characterized by Cretaceous-aged marine formations. It mostly occurs in Northwest New Mexico.

### 35X01 Central Colorado Plateau LRU

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#### I. Grand Staircase-Kaiparowits

##### A. Bottoms and Flats

1 Extra water is from perennial or intermittent streamflow ... DX035X01AESG01 – Grand Staircase-Bottoms & Flats-Streamflow

2 Extra water is from run-in or local water table ... DX035X01AESG02 – Grand Staircase-Bottoms & Flats-run in

##### B. Outcrops and Slopes

1 Soils are shallow to bedrock ... DX035X01AESG03 – Grand Staircase-Outcrops & Slopes-Shallow Soils

2 Soils are moderately deep or deeper ... DX035X01AESG04 – Grand Staircase-Outcrops & Slopes-Soils mod deep or deeper

##### C. Saline Hills and Badlands

1 Soil parent material is dominantly gypsiferous ... DX035X01AESG05 – Grand Staircase-Saline Hills &

#### Badlands-Gypsiferous Parent Material

2 Soil parent material is dominated by salts other than gypsum ... DX035X01AESG06 – Grand Staircase-Saline Hills & Badlands-Salts other than Gypsum

#### D. Saline Uplands and Flats

1 Soils are sandy loams ... DX035X01AESG07 – Grand Staircase-Saline Uplands & Flats-Sandy loam soils

2 Soils are loams to clays ... DX035X01AESG08 – Grand Staircase-Saline Uplands & Flats-Loam to Clay soils

#### E. Shallow Soil Shrublands and Woodlands

1 Soil parent material is volcanic cinders ... DX035X01AESG09 – Grand Staircase-Shallow Soils Shrub & Woodlands-Volcanic Cinders

2 Soil parent material is not volcanic cinders

i. Soils are sandy ... DX035X01AESG10 – Grand Staircase-Shallow Soils Shrub & Woodlands-Not Volcanic PM-Sandy Soils

ii. Soils are sandy loams ... DX035X01AESG11 – Grand Staircase-Shallow Soils Shrub & Woodlands-Not Volcanic PM-Sandy Loam Soils

iii. Soils are loams to clays ... DX035X01AESG12 – Grand Staircase-Shallow Soils Shrub & Woodlands-Not Volcanic PM-Loam to Clay Soils

#### F. Sandy Grasslands and Shrublands

1 Soils are sands ... DX035X01AESG13 – Grand Staircase-Sandy Grass & Shrub Lands-Soils are Sands

2 Soils are sandy loams ... DX035X01AESG14 – Grand Staircase-Sandy Grass & Shrub Lands-Sandy Loam Soils

#### G. Loam Soils Shrublands

1 Soils are gravelly ... DX035X01AESG15 – Grand Staircase-Loam Soils Shrublands-Gravelly Soils

2 Soils are generally free of rock fragments ... DX035X01AESG16 – Grand Staircase-Loam Soils Shrublands

#### H. Deep Rocky Soils

1 Low elevation MAST>54 degrees F ... DX035X01AESG17 – Grand Staircase-Deep Rocky-Low Elevation

2 Mid elevation MAST<54 degrees F ... DX035X01AESG18 – Grand Staircase-Deep Rocky-Mid Elevation

### II. Circle Cliffs

#### A. Bottoms and Flats

1 Extra water is from perennial or intermittent streamflow ... DX035X01BESG01 – Circle Cliffs - Bottoms and Flats - riparian

2 Extra water is from run-in or local water table

i. Soils are sodic ... DX035X01BESG02 – Circle Cliffs - Bottoms and Flats - run in - sodic

ii. Soils are not sodic ... DX035X01BESG03 – Circle Cliffs - Bottoms and Flats - run-in - nonsodic

#### B. Outcrops and Slopes

1 Soils are shallow ... DX035X01BESG04 – Circle Cliffs - Outcrops and Slopes - shallow soils

2 Soils are moderately deep or deeper ... DX035X01BESG05 – Circle Cliffs - Outcrops and Slopes - moderately deep or deeper soils

#### C. Saline Hills and Badlands

1 Soil parent material is dominantly gypsiferous ... DX035X01BESG06 – Circle Cliffs - Saline Hills and Badlands - gypsic

2 Soil parent material is dominated by salts other than gypsum ... DX035X01BESG07 – Circle Cliffs - Saline Hills and Badlands - saline, nongypsic

#### D. Saline Uplands and Flats

1 Soils are shallow ... DX035X01BESG08 – Circle Cliffs - Saline Uplands and Flats - shallow soils

2 Soils are moderately deep or deeper ... DX035X01BESG09 – Circle Cliffs - Saline Uplands and Flats - moderately deep and deeper soils

#### E. Shallow Shrublands and Woodlands

- 1 Low elevation, MAST > 54 degrees F. ... DX035X01BESG10 – Circle Cliffs - Shallow Shrublands and Woodlands - low elevation
- 2 Mid-elevation, MAST < 54 degrees F. ... DX035X01BESG11 – Circle Cliffs - Shallow Shrublands and Woodlands - mid-elevation

#### F. Sandy Grasslands and Shrublands

- 1 Low elevation, MAST > 54 degrees F. ... DX035X01BESG12 – Circle Cliffs - Sandy Grasslands and Shrublands - low elevation
- 2 Mid-elevation, MAST < 54 degrees F.
  - i. aridic grasslands and shrublands on sandsheets, dunes, and structural benches ... DX035X01BESG13 – Circle Cliffs - Sandy Grasslands and Shrublands - mid-elevation, aridic grasslands
  - ii. Ustic shrublands and woodlands on hills, mountains, and high benches ... DX035X01BESG14 – Circle Cliffs - Sandy Grasslands and Shrublands - mid-elevation, ustic shrublands and woodlands

#### G. Loamy Shrublands ... DX035X01BESG15 – Circle Cliffs - Finer Shrublands

#### H. Deep Rocky Soils

- 1 Low elevation, MAST > 54 degrees F. ... DX035X01BESG16 – Circle Cliffs - Deep Rocky - low elevation
- 2 Mid-elevation, MAST < 54 degrees F. ... DX035X01BESG17 – Circle Cliffs - Deep Rocky - mid elevation

### III. Mesa and Benches

#### A. Bottoms and Flats

- 1 Extra water is from perennial or intermittent streamflow ... DX035X01CESG01 – Mesas and Benches - Bottoms and Flats - riparian
- 2 Extra water is from run-in or local water table ... DX035X01CESG02 – Mesas and Benches - Bottoms and Flats - run in

#### B. Outcrops and Slopes ... DX035X01CESG03 – Mesas and Benches - Outcrops and Slopes

#### C. Saline Hills and Badlands

- 1 Soil parent material is dominantly gypsiferous ... DX035X01CESG04 – Mesas and Benches - Saline Hills and Badlands - gypsic
- 2 Soil parent material is dominated by salts other than gypsum ... DX035X01CESG05 – Mesas and Benches - Saline Hills and Badlands - saline, non-gypsic

#### D. Saline Uplands and Flats

- 1 Soils are loams to clays ... DX035X01CESG06 – Mesas and Benches - Saline Uplands and Flats - loam to clay
- 2 Soils are sandy loams ... DX035X01CESG07 – Mesas and Benches - Saline Uplands and Flats - sandy loams

#### E. Shallow Shrublands and Woodlands

- 1 Soils are sandy loams ... DX035X01CESG08 – Mesas and Benches - Shallow Shrublands and Woodlands - sandy loams
- 2 Soils are loams to clays ... DX035X01CESG09 – Mesas and Benches - Shallow Shrublands and Woodlands - loam to clay

#### F. Sandy Grasslands and Shrublands

- 1 Soils are sands ... DX035X01CESG10 – Mesas and Benches - Sandy Grasslands and Shrublands - sandy
- 2 Soils are sandy loams ... DX035X01CESG11 – Mesas and Benches - Sandy Grasslands and Shrublands - sandy loam

#### G. Deep Rocky Soils

- 1 Low elevation, MAST > 54 degrees F. ... DX035X01CESG12 – Mesas and Benches - Deep Rocky - low elevation
- 2 Mid-elevation, MAST < 54 degrees F. ... DX035X01CESG13 – Mesas and Benches - Deep Rocky - mid elevation

#### IV. Henry Mountains

A. Bottoms & Flats ... DX035X01DESG01 – Henry Mtns-Bottoms & Flats

B. Saline Hills & Badlands ... DX035X01DESG02 – Henry Mtns-Saline Hills & Badlands

C. Saline Uplands & Flats ... DX035X01DESG03 – Henry Mtns-Saline Uplands & Flats

D. Shallow Shrublands & Woodlands

1 Soils are sandy loams ... DX035X01DESG04 – Henry Mtns-Shallow Shrub & Wood lands-sandy loam

2 Soils are loams to clays ... DX035X01DESG05 – Henry Mtns-Shallow Shrub & Wood lands-loamy

E. Sandy Grasslands and Shrublands ... DX035X01DESG06 – Henry Mtns-Sandy Grass & Shrub lands

F. Deep Rocky Soils

1 Low elevation MAST>54 degrees F ... DX035X01DESG07 – Henry Mtns-Deep Rocky Soils-low elevation

2 Mid elevation MAST<54 degrees F ... DX035X01DESG08 – Henry Mtns-Deep Rocky Soils-mid elevation

#### V. Green River Desert

A. Bottoms and Flats

1 Extra water is from perennial or intermittent streamflow ... DX035X01EESG01 – Green River Desert - Bottoms and Flats - riparian

2 Extra water is from run-in or local water table ... DX035X01EESG02 – Green River Desert - Bottoms and Flats - run in

B. Outcrops and Slopes ... DX035X01EESG03 – Green River Desert - Outcrops and Slopes

C. Saline Hills and Badlands ... DX035X01EESG04 – Green River Desert - Saline Hills and Badlands

D. Shallow Shrublands and Woodlands

1 Low Elevation MAST > 54 degrees F. ... DX035X01EESG05 – Green River Desert - Shallow Shrublands and Woodlands - low elevation

2 Mid-elevation MAST < 54 degrees F. ... DX035X01EESG06 – Green River Desert - Shallow Shrublands and Woodlands - mid elevation

E. Sandy Grasslands and Shrublands

1 Soils are Sands ... DX035X01EESG07 – Green River Desert - Sandy Grasslands and Shrublands - low elevation

2 Soils are Sandy Loams ... DX035X01EESG08 – Green River Desert - Sandy Grasslands and Shrublands - mid elevation

F. Deep Rocky Soils

1 Low Elevation MAST > 54 degrees F. ... DX035X01EESG09 – Green River Desert - Deep Rocky - low elevation

2 Mid-Elevation MAST < 54 degrees F. ... DX035X01EESG10 – Green River Desert - Deep Rocky - mid elevation

#### VI. Canyonlands

A. Bottoms and Flats

1 Extra water is from perennial or intermittent streamflow ... DX035X01FESG01 – Canyonlands - Bottoms and Flats - riparian

2 Extra water is from run-in or local water table

i. Soils are sodic ... DX035X01FESG02 – Canyonlands - Bottoms and Flats - run in - sodic

ii. Soils are not sodic ... DX035X01FESG03 – Canyonlands - Bottoms and Flats - run-in - nonsodic

B. Outcrops and Slopes

1 Soils are shallow ... DX035X01FESG04 – Canyonlands - Outcrops and Slopes - shallow soils

2 Soils are moderately deep or deeper ... DX035X01FESG05 – Canyonlands - Outcrops and Slopes - mod. deep or deeper

C. Saline Hills and Badlands

1 Soil parent material is dominantly gypsiferous ... DX035X01FESG06 – Canyonlands - Saline Hills and

Badlands - gypsic

2 Soil parent material is dominated by salts other than gypsum ... DX035X01FESG07 – Canyonlands - Saline Hills and Badlands - saline, nongypsic

D. Saline Uplands and Flats

1 Soils are shallow ... DX035X01FESG08 – Canyonlands - Saline Uplands and Flats - shallow

2 Soils are moderately deep or deeper ... DX035X01FESG09 – Canyonlands - Saline Uplands and Flats - moderately deep and deeper soils

E. Shallow Shrublands and Woodlands

1 Low elevation MAST > 54 degrees F. ... DX035X01FESG10 – Canyonlands - Shallow Shrublands and Woodlands - low elevation

2 Mid-elevation MAST < 54 degrees F. ... DX035X01FESG11 – Canyonlands - Shallow Shrublands and Woodlands - medium elevation

F. Sandy Grasslands and Shrublands

1 Low Elevation MAST > 54 degrees F. ... DX035X01FESG12 – Canyonlands - Sandy Grasslands and Shrublands - low elevation

2 Mid-elevation MAST < 54 degrees F. ... DX035X01FESG13 – Canyonlands - Sandy Grasslands and Shrublands - mid elevation

G. Loamy Soils Shrublands ... DX035X01FESG14 – Canyonlands - Finer Shrublands

H. Deep Rocky Soils

1 Low elevation MAST > 54 degrees F. ... DX035X01FESG15 – Canyonlands - Deep Rocky - low elevation

2 Mid-elevation MAST < 54 degrees F. ... DX035X01FESG16 – Canyonlands - Deep Rocky - mid elevation

VII. Chinle Valley

A. Sodic

1 Bottoms ... DX035X01GESG01 – Chinle Valley Sodic Bottoms

2 Uplands

i. Stream terraces ... DX035X01GESG02 – Chinle Valley Sodic Uplands Stream Terraces

ii. Structural benches, fan remnants ... DX035X01GESG03 – Chinle Valley Sodic Uplands Structural Benches and Fan Terraces

B. Saline

1 Bottoms

i. [Criteria] ... DX035X01GESG04 – Chinle Valley Saline Bottoms

2 Uplands

i. Level to rolling

a. Moderately deep to very deep ... DX035X01GESG05 – Chinle Valley Saline Uplands Level to Rolling Moderately Deep to Very Deep

b. Shallow ... DX035X01GESG06 – Chinle Valley Saline Uplands Level to Rolling Shallow

ii. Escarpments ... DX035X01GESG07 – Chinle Valley Saline Uplands Escarpments and Steep Slopes

C. Gypsum ... DX035X01GESG08 – Chinle Valley Gypsum

D. Limy ... DX035X01GESG09 – Chinle Valley Limy

E. Sandy

1 Bottoms

i. Perennial streamflow ... DX035X01GESG10 – Chinle Valley Sandy Bottoms Perennial

ii. Annual streamflow ... DX035X01GESG11 – Chinle Valley Sandy Bottoms Annual

2 Uplands ... DX035X01GESG12 – Chinle Valley Sandy Uplands

F. Loamy

1 Washes and bottoms ... DX035X01GESG13 – Chinle Valley Loamy Washes and Bottoms

2 Upland

i. Shallow

- a. Hills, escarpments, cliffs ... DX035X01GESG14 – Chinle Valley Loamy Shallow Escarpments, Slopes, and Cliffs
- b. Benches, mesas ... DX035X01GESG15 – Chinle Valley Loamy Shallow Benches, Terraces, and Mesas

ii. Moderately deep to very deep

- a. Hills, escarpments, steep slopes ... DX035X01GESG16 – Chinle Valley Loamy Moderately Deep to Very Deep Hills, Escarpments, and Steep Slopes
- b. Benches, mesas, terraces ... DX035X01GESG17 – Chinle Valley Loamy Moderately Deep to Very Deep Benches, Mesas, and Terraces

G. Shale or clayey

1 Washes and Swales ... DX035X01GESG18 – Chinle Valley Clayey Washes and Swales

2 Upland

- i. Moderately deep to very deep ... DX035X01GESG19 – Chinle Valley Shale or Clayey Shallow
- ii. Moderately deep to very deep ... DX035X01GESG20 – Chinle Valley Shale or Clayey Moderately Deep to Very Deep

H. Sandstone or sandy loam

1 Shallow

- i. MAST > 54 degrees F ... DX035X01GESG21 – Chinle Valley Sandstone Shallow, MAST > 54 degrees F
- ii. MAST < 54 degrees F ... DX035X01GESG22 – Chinle Valley Sandstone Shallow, MAST < 54 degrees F

2 Moderately deep to very deep

- i. MAST > 54 degrees F ... DX035X01GESG23 – Chinle Valley Sandstone Moderately Deep to Very Deep, MAST > 54 degrees F
- ii. MAST < 54 degrees F ... DX035X01GESG24 – Chinle Valley Sandstone Moderately Deep to Very Deep, MAST < 54 degrees F

VIII. Black Mesa Navajo Mountain

A. Saline/Sodic soils ... DX035X01HESG01 – Black Mesa-Navajo Mtn-Saline/Sodic Soils

B. Sandy soils

- 1 Sandy washes ... DX035X01HESG02 – Black Mesa-Navajo Mtn-Sandy washes
- 2 Sandy uplands ... DX035X01HESG03 – Black Mesa-Navajo Mtn-Sandy uplands

C. Loamy soils

- 1 Loamy bottoms ... DX035X01HESG04 – Black Mesa-Navajo Mtn-Loamy bottoms
- 2 Loamy uplands ... DX035X01HESG05 – Black Mesa-Navajo Mtn-Loamy uplands
- 3 Loamy hills and escarpments ... DX035X01HESG06 – Black Mesa-Navajo Mtn-Loamy Hills & Escarpments

D. Clayey soils

- 1 Clayey washes ... DX035X01HESG07 – Black Mesa-Navajo Mtn-Clayey Washes
- 2 Clayey uplands ... DX035X01HESG08 – Black Mesa-Navajo Mtn-Clayey Uplands

E. Sandy loam soils

1 Shallow sandy loam soils

- i. Shallow sandy loam soils, warm ... DX035X01HESG09 – Black Mesa-Navajo Mtn-Shallow Sandy Loam Upland, warm
- ii. Shallow sandy loam soils ... DX035X01HESG10 – Black Mesa-Navajo Mtn-Shallow Sandy Loam Uplands

2 Sandy loam uplands

- i. Sandy loam uplands, warm ... DX035X01HESG11 – Black Mesa-Navajo Mtn-Sandy Loam Upland,

warm

ii. Sandy loam uplands ... DX035X01HESG12 – Black Mesa-Navajo Mtn-Sandy Loam Uplands

3 Sandy loam Pinyon/Juniper ... DX035X01HESG13 – Black Mesa-Navajo Mtn-Sandy Loam-Pinyon-Juniper

#### IX. Little Colorado River Basin

##### A. Salt affected soils

1 Receive extra water from run-in moisture ... DX035X01IESG01 – Little Colorado River Basin-salt affected soils-run in moisture

2 Soils do not receive extra water from run-in moisture

i. Shallow ... DX035X01IESG02 – Little Colorado River Basin-salt affected soils-non run in moisture

ii. Moderately deep or deeper ... DX035X01IESG03 – Little Colorado River Basin-salt affected soils-moderately deep or deeper

B. Gypsum ... DX035X01IESG04 – Little Colorado River Basin-Gypsum soils

C. Limy ... DX035X01IESG05 – Little Colorado River Basin-Limey Uplands soils

##### D. Sandy

1 Receive extra run-in or stream flow ... DX035X01IESG06 – Little Colorado River Basin-sandy soils-run in and streamflow moisture

2 Do not receive extra moisture from run-in ... DX035X01IESG07 – Little Colorado River Basin-sandy soils-non-run in moisture

##### E. Loamy

1 Receive extra run-in moisture ... DX035X01IESG08 – Little Colorado River Basin-Loamy soils, run in moisture

2 Does not receive extra run-in moisture

i. Shallow

a. On hills, escarpments, slopes and cliffs ... DX035X01IESG09 – Little Colorado River Basin-Loamy shallow soils on hills, escarpments, slopes and cliffs, non run-in moisture

b. On benches, terraces and mesas ... DX035X01IESG10 – Little Colorado River Basin- Loamy shallow soils on benches, terraces and mesas (landforms are capped by sandstone, limestone, or other sedimentary strata)

ii. Moderately deep or deeper

a. Slopes are less than 15% and upper part of soil has less than 35% rock fragments ... DX035X01IESG11 – Little Colorado River Basin-Loamy Soils moderately deep or deeper (slopes<15% and <35% rock fragments)

b. Slopes are greater than 15% and the upper part of the soil has more than 35% rock fragments ... DX035X01IESG12 – Little Colorado River Basin-Loamy Soils moderately deep or deeper (slopes >15% and >35% rock fragments)

##### F. Shale or Clayey

1 Receive extra water from run-in moisture ... DX035X01IESG13 – Little Colorado River Basin-Shale or clayey (receive run in moisture)

2 Does not receive extra water from run-in moisture

i. Generally shallow soils on hills, benches and slopes

a. landforms are dominantly shale ... DX035X01IESG14 – Little Colorado River Basin-Shale or clayey shallow soils. Dominantly shale (non run in moisture)

b. landforms are basalt capped or shallow to cinders ... DX035X01IESG15 – Little Colorado River Basin-Shale or clayey shallow soils basalt or cinders (non run in moisture)

ii. moderately deep and deeper soils on fan remnants and plains ... DX035X01IESG16 – Little Colorado River Basin-Shale or clayey mod-deep or deeper soils on fan remnants or plains

##### G. Sandstone or sandy loam

1 Shallow soils



- i. Low elevation, MAST >54 degrees F ... DX035X01IESG17 – Little Colorado River Basin-sandstone or sandy loam, shallow soils, low elevation
- ii. Mid elevation, MAST < 54 degrees F ... DX035X01IESG18 – Little Colorado River Basin-sandstone or sandy loam, shallow soils, mid-elevation

2 Moderately deep and deeper soils

- i. Low elevation, MAST >54 degrees F ... DX035X01IESG19 – Little Colorado River Basin-sandstone or sandy loam moderately deep or deeper soils (low elevation)
- ii. Mid elevation, MAST < 54 degrees F ... DX035X01IESG20 – Little Colorado River Basin-sandstone or sandy loam moderately deep or deeper soils (mid elevation)

X. Paria and Kaibito Plateaus

A. Saline

1 Bottoms and streambanks ... DX035X01JESG01 – Paria and Kaibito Plateaus Saline Bottoms and Streambanks

2 Upland ... DX035X01JESG02 – Paria and Kaibito Plateaus Saline Upland

B. Gypsum ... DX035X01JESG03 – Paria and Kaibito Plateaus Gypsum

C. Limy ... DX035X01JESG04 – Paria and Kaibito Plateaus Limy (calcareous)

D. Sandy

1 Washes and bottoms ... DX035X01JESG05 – Paria and Kaibito Plateaus Sandy Washes and Bottoms

2 Uplands

- i. Shallow ... DX035X01JESG06 – Paria and Kaibito Plateaus Shallow Upland
- ii. Moderately deep to very deep ... DX035X01JESG07 – Paria and Kaibito Plateaus Sandy Moderately Deep to Very Deep

E. Loamy

1 Washes and bottoms ... DX035X01JESG08 – Paria and Kaibito Plateaus Loamy Washes and Bottoms

2 Uplands

i. Shallow

- a. Hills, slopes, cliffs ... DX035X01JESG09 – Paria and Kaibito Plateaus Loamy Shallow Hills, Escarpments, and Cliffs
- b. Benches, terraces, mesas ... DX035X01JESG10 – Paria and Kaibito Plateaus Loamy Shallow Benches and Mesas

ii. Moderately deep to very deep

- a. Hills, escarpments, mesas ... DX035X01JESG11 – Paria and Kaibito Plateaus Loamy Moderately Deep to Very Deep Hills, Escarpments, and Steep Slopes
- b. Benches, terraces, mesas ... DX035X01JESG12 – Paria and Kaibito Plateaus Loamy Moderately Deep to Very Deep Benches, Terraces, and Mesas

F. Shale or clayey

1 [Criteria] ... DX035X01JESG13 – Paria and Kaibito Plateaus Shale or Clayey

G. Sandstone or sandy loam

1 Shallow

- i. MAST > 54 degrees F ... DX035X01JESG14 – Paria and Kaibito Plateaus Shallow Sandstone, MAST > 54 degrees F
- ii. MAST < 54 degrees F ... DX035X01JESG15 – Paria and Kaibito Plateaus Shallow Sandstone, MAST < 54 degrees F

2 Moderately deep to very deep

- i. MAST > 54 degrees F ... DX035X01JESG16 – Paria and Kaibito Plateaus Moderately Deep to Very Deep Sandy Loam, MAST > 54 degrees F
- ii. MAST < 54 degrees F ... DX035X01JESG17 – Paria and Kaibito Plateaus Moderately Deep to Very Deep Sandy Loam, MAST < 54 degrees F

## 35X02 Western Colorado Plateau LRU

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### I. North Slope of the Mogollon Rim (A)

#### A. Site parent material is limestone or dolomite, or soil is loamy.

- 1 Site soils are ustic aridic or within a 10-14" precipitation zone.
  - i. Site is and/or located in a wash. ... DX035X02AESG01 – North Slope of the Mogollon Rim - Ustic Aridic - Limestone or Loamy Bottoms
  - ii. Site is and/or located in an upland with slopes <15%. ... DX035X02AESG02 – North Slope of the Mogollon Rim - Ustic Aridic - Limestone or Loamy Upland
  - iii. Site is and/or located on a cliff with slopes >50%. ... DX035X02AESG03 – North Slope of the Mogollon Rim - Ustic Aridic - Limestone or Loamy Cliffs
- 2 Site soils are aridic ustic or within a 14-18" precipitation zone.
  - i. Site is and/or located in an upland with slopes <15%.
- 3 Site soils are typic aridic or within a 6-10" precipitation zone.
  - i. Site is and/or located in an upland with slopes <15%. ... DX035X02AESG06 – North Slope of the Mogollon Rim - Aridic Ustic - Limestone or Loamy Upland

#### B. Site parent material is sandstone or soil is a sandy loam.

- 1 Site soils are ustic aridic or within a 10-14" precipitation zone.
  - i. Site is and/or located in an upland with slopes <15%. ... DX035X02AESG07 – North Slope of the Mogollon Rim - Ustic Aridic - Sandstone or Sandy Loam Upland
- 2 Site soils are aridic ustic or within a 14-18" precipitation zone.
  - i. Site is and/or located in an upland with slopes <15%. ... DX035X02AESG08 – North Slope of the Mogollon Rim - Aridic Ustic - Sandstone or Sandy Loam Upland.

#### C. Soil is basalt, shale, or clayey.

- 1 Site soils are ustic aridic or within a 10-14" precipitation zone.
  - i. Site is and/or located in a wash. ... DX035X02AESG09 – North Slope of the Mogollon Rim - Ustic Aridic - Clayey Wash
  - ii. Site is and/or located in an upland with slopes <15%. ... DX035X02AESG10 – North Slope of the Mogollon Rim - Ustic Aridic - Clayey Upland
- 2 Site soils are aridic ustic or within a 14-18" precipitation zone.
  - i. Site is and/or located in an upland with slopes <15%.

### II. Coconino Plateau (B)

#### A. Site parent material is limestone or dolomite, or soil is loamy.

- 1 Site soils are ustic aridic or within a 10-14" precipitation zone.
  - i. Site is and/or located in a wash. ... DX035X02BESG01 – Coconino Plateau - Ustic Aridic - Limestone or Loamy Bottoms
  - ii. Site is and/or located in an upland with slopes <15%. ... DX035X02BESG02 – Coconino Plateau - Ustic Aridic - Limestone or Loamy Upland
  - iii. Site is and/or located on a cliff with slopes >50%. ... DX035X02BESG03 – Coconino Plateau - Ustic Aridic - Limestone or Loamy Cliffs
- 2 Site soils are aridic ustic or within a 14-18" precipitation zone.
  - i. Site is and/or located in an upland with slopes <15%. ... DX035X02BESG04 – Coconino Plateau - Aridic Ustic - Limestone or Loamy Upland

#### B. Soil at site is sandy.

- 1 Site is and/or located in an upland with slopes <15%. ... DX035X02BESG06 – Coconino Plateau - Ustic Aridic - Sandy Upland

#### C. Soil at site is Clayey.

1 Site soils are ustic aridic or within a 10-14" precipitation zone.

- i. Site is and/or located in a wash. ... DX035X02BESG07 – Coconino Plateau - Ustic Aridic - Clayey Wash
- ii. Site is and/or located in an upland with slopes <15%. ... DX035X02BESG08 – Coconino Plateau - Ustic Aridic - Clayey Upland

2 Site soils are aridic ustic or within a 14-18" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02BESG09 – Coconino Plateau - Aridic Ustic - Clayey Upland

D. Site parent material is volcanic.

1 Site is and/or located on a hill with slopes >15%. ... DX035X02BESG10 – Coconino Plateau - Ustic Aridic - Volcanic Hills

E. Site parent material is sandstone or soil is a sandy loam.

1 Site is and/or located in an upland with slopes <15%. ... DX035X02BESG11 – Coconino Plateau - Ustic Aridic - Sandstone or Sandy Loam Upland

### III. Coconino Transition (C)

A. Site parent material is limestone or dolomite, or soil is loamy.

1 Site soils are ustic aridic or within a 10-14" precipitation zone.

- i. Site is and/or located in a wash. ... DX035X02CESG01 – Coconino Transition - Ustic Aridic - Limestone or Loamy Wash
- ii. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG02 – Coconino Transition - Ustic Aridic - Limestone or Loamy Upland
- iii. Site is and/or located on a hill with slopes >15%. ... DX035X02CESG03 – Coconino Transition - Ustic Aridic - Limestone or Loamy Hills

2 Site soils are aridic ustic or within a 13-17" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG04 – Coconino Transition - Aridic Ustic - Limestone or Loamy Upland
- ii. Site is and/or located on a hill with slopes >15%. ... DX035X02CESG05 – Coconino Transition - Aridic Ustic - Limestone or Loamy Hills
- iii. Site is and/or located on a cliff with slopes >50%. ... DX035X02CESG06 – Coconino Transition - Aridic Ustic - Limestone or Loamy Cliffs

3 Site soils are aridic ustic or within a 14-18" precipitation zone.

- i. Site is and/or located in a wash. ... DX035X02CESG07 – Coconino Transition - Aridic Ustic - Limestone or Loamy Bottoms
- ii. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG08 – Coconino Transition - Aridic Ustic - Limestone or Loamy Upland
- iii. Site is and/or located on a hill with slopes >15%. ... DX035X02CESG09 – Coconino Transition - Aridic Ustic - Limestone or Loamy Hills
- iv. Site is and/or located on a cliff with slopes >50%. ... DX035X02CESG10 – Coconino Transition - Aridic Ustic - Limestone or Loamy Cliffs

B. Soil at site is sandy.

1 Site soils are ustic aridic or within a 10-14" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG11 – Coconino Transition - Ustic Aridic - Sandstone or Sandy Upland

2 Site soils are aridic ustic or within a 14-18" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG12 – Coconino Transition - Aridic Ustic - Sandstone or Sandy Upland

C. Soil at site is basalt or clayey.

1 Site soils are ustic aridic or within a 10-14" precipitation zone.

- i. Site is and/or located in a wash. ... DX035X02CESG13 – Coconino Transition - Ustic Aridic - Clayey

Wash

ii. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG14 – Coconino Transition - Ustic Aridic - Clayey Upland

iii. Site is and/or located on a hill with slopes >15%. ... DX035X02CESG15 – Coconino Transition - Ustic Aridic - Basalt Hills

2 Site soils are aridic ustic or within a 14-18" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02CESG16 – Coconino Transition - Aridic Ustic - Basalt or Clayey Upland

#### IV. Grand Canyon (D)

A. Site parent material is limestone or dolomite, or soil is loamy.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG01 – Grand Canyon - Typic Aridic - Limestone or Loamy Upland

ii. Slopes exceed 15% ... DX035X02DESG20 – Grand Canyon - Typic Aridic - Limestone Hills

2 Site soils are ustic aridic or within a 10-14" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG02 – Grand Canyon - Ustic Aridic - Limestone or Loamy Upland

ii. Site is and/or located on a hill with slopes >15%. ... DX035X02DESG03 – Grand Canyon - Ustic Aridic - Limestone or Loamy Hills

3 Site soils are aridic ustic or within a 13-17" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG04 – Grand Canyon - Aridic Ustic - Limestone or Loamy Upland

ii. Site is and/or located on a hill with slopes >15%. ... DX035X02DESG05 – Grand Canyon - Aridic Ustic - Limestone or Loamy Hills

iii. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG06 – Grand Canyon - Aridic Ustic - Limestone or Loamy Cliffs

4 Site soils are within a 17-25" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG07 – Grand Canyon - Typic Ustic - Limestone or Loamy Upland

B. Site parent material is volcanic or clayey.

1 Site soils are ustic aridic or within a 10-14" precipitation zone.

i. Site is and/or located in a wash. ... DX035X02DESG08 – Grand Canyon - Ustic Aridic - Clayey Bottoms

ii. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG09 – Grand Canyon - Ustic Aridic - Volcanic or Clayey Upland

iii. Site is and/or located on a hill with slopes >15%. ... DX035X02DESG10 – Grand Canyon - Ustic Aridic - Volcanic or Clayey Hills

2 [Criteria]

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG11 – Grand Canyon - Aridic Ustic - Volcanic or Clayey Upland

3 site is typic aridic or precipitation is within 6 to 10 inch range

i. site is volcanic or clayey, typic aridic, and slopes exceed 15% ... DX035X02DESG18 – Grand Canyon - Typic Aridic - Volcanic or Clayey Hills

ii. Upland, slopes are  $\leq 15\%$  ... DX035X02DESG24 – Grand Canyon - Typic Aridic - Volcanic or Clayey Upland

C. Site parent material is sandstone or soil is a sandy loam.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG12 – Grand Canyon - Typic Aridic - Sandstone or Sandy Loam Upland

ii. Site is and/or located on a hill with slopes >15%. ... DX035X02DESG13 – Grand Canyon - Typic Aridic - Sandstone or Sandy Loam Hills

2 Site soils are ustic aridic or within a 10-14" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG14 – Grand Canyon - Ustic Aridic - Sandstone or Sandy Loam Upland

3 Site soils are aridic ustic or within a 13-17" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02DESG15 – Grand Canyon - Aridic Ustic - Sandstone or Sandy Loam Upland

#### D. Sandy

1 Ustic Aridic

i. Sandy bottoms ustic aridic ... DX035X02DESG16 – Grand Canyon - Ustic Aridic - Sandy Bottoms

2 Typic Aridic

i. typic aridic sandy bottoms ... DX035X02DESG17 – Grand Canyon - Typic Aridic - Sandy Bottoms

#### E. Limy

1 uplands slopes  $\leq 15\%$

i. typic aridic limy uplands ... DX035X02DESG21 – Grand Canyon - Typic Aridic - Limy Upland

2 Hillslopes  $\geq 15\%$  typic aridic

i. [Criteria] ... DX035X02DESG22 – Grand Canyon - Typic Aridic - Limy Hills

#### F. Gypsum

1 Gypsum Uplands, Slopes  $\leq 15\%$

i. Gypsum Uplands, slopes  $\leq 15\%$ , typic aridic ... DX035X02DESG23 – Grand Canyon - Typic Aridic - Gypsic Upland

2 Gypsum Hills, Slopes  $\geq 15\%$

i. Gypsum Hills, slopes  $\geq 15\%$ , typic aridic ... DX035X02DESG19 – Grand Canyon - Typic Aridic - Gypsic Hills

#### V. Arizona Strip (E)

##### A. Site soils are gypsiferous

1 Soils are typic aridic, or precipitation is within the range of 7 to 11 inches.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG01 – Arizona Strip - Typic Aridic - Gypsum Upland

ii. Site is and/or located in an upland with slopes >15%. ... DX035X02EESG02 – Arizona Strip - Typic Aridic - Gypsum Hills

2 Soils are ustic aridic, or precipitation is within the range of 10 to 14 inches.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG03 – Arizona Strip - Ustic Aridic - Gypsum Upland

ii. Site is and/or located in an upland with slopes >15%. ... DX035X02EESG04 – Arizona Strip - Ustic Aridic - Gypsum Hills

##### B. Site is sandy.

1 Soils are typic aridic, or precipitation is within the range of 6 to 10 inches.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG05 – Arizona Strip - Typic Aridic - Sandy Upland

2 Soils are Ustic Aridic, or precipitation is within a range of 10 to 14 inches

i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG06 – Arizona Strip - Ustic Aridic - Sandy Upland

##### C. Site parent material is sandstone or sandy loam.

1 Soil are typic aridic, or precipitation is within the range of 7 to 11 inches.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG07 – Arizona Strip - Typic Aridic - Sandstone or Sandy Loam Upland

2 Soils are ustic aridic, or precipitation is within the range of 10 to 14 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG08 – Arizona Strip - Ustic Aridic - Sandstone or Sandy Loam Upland

3 moisture is aridic ustic or precipitation is 13 to 17 inches annually

- i. upland, slopes are ≤ 15% ... DX035X02EESG23 – Arizona Strip - Aridic Ustic - Sandstone or Sandy Loam Upland

D. Site parent material is basalt or clayey

1 Soils are typic aridic, or precipitation is within the range of 7 to 11 inches.

- i. Site is and/or located in a wash. ... DX035X02EESG09 – Arizona Strip - Typic Aridic - Clay Loam Bottoms
- ii. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG10 – Arizona Strip - Typic Aridic - Basalt or Clay Loam Upland

2 Soils are ustic aridic or precipitation is within the range of 10 to 14 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG11 – Arizona Strip - Ustic Aridic - Basalt or Clay Loam Upland

3 Soils are ustic aridic, or precipitation is within the range of 13 to 17 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG13 – Arizona Strip - Aridic Ustic - Clayey or Clay Loam Upland
- ii. Site is and/or located in an upland with slopes >15%. ... DX035X02EESG14 – Arizona Strip - Aridic Ustic - Basalt Slopes

E. Site parent material is limestone or loamy.

1 Soils are typic aridic, or precipitation is within the range of 7 to 11 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG15 – Arizona Strip - Typic Aridic - Limestone or Loamy Upland
- ii. Site is and/or located in an upland with slopes >15%. ... DX035X02EESG16 – Arizona Strip - Typic Aridic - Limestone Slopes

2 Soils are ustic aridic, or precipitation is within the range of 10 to 14 inches.

- i. Site is and/or located in a wash. ... DX035X02EESG17 – Arizona Strip - Ustic Aridic - Limestone or Loamy Bottoms
- ii. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG18 – Arizona Strip - Ustic Aridic - Limestone or Loamy Upland Blackbrush
- iii. Site is and/or located in an upland with slopes >15%. ... DX035X02EESG19 – Arizona Strip - Ustic Aridic - Limestone or Loamy Slopes

3 Soils are aridic ustic, or precipitation is within the range of 13 to 17 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02EESG20 – Arizona Strip - Aridic Ustic - Limestone or Loamy Upland
- ii. Site is and/or located in an upland with slopes >15%. ... DX035X02EESG21 – Arizona Strip - Aridic Ustic - Limestone or Loamy Slopes

F. Blackbrush (*coleogyne ramosissima*) is present on site

1 Parent Material is not basalt. ... Dx035X02EESG22 – Arizona Strip- Ustic Aridic- Limestone or loamy upland- Blackbrush

2 Parent material is basalt. ... DX035X02EESG12 – Arizona Strip - Ustic Aridic - Basalt or Clay Loam Slopes- Blackbrush

VI. Kaibab Plateau (F)

A. Site soils are gypsiferous.

1 Soils are ustic aridic or precipitation is within the range of 10 to 14 inches.

- i. Site is and/or located in an upland with slopes >15%. ... DX035X02FESG01 – Kaibab Plateau - Ustic Aridic - Gypsum Hills

B. Site parent material is shale or clayey.

1 Soils are ustic aridic, or precipitation is within the range of 10 to 14 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02FESG02 – Kaibab Plateau - Ustic Aridic - Clay Loam or Shale Upland

C. Site parent material is limestone or loamy.

1 Soils are ustic aridic, or precipitation is within the range of 10 to 14 inches.

- i. Site is and/or located in a wash. ... DX035X02FESG03 – Kaibab Plateau - Ustic Aridic - Limestone or Loamy Bottoms
- ii. Site is and/or located in an upland with slopes <15%. ... DX035X02FESG04 – Kaibab Plateau - Ustic Aridic - Limestone or Loamy Upland
- iii. Site is and/or located in an upland with slopes >15%. ... DX035X02FESG05 – Kaibab Plateau - Ustic Aridic - Limestone or Loamy Slopes

2 Soils are aridic ustic, or precipitation is within the range of 13 to 17 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02FESG06 – Kaibab Plateau - Aridic Ustic - Limestone or Loamy Upland
- ii. Site is and/or located in an upland with slopes >15%. ... DX035X02FESG07 – Kaibab Plateau - Aridic Ustic - Limestone or Loamy Slopes

3 Soils are typic ustic, or precipitation is within the range of 17 to 25 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02FESG08 – Kaibab Plateau - Xeric Udic - Limestone or Loamy Upland

4 Soils are ustic udic, or precipitation is within the range of 25 to 33 inches.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02FESG09 – Kaibab Plateau - Typic Udic - Limestone or Loamy Upland

## VII. Marble Canyon (G)

A. Soil at site is colluvial.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG01 – Marble Canyon - Typic Aridic - Upland Colluvial

B. Soil at site is saline.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG02 – Marble Canyon - Typic Aridic - Saline Upland

E. Soil at site is sandy.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG06 – Marble Canyon - Typic Aridic - Sandy Upland

2 Site soils are within a 7-11" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG08 – Marble Canyon - Typic Aridic - Sandy Upland 7-11" p.z.

F. Soil at site is sedimentary or loamy.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG10 – Marble Canyon - Typic Aridic - Limestone or Loamy Upland
- ii. Site is and/or located on a hill with slopes >15%. ... DX035X02GESG11 – Marble Canyon - Typic Aridic - Limestone or Loamy Cliffs

2 Site soils are within a 7-11" precipitation zone.

- i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG13 – Marble Canyon - Typic Aridic - Limestone or Loamy Upland 7-11" p.z.

H. Site parent material is sandstone or soil is a sandy loam.

1 Site soils are typic aridic or within a 6-10" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG20 – Marble Canyon - Typic Aridic - Sandstone or Sandy Loam Upland

2 Site soils are within a 7-11" precipitation zone.

i. Site is and/or located in an upland with slopes <15%. ... DX035X02GESG21 – Marble Canyon - Typic Aridic - Sandstone or Sandy Loam Upland 7-11" p.z.

F. site is gypsic

1 site soils are typic aridic or within 6 to 10 inch precipitation range

i. site slopes are upland, slopes ≤ 15% ... DX035X02GESG04 – Marble Canyon - Typic Aridic - Gypsum Upland

ii. site slopes are hills, slopes are ≥ 15% ... DX035X02GESG05 – Marble Canyon - Typic Aridic - Gypsum Hills

G. shale

1 soils are in the typic aridic or within the 6 to 10 inch annual precipitation range

i. upland, slopes are ≤ 15% ... DX035X02GESG18 – Marble Canyon - Typic Aridic - Shale or Clayey Upland

ii. bottoms ... DX035X02GESG19 – Marble Canyon - Typic Aridic - Shale or Clayey Bottoms

## **35X03 Northwest New Mexico Highlands LRU**

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I. Acoma Valley, Tres Hermanos, and Sierra Lucero

A. Soils limy ... DX035X03AESG03 – Acoma Valley - Limy

B. Soils not limy

1 Soils sandy ... DX035X03AESG04 – Acoma Valley - Sandy

2 Soils not sandy

i. Parent Material is Sedimentary or soil is loamy ... DX035X03AESG05 – Acoma Valley - Sedimentary or Loamy

ii. Parent Material is Shale or soil is Clayey ... DX035X03AESG06 – Acoma Valley - Shale or Clayey

iii. Parent Material is Sandstone or soil is Sandy Loam ... DX035X03AESG07 – Acoma Valley - Sandstone or Sandy Loam

II. Chuska Mountains

A. Soils sodic ... DX035X03BESG01 – Chuska Mountains - Sodic

B. Soils not sodic

1 Soils saline ... DX035X03BESG02 – Chuska Mountains - Saline

2 Soils not saline

i. Soils limy ... DX035X03BESG03 – Chuska Mountains - Limy

ii. Soils not limy

a. Soils silty ... DX035X03BESG04 – Chuska Mountains - Silty

b. Soils not silty

1) Soils sandy ... DX035X03BESG05 – Chuska Mountains - Sandy

2) Soils not sandy

a) Parent Material is Sedimentary or soil is Loamy ... DX035X03BESG06 – Chuska Mountains - Sedimentary or Loamy

b) Parent Material is Shale or soil is Clayey ... DX035X03BESG07 – Chuska Mountains - Shale or Clayey

c) Parent Material is Sandstone or soil is Sandy Loam ... DX035X03BESG08 – Chuska



Mountains - Sandstone or Sandy Loam

III. Defiance Plateau

A. Soils sodic ... DX035X03CESG01 – Defiance Plateau - Sodic

B. Soils not sodic

1 Soils saline ... DX035X03CESG02 – Defiance Plateau - Saline

2 Soils not saline

i. Soils limy ... DX035X03CESG03 – Defiance Plateau - Limy

ii. Soils not limy

a. Soils silty ... DX035X03CESG04 – Defiance Plateau - Silty

b. Soils not silty

1) Soils sandy ... DX035X03CESG05 – Defiance Plateau - Sandy

2) Soils not sandy

a) Parent Material is Sedimentary or soil is Loamy ... DX035X03CESG06 – Defiance Plateau - Sedimentary or Loamy

b) Parent Material is Shale or soil is Clayey ... DX035X03CESG07 – Defiance Plateau - Shale or Clayey

c) Parent Material is Sandstone or soil is Sandy Loam ... DX035X03CESG08 – Defiance Plateau - Sandstone or Sandy Loam

IV. Lake Bidahochi Sediments

A. Soils sodic ... DX035X03DESG01 – Lake Bidahochi - Sodic

B. Soils not sodic

1 Soils saline ... DX035X03DESG02 – Lake Bidahochi - Saline

2 Soils not saline

i. Soils sandy ... DX035X03DESG03 – Lake Bidahochi - Sandy

ii. Soils not sandy

a. Parent Material is Sedimentary, or soil is Loamy ... DX035X03DESG04 – Lake Bidahochi - Sedimentary or Loamy

b. Parent Material is Shale or Volcanic, or soil is Clayey ... DX035X03DESG05 – Lake Bidahochi - Shale or Clayey

c. Parent Material is Sandstone, or soil is Sandy Loam ... DX035X03DESG06 – Lake Bidahochi - Sandstone or Sandy Loam

V. Nacimiento Sediments

A. Soils sodic ... DX035X03EESG01 – Nacimiento Sediments - Sodic

B. Soils not sodic

1 Soils limy ... DX035X03EESG02 – Nacimiento Sediments - Limy

2 Soils not limy

i. Soils sandy ... DX035X03EESG03 – Nacimiento Sediments - Sandy

ii. Soils not sandy

a. Parent Material is Sedimentary or soil is Loamy ... DX035X03EESG04 – Nacimiento Sediments - Sedimentary or Loamy

b. Parent Material is Shale or soil is Clayey ... DX035X03EESG05 – Nacimiento Sediments - Shale or Clayey

c. Parent Material is Sandstone or soil is Sandy Loam ... DX035X03EESG06 – Nacimiento Sediments - Sandstone or Sandy Loam

VI. Puerco, Zuni, and Carrizo Basins

A. Parent Material is Sedimentary or soil is Loamy ... DX035X03FESG03 – Puerco, Zuni, and Carrizo Basins - Sedimentary or Loamy

B. Parent Material is Shale or soil is Clayey ... DX035X03FESG04 – Puerco, Zuni, and Carrizo Basins - Shale

or Clayey

C. Parent Material is Sandstone or soil is Sandy Loam ... DX035X03FESG05 – Puerco, Zuni, and Carrizo Basins - Sandstone or Sandy Loam

## VII. Zuni Mountains

A. Parent Material is Sedimentary or soil is Loamy ... DX035X03GESG05 – Zuni Mountains - Sedimentary or Loamy

B. Parent Material is Shale or soil is Clayey ... DX035X03GESG06 – Zuni Mountains - Shale or Clayey

C. Parent Material is Sandstone or soil is Sandy Loam ... DX035X03GESG07 – Zuni Mountains - Sandstone or Sandy Loam

## 35X04 San Juan Basin LRU

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I. San Juan River Corridor. This LRU subset consists of landforms which drain directly into the San Juan River. Elevations are mostly under 1900 meters. Stratigraphy is varied, ranging from the Mancos to the Nacimiento formations. This LRU subset is distinct from the rest of 35.4 in that it provides irrigation water. Thus, upland landforms which contribute significant water are included.

A. Site occurs on landforms that are concave in one or more dimensions, and receive extra moisture from runoff, throughflow, or discharge in the landscape. ... DX035X04AESG01 – San Juan River Corridor LRU Subset - Bottomlands Subgroup

B. Sites that occur on "upland", water-shedding landforms. Elevated terraces are included in this group.

1 Soils are < 50 cm to lithic or paralithic contact (root-restrictive bedrock). ... DX035X04AESG02 – San Juan River Corridor LRU Subset - Shallow Subgroup

2 Soils are > 50 cm to lithic or paralithic contact (root-restrictive bedrock).

i. Sites that have saline and/or sodic soils. In these cases soils regularly have an EC > 4.0 and/or SAR > 10 or ESP > 15. ... DX035X04AESG03 – San Juan River Corridor LRU Subset - Saline/Sodic Subgroup

ii. Soils lack both significant salinity and sodicity.

a. Soils have a combination of free carbonates and calcareous rock fragments at the surface. Strong or violent response to dilute HCl and ≥ 5% calcareous fragments. ... DX035X04AESG04 – San Juan River Corridor LRU Subset - Limy Subgroup

b. Soils lack one or both of the following at the surface: Strong or violent response to dilute HCl or ≥ 5% calcareous fragments.

1) Sites with soils that have particle size classes of loamy or fine loamy. ... DX035X04AESG06 – San Juan River Corridor LRU Subset - Loamy Subgroup

2) Sites with soils that have particle size classes of fine or very fine. ... DX035X04AESG07 – San Juan River Corridor LRU Subset - Clayey Subgroup

3) Sites with soils that have particle size classes of sandy, coarse loamy, or coarser. ... DX035X04AESG05 – San Juan River Corridor LRU Subset - Sandy Subgroup

II. Bisti Lowlands. This LRU subset is composed of Cretaceous materials, and is generally below 1900 m in elevation. The Bisti Lowlands subset is further distinguished from Chaco Mesa in that the former receives less monsoonal moisture, harbors less warm-season grass, and experiences low amounts of blowing sands.

A. Site occurs on landforms that are concave in one or more dimensions, and receive extra moisture from runoff, throughflow, or discharge in the landscape. ... DX035X04BESG06 – Bisti Lowlands LRU Subset - Bottomland Subgroup

B. Sites that occur on "upland", water-shedding landforms. Elevated terraces are included in this group.

1 Soils are < 50 cm to lithic or paralithic contact (root-restrictive bedrock). ... DX035X04BESG07 – Bisti Lowlands LRU Subset - Shallow Subgroup

2 Soils are > 50 cm to lithic or paralithic contact (root-restrictive bedrock).

i. Sites that have saline and/or sodic soils. In these cases soils regularly have an EC > 4.0 and/or SAR >

10 or ESP > 15. ... DX035X04BESG01 – Bisti Lowlands LRU Subset - Saline and Sodic Uplands Subgroup

ii. Soils lack both significant salinity and sodicity.

a. Soils have a combination of free carbonates and calcareous rock fragments at the surface. Strong or violent response to dilute HCl and  $\geq 5\%$  calcareous fragments. ... DX035X04BESG02 – Bisti Lowlands LRU Subset - Limy Subgroup

b. Soils lack one or both of the following at the surface: Strong or violent response to dilute HCl or  $\geq 5\%$  calcareous fragments.

1) Sites with soils that have particle size classes of sandy, coarse loamy, or coarser. ... DX035X04BESG03 – Bisti Lowlands LRU Subset - Sandy Subgroup

2) Sites with soils that have particle size classes of loamy or fine loamy. ... DX035X04BESG05 – Bisti Lowlands LRU Subset - Loamy Subgroup

3) Sites with soils that have particle size classes of clayey, fine, or very fine. ... DX035X04BESG04 – Bisti Lowlands LRU Subset - Clayey Subgroup

IV. Chaco Mesa. This LRU subset is composed of Cretaceous materials, is generally above 1900 m in elevation, and does not drain directly into the San Juan River. The Chaco Mesa subset is further distinguished from the Bisti Lowlands in that the former receives more monsoonal moisture, harbors more warm-season grasses, and experiences a considerable amount of blowing sands.

A. Site occurs on landforms that are concave in one or more dimensions, and receive extra moisture from runoff, throughflow, or discharge in the landscape. ... DX035X04CESG01 – Chaco Mesa LRU subset - Bottomlands

B. Sites that occur on "upland", water-shedding landforms. Elevated terraces are included in this group.

1 Soils are < 50 cm to lithic or paralithic contact (root-restrictive bedrock). ... DX035X04CESG02 – Chaco Mesa LRU subset - Shallow

2 Soils are > 50 cm to lithic or paralithic contact (root-restrictive bedrock).

i. Sites that have saline and/or sodic soils. In these cases soils regularly have an EC > 4.0 and/or SAR > 10 or ESP > 15. ... DX035X04CESG03 – Chaco Mesa LRU Subset - Saline and Sodic Uplands

ii. Soils lack both significant salinity and sodicity.

a. Soils have a combination of free carbonates and calcareous rock fragments at the surface. Strong or violent response to dilute HCl and  $\geq 5\%$  calcareous fragments. ... DX035X04CESG04 – Chaco Mesa LRU Subset - Limy

b. Soils lack one or both of the following at the surface: Strong or violent response to dilute HCl or  $\geq 5\%$  calcareous fragments.

1) Sites with soils that have particle size classes of sandy, coarse loamy, or coarser. ... DX035X04CESG05 – Chaco Mesa LRU Subset - Sandy

2) Sites with soils that have particle size classes of loamy or fine loamy. ... DX035X04CESG06 – Chaco Mesa LRU Subset - Loamy

3) Sites with soils that have particle size classes of clayey, fine, or very fine. ... DX035X04CESG07 – Chaco Mesa LRU Subset - Clayey

III. Canon Seboyeta. This LRU subset drains eastward toward the Acoma Valley, and is confined to Cretaceous sedimentary parent materials. It is bounded to the west by the Mt. Taylor Volcanic field, to the north by a watershed divide, and to the east and south by a break between Cretaceous and Jurassic strata.

A. Site occurs on landforms that are concave in one or more dimensions, and receive extra moisture from runoff, throughflow, or discharge in the landscape. ... DX035X04DESG01 – Canon Seboyeta LRU Subset - Bottomland Subgroup

B. Sites that occur on "upland", water-shedding landforms. Elevated terraces are included in this group.

1 Sites that have saline and/or sodic soils. In these cases soils regularly have an EC > 4.0 and/or SAR > 10 or ESP > 15. ... DX035X04DESG02 – Canyon Seboyeta LRU Subset - Salty Sites subgroup

2 Soils lack both significant salinity and sodicity.

i. Sites with soils that have particle size classes of loamy, fine loamy, or coarser. ... DX035X04DESG03

– Canyon Seboyeta LRU Subset - Loamy Subgroup

ii. Sites with soils that have particle size classes of clayey, fine, or very fine. ... DX035X04DESG04 – Canon Seboyeta LRU Subset - Clayey Subgroup

## Rio Puerco

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### I. Additional water

A. Perennial water ... RPESG09 – Riparian

B. Ephemeral water

1 Subsurface EC >4 ... RPESG10 – Saline Bottoms

2 Subsurface EC <4

i. Sand >50% & clay <25% for surface and subsurface ... RPESG13 – Sandy Bottoms

ii. Sand <50% or clay >25% for surface and subsurface ... RPESG01 – Bottoms

### II. Uplands

A. >75% bedrock outcrop ... RPESG08 – Outcrops

B. <75% bedrock outcrop

1 Surface SAR >8 ... RPESG11 – Saline Hills

2 Surface SAR <8

i. Gypsum >5% surface or >10% subsurface ... RPESG06 – Gypsum

ii. Gypsum <5% and <10% subsurface

a. Subsurface EC >8 or surface EC >4 ... RPESG11 – Saline Hills

b. Subsurface EC <8 and surface EC <4

1) EC >1.5 surface or >2 subsurface ... RPESG12 – Saline Uplands

2) EC <1.5 surface and <2 subsurface

a) Slope >35% & >40% surface rock ... RPESG02 – Breaks

b) Slope <35% or <40% surface rock

(1) Depth <30cm ... RPESG16 – Very Shallow

(2) Depth: 30-55cm ... RPESG15 – Shallow

(3) Depth >55cm

(a) Rock >30% surface or >30% subsurface ... RPESG04 – Deep Rocky

(b) Rock <30% surface and <30% subsurface

(1) Clay >30% surface or >35% subsurface ... RPESG03 – Clay Uplands

(2) Clay <30% surface and <35% subsurface

(a) Sand >75% or texture is loamy sand or sandier in surface & subsurface ... RPESG14 – Sandy Uplands

(b) Sand <75% or texture is sandy loam or finer in surface & subsurface

(1) Clay <20% or texture is sandy loam or sandier in surface ... RPESG07 – Loamy Uplands

(2) Clay >20% or texture is finer than sandy loam in surface ... RPESG05 – Finer Uplands