

Ecological site R026XF055CA Willow Thicket

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General information

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

MLRA notes

Major Land Resource Area (MLRA): 026X–Carson Basin and Mountains

The area lies within western Nevada and eastern California, with about 69 percent being within Nevada, and 31 percent being within California. Almost all this area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. Isolated north-south trending mountain ranges are separated by aggraded desert plains. The mountains are uplifted fault blocks with steep side slopes. Most of the valleys are drained by three major rivers flowing east across this MLRA. A narrow strip along the western border of the area is in the Sierra Nevada Section of the Cascade-Sierra Mountains Province of the Pacific Mountain System. The Sierra Nevada Mountains are primarily a large fault block that has been uplifted with a dominant tilt to the west. This structure leaves an impressive wall of mountains directly west of this area. This helps create a rain shadow affect to MLRA 26. Parts of this eastern face, but mostly just the foothills, mark the western boundary of this area. Elevations range from about 3,806 feet (1,160 meters) on the west shore of Pyramid Lake to 11,653 feet (3,552 meters) on the summit of Mount Patterson in the Sweetwater Mountains.

Valley areas are dominantly composed of Quaternary alluvial deposits with Quaternary playa or alluvial flat deposits often occupying the lowest valley bottoms in the internally drained valleys, and river deposited alluvium being dominant in externally drained valleys. Hills and mountains are dominantly Tertiary andesitic flows, breccias, ash flow tuffs, rhyolite tuffs or granodioritic rocks. Quaternary basalt flows are present in lesser amounts, and Jurassic and Triassic limestone and shale, and Precambrian limestone and dolomite are also present in very limited amounts. Also of limited extent are glacial till deposits along the east flank of the Sierra Nevada Mountains, the result of alpine glaciation.

The average annual precipitation in this area is 5 to 36 inches (125 to 915 millimeters), increasing with elevation. Most of the rainfall occurs as high-intensity, convective storms in spring and autumn. Precipitation is mostly snow in winter. Summers are dry. The average annual temperature is 37 to 54 degrees F (3 to 12 degrees C). The freeze-free period averages 115 days and ranges from 40 to 195 days, decreasing in length with elevation.

The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an aridic or xeric soil moisture regime, and mixed or smectitic mineralogy. They generally are well drained, are clayey or loamy and commonly skeletal, and are very shallow to moderately deep.

This area supports shrub-grass vegetation characterized by big sagebrush. Low sagebrush and Lahontan sagebrush occur on some soils. Antelope bitterbrush, squirreltail, desert needlegrass, Thurber needlegrass, and Indian ricegrass are important associated plants. Green ephedra, Sandberg bluegrass, Anderson peachbrush, and several forb species also are common. Juniper-pinyon woodland is typical on mountain slopes. Jeffrey pine, lodgepole pine, white fir, and manzanita grow on the highest mountain slopes. Shadscale is the typical plant in the drier parts of the area. Sedges, rushes, and moisture-loving grasses grow on the wettest parts of the wet flood plains and terraces. Basin wildrye, alkali sacaton, saltgrass, buffaloberry, black greasewood, and rubber rabbitbrush grow on the drier sites that have a high concentration of salts.

Some of the major wildlife species in this area are mule deer, coyote, beaver, muskrat, jackrabbit, cottontail, raptors, pheasant, chukar, blue grouse, mountain quail, and mourning dove. The species of fish in the area include trout and catfish. The Lahontan cutthroat trout in the Truckee River is a threatened and endangered species.

LRU notes

The Bodie Hills LRU straddles the California-Nevada state boundary, just north of Mono Lake. The area is underlain by late Miocene age volcanic fields with upper Miocene and Pliocene sedimentary deposits over top. The youngest faults in the area are north and north-east striking. Extensive zones of hydrothermally altered rocks and large mineral deposits, including gold and silver rich veins, formed during hydrothermally active periods of the Miocene (John et al. 2015). A primary distinguishing factor between the Bodie Hills and other hills in MLRA 26 is the dominance of volcanic parent material. Elevations range from 2170 to 2650 meters and slopes typically range from 5 to 35 percent. FFD range from 75-105.

Ecological site concept

The Willow Thicket site occurs adjacent to springs in areas that receive extra moisture through groundwater discharge. The soils are typically saturated to within 40 to 50 inches during the winter and spring. Soils are generally medium textured and have high organic matter content in the near surface horizons. The dominant vegetation are willows (*Salix*) and tufted hairgrass (*Deschampsia cespitosa*).

Associated sites

R026XF057CA	Ashy Shallow Loam 14-16 P.Z.
R026XF060CA	Ashy Claypan 12-14 P.Z.
R026XY078NV	CLAYPAN 12-14 P.Z.
R026XY105NV	GRAVELLY LOAMY SLOPE 14-16 P.Z.

Similar sites

R026XF018CA	Streambank Streambank [Occurs along streams with more species diversity]
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix</i>
Herbaceous	(1) <i>Deschampsia caespitosa</i>

Physiographic features

The Willow Thicket site occurs adjacent to springs in areas that receive extra moisture through groundwater discharge. Slopes range from 0 to 8 percent. Elevations are 7200 to 9200 feet

Table 2. Representative physiographic features

Landforms	(1) Mountains > Stream terrace
Elevation	2,195–2,804 m
Slope	0–8%
Water table depth	102–127 cm

Climatic features

The climate is semiarid with cold, moist winters and cool, dry summers. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 42 to 44 degrees F. The average growing season is about 30 to 70 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	356-406 mm
Frost-free period (average)	70 days
Freeze-free period (average)	
Precipitation total (average)	406 mm

Influencing water features

The Willow Thicket site occurs adjacent to streams on stream terraces. It may also occur at seeps.

Soil features

The soils are typically saturated to within 40 to 50 inches during the winter and spring. Soils are generally medium textured and have high organic matter content in the near surface horizons.

Soils correlated to this ecological site include Aquandic Cryaquolls and Vitrandic Haplocryolls.

Table 4. Representative soil features

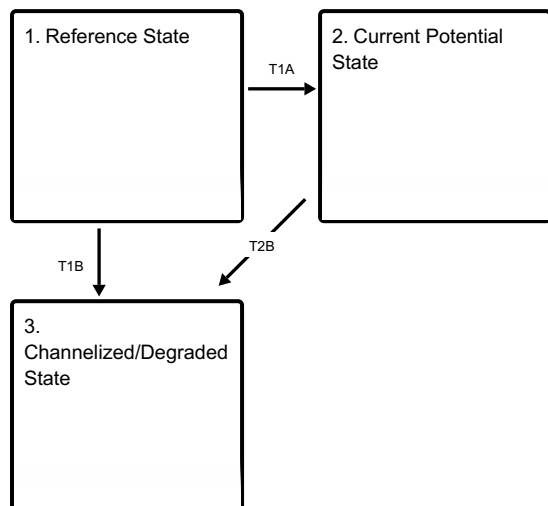
Parent material	(1) Volcanic ash (2) Eolian deposits–volcanic rock (3) Alluvium–volcanic rock
Surface texture	(1) Gravelly, ashy loamy fine sand
Family particle size	(1) Ashy
Drainage class	Moderately well drained
Permeability class	Moderately rapid
Surface fragment cover <=3"	25%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	14.22–16.76 cm
Calcium carbonate equivalent (Depth not specified)	0%
Clay content (Depth not specified)	8–15%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	28%
Subsurface fragment volume >3" (Depth not specified)	22%

Ecological dynamics

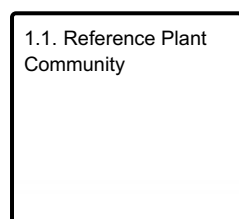
Where management results in abusive livestock use, mountain sagebrush, rubber rabbitbrush become more prevalent. Species likely to invade this site include thistle, mullein, curly dock and Kentucky bluegrass. Fires are uncommon in riparian communities. Most fires kill only aboveground plant parts of willows. Willow will generally sprout from its root crown or stem base following fire. However, severe fires can completely remove organic soil layers, leaving willow roots exposed and charred, thus eliminating basal sprouting.

State and transition model

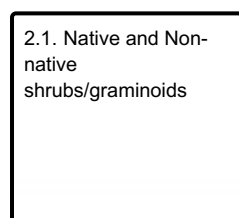
Ecosystem states



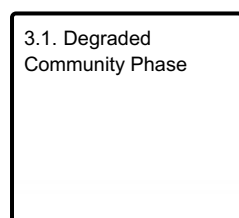
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1 Reference State

The Reference State concept has one main community phase. Rhizomatous willow and graminoids are less influenced by seasonal flooding and may remain intact after seasonal flooding. Willow are often tolerant to saturated soil and flooding.

Community 1.1 Reference Plant Community

The plant community is dominated by willows. Whitestem gooseberry is a common plant, and typically occurs intermingled within the willow overstory. Dominant plants of the willow understory are tufted hairgrass. Potential vegetative composition is about 10% grasses, 10% forbs and 80% shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	4035	5380	7622
Forb	504	673	953
Grass/Grasslike	504	673	953
Total	5043	6726	9528

State 2 Current Potential State

The Current Potential State is similar to the References state except that the Current Potential State includes non-native plants.

Community 2.1 Native and Non-native shrubs/graminoids

Tamarisk may also occur and take the place of native willows. Kentucky bluegrass is effective at invading wet to semiwet sites and may dominate the understory.

State 3 Channelized/Degraded State

The Channelized/Degraded state is characterized by a adjacent stream that has been channelized. Most seasonal floodwaters remain the in channel and do not inundate the flood plain. This reduces cottonwood recruitment and may reduce soil moisture on the site allowing species that are more tolerant to dry conditions to establish.

Community 3.1 Degraded Community Phase

The plant community at this phase may look like a drier ecological site with sagebrush or rabbitbrush. This phase may also be converted to a agricultural field or urban development.

Transition T1A State 1 to 2

Introduction of non-native plants.

Transition T1B State 1 to 3

Reduced soil moisture and altered hydrology of the site. Urbanization and agriculture uses may be present.

Transition T2B State 2 to 3

Reduced soil moisture and altered hydrology of the site. Urbanization and agriculture uses may be present.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Secondary Perennial Grasses/Grasslikes			336–673	
	creeping bentgrass	AGST2	<i>Agrostis stolonifera</i>	34–202	–
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	34–202	–
	tufted hairgrass	DECE	<i>Deschampsia cespitosa</i>	34–202	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	34–202	–
	meadow barley	HOBR2	<i>Hordeum brachyantherum</i>	34–202	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	34–202	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	34–202	–
	alpine timothy	PHAL2	<i>Phleum alpinum</i>	34–202	–
Forb					
2	Perennial Forbs			336–673	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	34–67	–
	Chamisso arnica	ARCHF	<i>Arnica chamissonis</i> ssp. <i>foliosa</i>	34–67	–
	fringed willowherb	EPCI	<i>Epilobium ciliatum</i>	34–67	–
	willowherb	EPILO	<i>Epilobium</i>	34–67	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	34–67	–
	Pacific lupine	LULE2	<i>Lupinus lepidus</i>	34–67	–
	slender cinquefoil	POGR9	<i>Potentilla gracilis</i>	34–67	–
	Oregon checkerbloom	SIOR	<i>Sidalcea oregana</i>	34–67	–
	cows clover	TRWO	<i>Trifolium wormskioldii</i>	34–67	–
Shrub/Vine					
3	Primary Shrubs			4035–5044	
	narrowleaf willow	SAEX	<i>Salix exigua</i>	2018–2522	–
	arroyo willow	SALA6	<i>Salix lasiolepis</i>	2018–2522	–
	whitestem gooseberry	RIIN2	<i>Ribes inerme</i>	336–673	–
4	Secondary Shrubs			135–336	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	34–135	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	34–135	–
	Woods' rose	ROWO	<i>Rosa woodsii</i>	34–135	–

Animal community

Livestock Interpretations:

In the West, willows are generally considered to be more palatable to sheep than to cattle, but cattle may make greater use of willow because they tend to frequent riparian areas. Wildlife Interpretations:

Willows provide food and cover for many wildlife species. Willows, in general, are a preferred food and building material of beaver. It is especially important for deer and nongame birds. Willow is moderately to highly palatable for mule deer and elk, and is an important browse during winter. Ducks, grouse, other birds, and small mammals eat willow shoots, catkins, buds, and leaves.

Other products

Native Americans used the leaves of willows to treat mosquito bites, bee stings and stomach aches and used to

stems for implements such as baskets, arrow shafts, scoops and fish traps.

Other information

Willow is useful in stabilizing streambanks and providing erosion control on severely disturbed sites. It is valuable in revegetating disturbed riparian sites having high water tables and low elevations.

Type locality

Location 1: Mono County, CA	
Latitude	38° 14' 54"
Longitude	118° 58' 8"
General legal description	Bodie Hills, 1 mile north-northwest of Coyote Spring in Bridgeport Canyon, Ca

Contributors

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Approval

Kendra Moseley, 4/10/2024

Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	05/19/2024
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

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

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

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

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

Dominant:

Sub-dominant:

Other:

Additional:

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

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

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

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