Ecological site F026XY059NV
Sandy Flood Plain 8-10 P.Z

Last updated: 4/10/2024
Accessed: 05/19/2024

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

MLRA 26 is in western Nevada and eastern California; approximately 69 percent is in Nevada, and 31 percent in California. The area is predominantly 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. The valleys are drained by three major rivers flowing east across MLRA 26; the Truckee, Carson and Walker rivers. A narrow strip along the western border of MLRA 26 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. The structure creates an impressive wall of mountains directly west of the area creating a rain shadow affect to MLRA 26. Parts of the eastern face; the foothills, mark the western boundary of the area. Elevations range from near 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.

In MLRA 26, the valleys are composed dominantly of Quaternary alluvial deposits. Quaternary playa or alluvial flat deposits typically occupy the lowest valley bottoms in the internally drained valleys. Tertiary andesitic flows, breccias, ash flow tuffs, rhyolite tuffs or granodioritic rocks dominate the hills and mountains. Quaternary basalt flows are present in lesser amounts. Jurassic and Triassic limestone and shale, and Precambrian limestone and dolomite are also present in very limited amounts. Glacial till deposits, of limited extent are along the east flank of the Sierra Nevada Mountains; the result of alpine glaciation.

The average annual precipitation in MLRA 26 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 MLRA 26 are Aridisols and Mollisols. The soils in the area typically have a mesic soil temperature regime, an aridic or xeric soil moisture regime, and mixed or smectitic mineralogy. The soils are generally well drained, clayey or loamy and are commonly skeletal. The soils depths are typically very shallow to moderately deep.

This area supports shrub-grass vegetation characterized by big sagebrush. Low sagebrush and Lahontan sagebrush are on some soils. Antelope bitterbrush, squirreltail, desert needlegrass, Thurber needlegrass, and Indian ricegrass are important associated plants. Green ephedra, Sandberg bluegrass, desert peach, and several forb species are also 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.

Wildlife species in the area are mule deer, coyote, beaver, muskrat, jackrabbit, cottontail, raptors, pheasant, chukar, blue grouse, mountain quail, and mourning dove, amongst other species. 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 Sierra Influenced Ranges LRU is characterized by wooded great basin mountains and climatic and biotic affinities to the Sierra Nevada Mountain range. The Sierra Influenced Ranges LRU receives greater precipitation than the mountain ranges of central Nevada.

Amount of precipitation varies in relation to the local strength of the Sierra Nevada rain shadow, characterized by pinyon and juniper trees. The White, Sweetwater, Pine Nut, Wassuk, and Virginia ranges of Nevada support varying amounts of Sierra Nevada flora, like ponderosa pine. Elevations range from 1610 to 2420 meters and slopes range from 5 to 49 percent, with a median value of 22 percent.
Frost free days (FFD) ranges from 92 to 163.

Classification relationships

POFR2 WSG:4W1510

Ecological site concept

The Sandy Flood Plain 8-10 P.Z is on axial-stream flood plains. Slope gradients are typically 0 to 2 percent. Elevations are 4400 to near 4700 feet. The site is flooded rarely by semi-arid adjacent streams. The water table is typically between 39 to 59 inches. The soils formed in alluvium derived from mixed igneous rocks. The soils are very deep and moderately drained. The dominant plants are Fremont cottonwood (Populus fremontii), willow (Salix spp.), Wood's rose (Rosa woodsii), and both basin and beardless wildrye (Leymus spp.).

Similar sites

R026XY073NV	**STREAMBANK** Streambank; SALIX-SHAR dominant

Table 1. Dominant plant species

Tree	(1) *Populus fremontii*
Shrub	(1) *Salix* (2) *Rosa woodsii*
Herbaceous	(1) *Leymus*

Physiographic features

The Sandy Flood Plain 8-10 P.Z is on axial-stream flood plains. Slope gradients are typically 0 to 2 percent. Elevations are 4400 feet to near 4700 feet. The site is flooded rarely by the adjacent streams. The water table is typically between 39 to 59 inches.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Runoff class	Very low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	1,341–1,433 m
Slope	0–2%

Water table depth	99–150 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semi-arid, characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 10 inches (13 to 30 cm). Mean annual temperature is 48 to 53 degrees F. The average growing season is 90 to 140 days.

Nevada’s climate is predominantly arid, and has large daily ranges of temperature, infrequent severe storms, heavy snowfall in the higher mountains, and significant variations with elevation. Three basic geographical factors largely influence Nevada’s climate (1) continentality, (2) latitude, and (3) elevation. Continentality is the most important factor. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada is on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt, not only in the west, but throughout the state. As a result, the lowlands of Nevada are largely deserts or steppes. The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons. The terrain responds quickly to changes in solar heating.

Nevada is within the mid-latitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in
weather during the late fall, winter, and spring months when most of the precipitation occurs. To the south of the mid-latitude westerlies, is a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with scattered thundershowers. The eastern portion of the state receives significant summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Table 3. Representative climatic features

Frost-free period (average)	115 days
Freeze-free period (average)	
Precipitation total (average)	229 mm

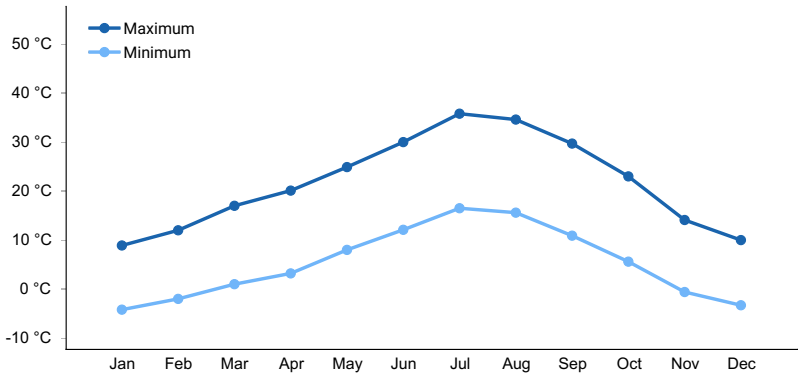


Figure 1. Monthly average minimum and maximum temperature

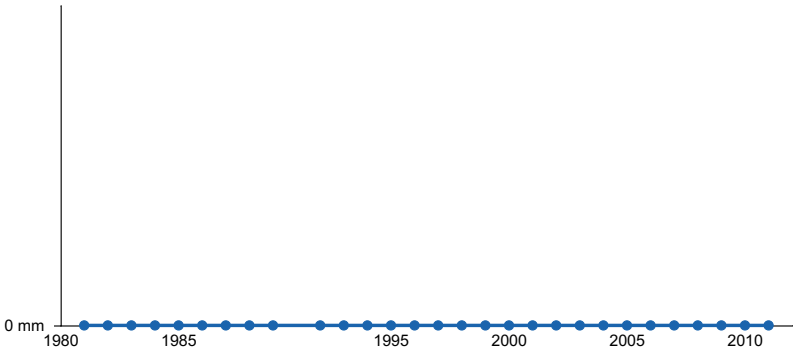


Figure 2. Annual precipitation pattern

Influencing water features

The Sandy Flood Plain 8-10 P.Z is adjacent to stream terraces and axial-stream flood plains that are frequently flooded in the late winter and early spring.

Soil features

The soils formed in alluvium derived from mixed igneous rocks. The soils are very deep and moderately well drained. They have a very thick, dark-colored, surface layer high in organic matter. The soils are rarely flooded in the late winter and early spring. During the spring, a seasonal water table might fluctuate to within 12 inches from the surface but stabilizes at depths between 2 to 3 feet during the growing season. The soil series associated with this site include: Carwalker.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous rock
Surface texture	(1) Fine sand (2) Sandy loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained
Permeability class	Moderately rapid to rapid
Soil depth	183 cm
Surface fragment cover <=3"	0–9%
Surface fragment cover >3"	0–2%
Available water capacity (0-101.6cm)	5.08–8.64 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Major Successional Stages of Forestland Development

HERBACEOUS: Vegetation is dominated by grasses and forbs under full sunlight. This stage is experienced after major disturbance like, (1) insect damage, (2) disease damage, or (3) tree harvest. Various amounts of tree seedlings develop into saplings (less than 20 inches in height) and might be present to the point they are a major component of the vegetal structure. Residual trees following disturbance have little or no effect on the composition and production of herbaceous vegetation.

SAPLING: In the absence of disturbance, the tree seedlings develop into saplings (20 inches to 4.5 feet in height) Canopy cover of saplings is 5 to 20 percent. Vegetation consists of grasses and forbs in association with tree saplings.

POLE STAGE: As the canopy closes, trees stratify into crown classes despite genetic uniformity within clones. Cottonwood stands are self-thinning, especially at young ages. This stage is characterized by rapid growth of the cottonwood trees, both in height and canopy. The visual aspect and vegetal structure are dominated by cottonwood trees ranging from about 10 to 20 feet in height, with a diameter at breast height (DBH) of near 3 to 8 inches. Understory vegetation is moderately influenced by a tree canopy of about 15 to over 25 percent.

IMMATURE WOODLAND: The visual aspect and vegetal structure are dominated by Fremont's cottonwood greater than four and a half feet in height.

Seedlings and saplings are present in the understory. Understory vegetation is moderately influenced by a tree overstory canopy of nearly 10 to 20 percent.

MATURE WOODLAND: The visual aspect and vegetal structure are dominated by cottonwoods which have reached or are near maximal heights for the site. Tree canopy cover ranges from 40 to 65 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings, saplings or both of cottonwood occur in the understory.

OVER-MATURE WOODLAND: In the absence of naturally occurring disturbances, the tree canopy on this site might become very dense. This stage is dominated by Fremont's cottonwood which have reached maximal heights for the site. Understory vegetation is sparse due to tree competition, overstory shading, duff accumulation, etc. Tree canopy cover is commonly greater than 70 percent.

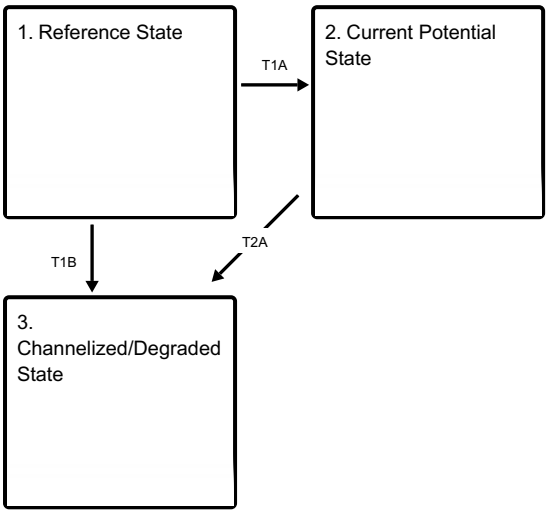
Fremont cottonwood is a fast-growing obligate seeder. Reproduction primarily is from establishment of wind-borne seeds. Asexual regeneration occurs following crown and branch damage, uprooting, or flood-related disturbance. Regeneration is tied to the annual runoff regime of the area. Mortality of both saplings and mature trees might be significant following major flood events. Recruitment, however, typicallytakes place on the newly created microsites.

Fire Ecology:
Fremont cottonwoods are not fire dependent. Historical fire regimes for riparian zones dominated by Fremont cottonwood thatborder drier ecosystems are poorly described. Wildland fires appear infrequent in riparian communities dominated by Fremont cottonwood. Mature Fremont cottonwood trees are top-killed by moderate fire. The cambium layer is damaged by low-severity surface fire. Fremont cottonwood sprouts after fire or other injury. Coppice sprouting is the predominant mechanism of vegetative reproduction in most areas. Root suckering, however, is the predominant method in some areas. Most fires kill only aboveground plant parts on willow. Severe fires might completely remove organic soil layers, leaving willow roots exposed and charred thus eliminating basal sprouting. Willow generally sprouts from its root crown or stem base following fire. Wood’s rose is typically top-killed by fire. Wood’s rose is moderately fire tolerant and is usually favored by low-severity fire. It might persist after low to moderate severity fire because of its ability to sprout from undamaged or buried root crowns and rhizomes. The shallow root crowns of Wood’s rose are susceptible to injury, and populations consequently decrease following high-severity fire. It occasionally germinates from on-site and off-site seed sources after fire. Creeping wildrye is top-killed by fire. Creeping wildrye is generally tolerant to fire but might be damaged by early season fire combined with dry soil conditions. Basin wildrye is top-killed by fire. Older basin wildrye plants with large proportions of dead material within the perennial crown might have higher mortality due to fire than younger plants having little debris. Basin wildrye is generally tolerant of fire but might be damaged by early season fire combined

with dry soil conditions. Streambank wheatgrass is quite tolerant of fire. Subsurface growing points and primarily rhizomatous reproduction might explain its ability to increase rapidly (within 2-5 years) following burning. Sedge is top-killed by fire. Rhizomes are protected by insulating soil. The rhizomes of sedge species might be killed by high-severity fires which remove most of the soil organic layer. Reestablishment after fire is by seed establishment, rhizomatous spread or both. Bluegrass is typically unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Its rapid maturation in the spring reduces fire damage because it is dormant when most fires occur.
Saltgrass rhizomes occur deep in the soil where they are insulated from the heat of most fires. Saltgrass survives fire by sending up new growth from rhizomes.

State and transition model

Ecosystem states

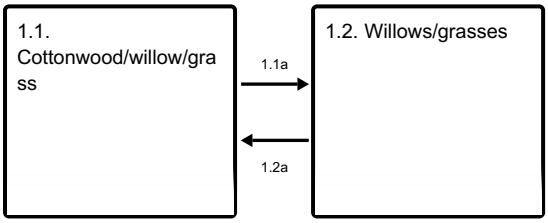


T1A - Transition T1A is an introduction of non-native species. Also exists in Transition T1A is artificial hydrology alteration, for example, irrigation.

T1B - Transition T1B is channelization of adjacent stream channel which causes reduced soil moisture and altered hydrology of the site. Urbanization and agriculture use might be present.

T2A - Transition T2A is channelization of adjacent stream channel which causes reduced soil moisture and altered hydrology of the site. Urbanization and agriculture use might be present.

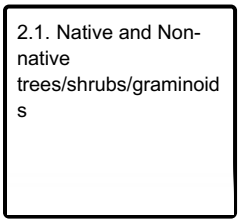
State 1 submodel, plant communities



1.1a - This community occurs after flooding, fire, or other disturbances that remove the tree canopy.

1.2a - This community occurs after sufficient time allows the cottonwood trees to establish on the site.

State 2 submodel, plant communities



State 3 submodel, plant communities

3.1. Degraded Community Phase

State 1
Reference State

The Reference State concept has two main community phases influenced by time since disturbance (flooding, fire, etc.) Cottonwood seeds will be left behind after a seasonal flood event. The cottonwood seedlings will germinate if the soil conditions are right (moist and bare). These seedlings, if left undisturbed, will mature to trees. Understory plants, like rhizmomatous willow and graminoids are less influenced by seasonal flooding and may remain intact after seasonal flooding. Extreme flooding or fire may remove the tree overstory and the understory, allowing the graminoids and willows to dominate the site until the conditions are appropriate for cottonwood establishment.

Community 1.1
Cottonwood/willow/grass

The reference plant community is dominated by an overstory tree canopy of 40 to 60 percent in the pristine environment. Overstory tree canopy composition is 100 percent Fremont's cottonwood. This community phase develops during the time between disturbances.

Forest overstory. MATURE FORESTLAND: The visual aspect and vegetal structure are dominated by cottonwood that have reached or are near maximal heights for the site. Tree canopy cover ranges from 40 to 65 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings and/or saplings of cottonwood occur in the understory.

Forest understory. Understory vegetative composition is about 65 percent grasses and grass-like plants, 10 percent forbs, and about 25 percent shrubs and young trees when the average overstory canopy is medium (40 to 60 percent). Average understory production ranges from 1500 to 3000 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4½ feet of the ground surface.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1093	1603	2186
Shrub/Vine	303	444	605
Forb	168	247	336
Tree	118	173	235
Total	**1682**	**2467**	**3362**

Community 1.2
Willows/grasses

This community phase occurs after a disturbance removes the tree canopy. This can occur after a fire or large flood.

Pathway 1.1a
Community 1.1 to 1.2

This community occurs after flooding, fire, or other disturbances that remove the tree canopy.

Pathway 1.2a

Community 1.2 to 1.1

This community occurs after sufficient time allows the cottonwood trees to establish on the site.

State 2
Current Potential State

The Current Potential State occurs after non-native plant species introduction. The species can range from trees, shrubs, to herbaceous. Russian olive, tamarisk, Kentucky bluegrass, and thistles are common non-native plants that can establish on this site.

Community 2.1
Native and Non-native trees/shrubs/graminoids

Non-native trees, like Russian olive are present and might dominate the tree canopy. Tamarisk might also occur and take the place of native willows. Kentucky bluegrass is effective at invading wet to semiwet sites and might 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 the degraded community phase might be like a drier ecological site with sagebrush or rabbitbrush. This phase might also be converted to an agricultural field or urban development.

Transition T1A
State 1 to 2

Transition T1A is an introduction of non-native species. Also exists in Transition T1A is artificial hydrology alteration, for example, irrigation.

Transition T1B
State 1 to 3

Transition T1B is channelization of adjacent stream channel which causes reduced soil moisture and altered hydrology of the site. Urbanization and agriculture use might be present.

Transition T2A
State 2 to 3

Transition T2A is channelization of adjacent stream channel which causes reduced soil moisture and altered hydrology of the site. Urbanization and agriculture use might 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	**Primary Perennial Grasses/Grasslikes**			986–2071	
	basin wildrye	LECI4	*Leymus cinereus*	247–592	–
	beardless wildrye	LETR5	*Leymus triticoides*	247–592	–
	bluegrass	POA	*Poa*	123–222	–
	sedge	CAREX	*Carex*	123–222	–
	saltgrass	DISP	*Distichlis spicata*	123–222	–
	thickspike wheatgrass	ELLA3	*Elymus lanceolatus*	123–222	–
2	**Secondary Perennial Grasses/Grasslikes**			25–123	
	rush	JUNCU	*Juncus*	25–123	–
Forb					
3	**Perennial**			49–247	
	yarrow	ACHIL	*Achillea*	25–123	–
	clover	TRIFO	*Trifolium*	25–123	–
Shrub/Vine					
4	**Primary Shrubs**			247–444	
	Woods' rose	ROWO	*Rosa woodsii*	123–222	–
	willow	SALIX	*Salix*	123–222	–
5	**Secondary Shrubs**			62–197	
	silver buffaloberry	SHAR	*Shepherdia argentea*	25–123	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	12–25	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	12–25	–
	currant	RIBES	*Ribes*	12–25	–
Tree					
6	**Deciduous**			123–222	
	Fremont cottonwood	POFR2	*Populus fremontii*	123–222	–

Table 7. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
Fremont cottonwood	POFR2	*Populus fremontii*	Native	–	95–100	–	–

Animal community

Livestock Interpretations:
This site is suited to cattle and sheep grazing during the summer and fall. Grazing management should be keyed to wheatgrass and bluegrass production. Livestock will often concentrate on this site and take advantage of both shade and shelter offered by the tree overstory. Harvesting trees under a sound management program for fuelwood or other products can open the tree canopy to allow increased production of understory species desirable for grazing.

Stocking rates vary with factors like kind and class of grazing animals, season of use and fluctuations in climate. Actual use records for individual sites, a determination of the degree to which the sites have been grazed, and an evaluation of trend in site condition are the most reliable basis for developing initial stocking rates.

Selection of initial stocking rates for given grazing units is a planning decision. This decision should be made only after careful consideration of:(1) total resources available, (2) evaluation of alternatives for use and treatment, and (3) establishment of objectives by the decisionmaker.

The forage value rating is not an ecological evaluation of the understory. The range condition rating for rangeland however is an ecological evaluation of the understory. The forage value rating is a utilitarian rating of the existing understory plants for use by specific kinds of grazing animals.

The amount and nature of the understory vegetation in a forestland is highly responsive to the amount and duration of shade provided by the overstory canopy. Significant changes in kinds and abundance of plants occur as the canopy changes, often regardless of grazing use.

Wildlife Interpretations:
Fremont cottonwood and Fremont cottonwood-willow stands provide valuable habitat for many species of birds and other wildlife in Nevada. Species such as golden eagle, Swainson's hawk, red-tailed hawk, and Bell's vireo build their nests in the crown, while various cavity-nesting birds nest in the dead trunks and limbs of Fremont cottonwood. In Nevada, Fremont cottonwood sites are breeding areas for great blue heron. Birds known to have a high affinity for Fremont cottonwood stands include hawks (gray, black, zone-tailed, red-tailed), bald eagle, and woodpeckers (downy and ladder-backed). Fremont cottonwood communities also provide cover, nesting, and foraging habitats for other birds, ringtail, squirrels, beavers, and other rodents. Fremont cottonwood communities provide a food source for beavers, elk, deer, and squirrels, and help maintain mesic habitats for upland amphibian and reptile species in the desert.

Hydrological functions

Runoff is very low and permeability is moderately rapid.

Recreational uses

Aesthetic value is derived from the rich hues and textures of the trees, particularly in the fall. The diverse floral and faunal composition and the colorful flowering of wildflowers during the summer enhance the beauty of this site. The site offers rewarding opportunities to photographers and for nature study. It has high value for hunting, camping, picnicking, and family wood gathering.

Wood products

Fremont's cottonwood has been used for lumber, fence posts, and fuelwood. This tree has a considerable potential for increased utilization. It makes excellent pulp. Some of this wood is used to produce excelsior, door corestock and boxwood. An undesirable characteristic of Fremont's cottonwood is the heavy drain on soil moisture.

PRODUCTIVE CAPACITY

This site is of medium quality for tree production. Site index ranges from near 65 to 75 (Baker & Broadfoot, 1977).
Productivity class: 4
CMAI*: 56 to 67 ft3/ac/yr;
3.6 to 4.7 m3/ha/yr
*CMAI: is the culmination of mean annual increment highest average growth rate of the stand in the units specified.

Fuelwood Production: 8 to 10 cords per acre. Firewood is commonly measured by cords, or a stacked unit equivalent to 128 cubic feet. Solid wood volume in a cord varies but usually ranges from 65 to 90 cubic feet. Assuming an average of 75 cubic feet of solid wood volume per cord, there are about 15 million British Thermal Units (BTUs) heat value in a cord of Fremont cottonwood wood.

Saw Timber: 200 to 300 board-feet per acre. MANAGEMENT GUIDES AND INTERPRETATIONS
1. LIMITATIONS AND CONSIDERATIONS
a. Potential for sheet erosion is low.
b. Moderate to severe equipment limitations on wet soils.
c. Proper spacing is the key to a well-managed, multiple use and multi-product cottonwood forestland.

2. ESSENTIAL REQUIREMENTS
a. Adequately protect from wildfire.
b. Protect soils from accelerated erosion.

c. Apply proper grazing management.

3. SILVICULTURAL PRACTICES
a. Harvest cut selectively or in small patches (size dependent upon site conditions) to enhance forage production.
1) Thinning and improvement cutting – Removal of poorly formed, diseased, and low vigor trees for fuelwood.
2) Harvest cutting: - Selectively harvest surplus trees to achieve desired spacing. Harvest stands in small blocks of 1/5 to 1/2 acre with slash left in place to shelter tree seedlings from browsing.
3) Spacing Guide: spacing of about 15 X 15 feet is considered desirable for multiple use management during periods of stand maturity.
b. Selective tree removal on suitable sites to enhance forage production and manage site reproduction.
c. Pest control - Use necessary and approved control for specific pests and diseases.
d. Fire hazard - Fire is rarely a problem in Fremont cottonwood stands. However, even a light fire might kill Fremont cottonwood seedlings, saplings and mature trees.

Other products

Native Americans eat the inner bark of Fremont cottonwood for antiscorbutic. The bark and leaves areused to make poultices to relieve swelling, treat cuts, cure headaches, and wash broken limbs, and to treat saddle sores and swollen legs of horses. Native Americans make extensive use of Wood's rose roots, stems, leaves, flowers, and hips for foods and therapeutic materials. The hips are a source of vitamin C and are dried for use in flavoring teas, jellies, fruitcakes, and puddings. Wood's rose is used as an ornamental near homes to attract birds and other wildlife. Native Americans use 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. Basin wildrye has been used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

Fremont cottonwood's rapid early growth makes it well suited for revegetating riparian sites. It has been recommended for revegetating areas where invasive saltcedar has been removed. Fremont cottonwood, along with willows and other native plants, has also been used to restore, enhance, or create bird habitat in riparian areas. Wood's rose extensive rhizomes, and good survivability and revegetation characteristics even on harsh sites makes this species an effective tool in erosion control. It has also been suggested as a useful species for revegetation on high pH and lime soils. Wood's rose is used to revegetate disturbed sites along streambanks and seeps. 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. Creeping wildrye is primarily used for reclamation of wet, saline soils. Basin wildrye is useful in mine reclamation, fire rehabilitation and stabilizing disturbed areas. Its usefulness in range seeding, however, might be limited by initially weak stand establishment. Streambank is a good revegetation species because it forms tight sod under dry rangeland conditions, has good seedling strength, and performs well in low fertility or eroded sites. It does not compete well with aggressive introduced grasses during the establishment period, but are very compatible with slower developing natives, bluebunch wheatgrass (Pseudoroegneria spicata), western wheatgrass (Pascopyrum smithii), and needlegrass (Achnatherum spp.) species. It's drought tolerance combined with rhizomes, fibrous root systems, and good seedling vigor make these species ideal for reclamation in areas receiving 8 to 20 inches annual precipitation. Streambank wheatgrass can be used for hay production and will make nutritious feed, but is more suited to pasture use.
Given its extensive system of rhizomes and roots which form a dense sod, saltgrass is considered a suitable species for controlling wind and water erosion.

Table 8. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
Fremont cottonwood	*POFR2*	65	75	56	67	–	–	–	

Inventory data references

NASIS data for soil survey areas CA686, NV629, and NV772.

Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T9 N R28 E S13
UTM zone	N
UTM northing	343034
UTM easting	4278252
Latitude	38° 38′ 20″
Longitude	118° 48′ 12″
General legal description	N½ NE¼ About 2 miles west of Walker Lake, along Cottonwood Creek drainage, Mineral County, Nevada. This site also occurs in Carson City, Douglas, Lyon and Washoe County, Nevada.

Other references

Fire Effects Information System (Online; http://www.fs.fed.us/database/feis/plants/).

Howell, J. 1940. Pinyon and juniper: a preliminary study of volume, growth, and yield. Regional Bulletin 71. Albuquerque, NM:

Jordan, M. 1974. An inventory of two selected woodland sites in the Pine Nut Hills of Western Nevada. Master's Thesis, UNReno.

USDA-NRCS. 2000 National Forestry Manual - Part 537. Washington, D.C.

USDA-NRCS. 2004 National Forestry Handbook, Title 190. Washington, D. C.

USDA-NRCS Plants Database (Online; http://www.plants.usda.gov).

Contributors

GED/DSH/RCB

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:**

17. **Perennial plant reproductive capability:**