USDA Natural Resources Conservation Service

Ecological site R009XY505OR
Moderately Sloping Confined Intermittent Riparian Complex

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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): 009X–Palouse and Nez Perce Prairies

This community component occurs on valley bottoms on broad plateaus influenced by loess material and has few rock fragments. This site is subject to very rare flooding. Historic vegetation on these stream terraces may have been dominated by basin wildrye (*Leymus cinereus*), Idaho fescue (*Festuca idahoensis*), and/or bluebunch wheatgrass (*Pseudoroegneria spicata*). Basin wildrye is sporadically present with low cover, and Idaho fescue was dominant in one plot where was planted. The Loamy Bottoms ecological site (R010XY005OR) describes an upland ecological site with a similar ecological niche as this upper floodplain. Basin wildrye commonly grows in bottomland and depression soils with additional moisture, but does not persist under saturated conditions (CTUIR 2003).

When disturbed by grazing or cultivation, quackgrass, poison hemlock, and Fuller's teasel can become dominant. The dominance of these and other non-native species can reduce forage, wildlife habitat, and plant diversity.

Native grasses documented include Idaho fescue, basin wildrye, blue wildrye (Elymus glaucus), and wildrye (Leymus sp.). Non-native grasses include tall oatgrass, soft brome, poverty brome, cheatgrass (*Bromus tectorum*), orchardgrass, bulbous bluegrass (*Poa bulbosa*), and North Africa grass (Ventenata dubia). Native forbs include common yarrow, blue eyed Mary (Collinsia parviflora), willowherb (Epilobium sp.), bedstraw, lupine (Lupinus sp.), tarweed (Madia sp.), and vetch (Vicia sp.). Non-native forbs include lesser burdock, field bindweed (Convolvulus arvensis), gypsyflower, Queen Anne’s lace, common viper’s bugloss, common St. Johnswort, prickly lettuce (Lactuca serriola), and Scotch cottonthistle.

Shrub cover is sparse, but may have been cleared in some areas. Native shrubs include smooth sumac (*Rhus glabra*) and blue elderberry. Non-native shrubs include sweetbriar rose (Rosa rubiginosa) and common lilac (Syringa vulgaris).

Ecological site concept

This riparian complex occurs on Strahler 2nd order streams in moderately sloping (5 to 15 percent), narrow alluvial and colluvial valleys within dissected lava plateaus. These are intermittent, Rosgen A3 stream types, with stream gradients between 5 and 10 percent. These streams are naturally entrenched, with low width/depth ratios and low sinuosity. Drainage area is less than 2,000 acres. Black hawthorn (Crataegus douglasii), oceanspray (Holodiscus discolor), Lewis' mock orange (Philadelphus lewisii), and blue elderberry (Sambucus nigra subsp. cerulea) are dominant. Soils have developed in recent alluvium from basalt.

Associated sites

R009XY060OR	**Shrubby North 15+ PZ** This site occurs on upper mountain slopes at higher elevations. Soils formed in loess and colluvial parent material. Soil temperature regime is frigid. Slopes typically range from 40 to 70 percent. Mallow ninebark is dominant.
R009XY046OR	**Shrubby Moist North 15+ PZ** This site occurs on mountain and plateau side slopes. Soils formed in loess and colluvial parent material. Soil temperature regime is frigid. Slopes typically range from 40 to 70 percent. Hawthorn dominates.

Similar sites

R009XY504OR	**Moderately Sloping Plateau Riparian Complex** This riparian ecological site typically occurs downstream from this ecological site (R009XY505OR). It occurs on the Colombia Plateau, has lower slopes, more perennial flow, and black cottonwood is dominant.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Crataegus douglasii* (2) *Holodiscus discolor*
Herbaceous	(1) *Claytonia* (2) *Bromus*

Physiographic features

This ecological site occurs in drainageways and on stream terraces. Valley slopes range

from 5 to 15 percent, and elevations range from 1,800 to 3,100 feet.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Stream terrace
Flooding frequency	Rare
Ponding frequency	None
Elevation	1,800–3,100 ft
Slope	5–15%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

This ecological has a xeric moisture regime, with moist winters and dry summers. Precipitation occurs as rain in the fall and spring, and snow in winter. There is very little rain in the summer months. Mean annual precipitation (MAP) ranges from 23 to 30 inches (580 to 760 millimeters). Mean annual air temperature (MAAT) ranges from 45 to 50 degrees F (7 to 10 degrees C). The frost-free period ranges from 110 to 150 days, and the freeze-free period ranges from 148 to 173 days.

Data for the Frost Free table and the Monthly precipitation and temperature distribution table are from the Meacham Climate Station. Mean annual and temperature precipitation ranges in the narrative are from PRISM data. The Meacham climate station MAP is 32.4 inches and MAAT is 43.5 degrees F, which is 2 inches higher that the max precipitation and 2 degrees F cooler than the minimum temperature range for this ecological site (based on PRISM data).

Table 3. Representative climatic features

Frost-free period (average)	122 days
Freeze-free period (average)	154 days
Precipitation total (average)	32 in

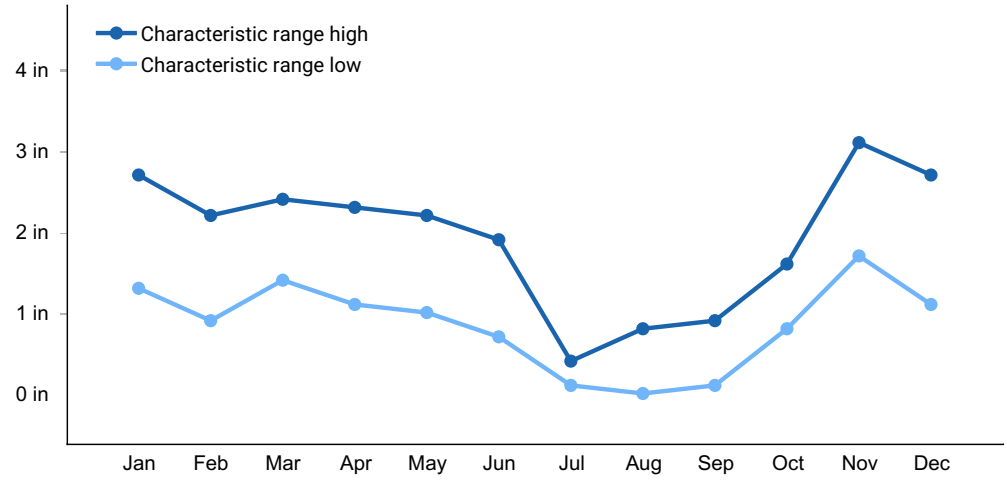


Figure 1. Monthly precipitation range

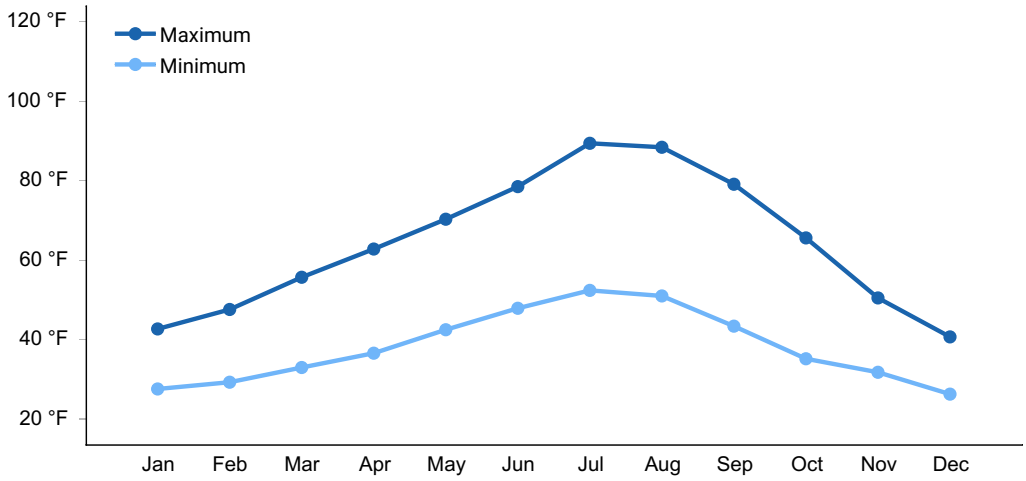


Figure 2. Monthly average minimum and maximum temperature

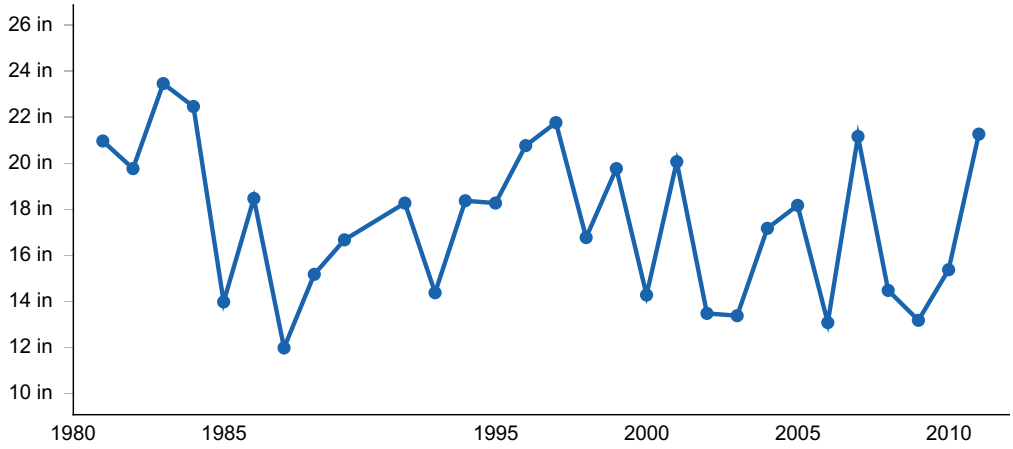


Figure 3. Annual precipitation pattern

Climate stations used

- (1) PENDLETON BR EXP STN [USC00356540], Pendleton, OR

Influencing water features

This site occurs in drainageways and on terraces, with rare flooding.

The blue line in the cross section diagram represents bank full flow, the red line represents the level of flow at 1.5 times the bank full depth, and the dotted red line represents low bank height.

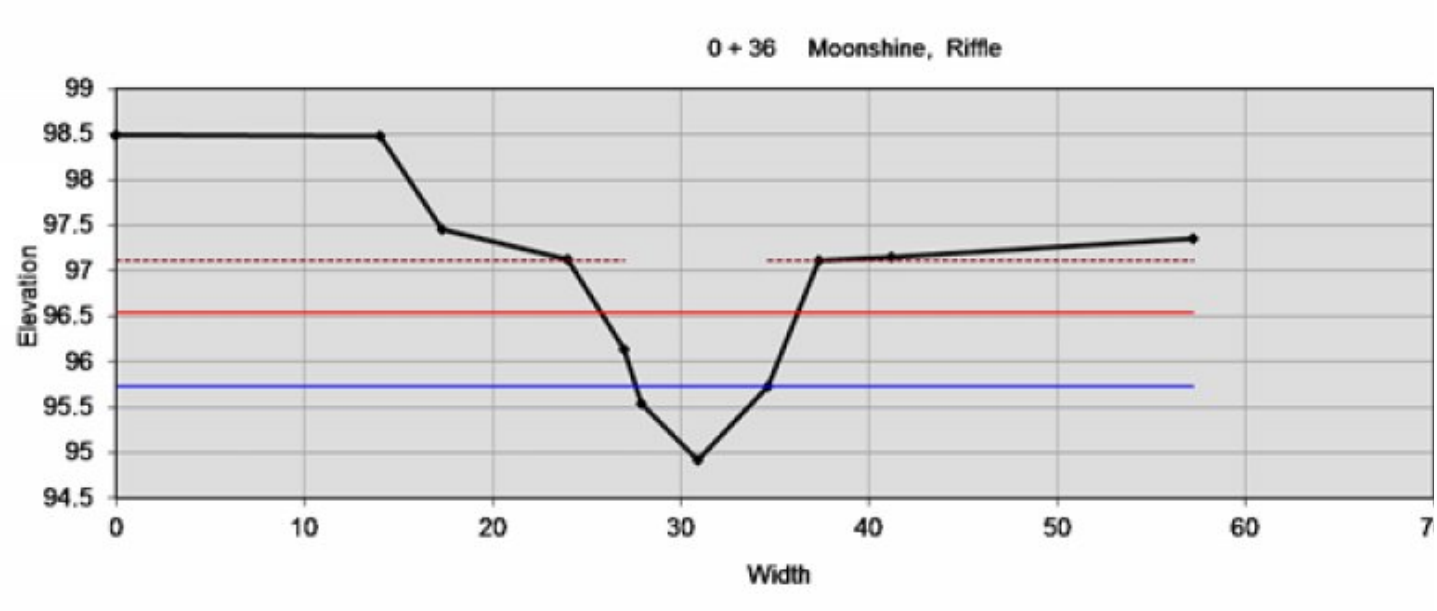


Figure 5. MS_XS2

Soil features

This site includes the drainageway and associated stream terrace, and typically lacks a developed floodplain. The terrace soil is very deep, and formed in alluvium predominantly derived from basalt parent material. The soil moisture regime is xeric and the soil temperature regime is mesic.

CC1, Stream terrace, rarely flooded
The Bridgewater soils are associated with this component. These soils are classified as Loamy-skeletal, mixed, superactive, mesic Cumulic Haploxerolls. Surface rock cover < 3 inches (gravels) would typically be 10 percent, and rock fragments > 3 inches (cobbles) typically would have 10 percent. Subsurface rock fragments < 3 inches range from 10 to 30 percent, and > 3 inch fragments range from 20 to 40 percent.

Table 4. Representative soil features

Parent material	(1) Alluvium–basalt
Surface texture	(1) Extremely cobbly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Soil depth	60 in

Surface fragment cover <=3"	5–15%
Surface fragment cover >3"	5–15%
Subsurface fragment volume <=3" (Depth not specified)	10–30%
Subsurface fragment volume >3" (Depth not specified)	20–40%

Ecological dynamics

Scale and stream classification system:
Lotic ecological sites describe portions of valley section with similar reaches, defined by slope, valley width, Strahler stream order, and similar associated fluvial landforms and associated vegetation. The scale of lotic ecological sites is tied to the scale of the NRCS soil survey. The Umatilla County Soil Survey for this area was mapped at Order 3, with map unit size ranging from 1.6 to 16 hectares (Soil Survey Division Staff 1993). The closest equivalent scale for stream classification is the valley segment, which ranges from 0.1 to 10,000 hectares (Montgomery and Buffington 1993). Soil surveys may have different map units for a valley section based on slope classes and changes in composition of soil components, which often correspond to changes in stream classification. Lotic ecological sites incorporate Rosgen stream classification (Rosgen 1994) to identify the channel morphology and stream succession scenarios. Stream succession scenarios are used to develop state-and-transition models based on morphological changes of stream channels over time.

Site concept:
This riparian complex occurs on Strahler 2nd order streams in moderately sloping (5 to 15 percent), narrow alluvial and colluvial valleys within dissected lava plateaus. These are intermittent, Rosgen A3 stream types, with stream gradients between 5 and 10 percent. These streams are naturally entrenched, with low width/depth ratios and low sinuosity. Drainage area is less than 2,000 acres. Black hawthorn, oceanspray, Lewis' mock orange, and blue elderberry are dominant. Soils have developed in recent alluvium from basalt.

Disturbance Factors:
This ecological site is developed based on the mid channel reaches of Moonshine Creek, Coonskin Creek, Mission Creek, and Cottonwood Creek. These streams are tributaries of the Umatilla River in northeast Oregon and are within the boundaries of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). The treaty between the US government and the CTUIR was signed in 1855, which defined the reservation and began the settlement of tribal people in this area. The valleys were farmed, and horses grazed the hillslopes. Additional incentives for land allotments drew more Indian and non-Indian settlers. Land use intensified, and cattle and sheep grazing increased (CTUIR 2014). Highest stocking rates occurred during the 1880s to the 1920s. The tribes possessed 20,000 horses and 3,000 cattle by 1890, and non-Indian settlers and travelers brought several thousand additional cattle (BIA and CTUIR 2007). Intensive grazing caused a

decline in vegetative cover on steep hillslopes from foraging and hoof trampling (BIA and CTUIR 2007). Grazing along the stream channels can impact and alter riparian vegetation by selective herbivory and physical trampling of the stream banks, resulting in a decline in bank stability due to the loss of root structure and an increase in bare soil. Channel incision and streambank erosion are common for this ecological site.

Fire was historically an important natural disturbance in these riparian areas and adjacent ponderosa pine forests. Ponderosa pine forests typically have fire regimes dominated by frequent, low-intensity understory burns. Pine forests and shrublands are typically on north-facing aspects and grasslands are typically on south-facing aspects above the valley floor. Fires initiated on the hillslopes may burn down into the riparian areas due to wind or fuel conditions. A study in the Blue Mountains, south of this ecological site, indicated that historic fire regimes in riparian areas are closely associated with the fire regime of the surrounding upslope vegetation. The mean fire return interval (MFRI) for the riparian plots near Dugout, Oregon was between 13-14 years, one year longer than the upslope forest. The riparian plots near Baker, Oregon had a MRFI of 13-36 years, while paired upland plots have 10 to 20 year MFRIs (Olson 2000). The shrubs associated with this ecological site are adapted to fire. They have the ability to resprout from the root crown or from rhizomes after being top-killed by fire. Shrubs which resprout after fire include black hawthorn, western chokecherry (*Prunus virginiana*), Woods' rose (*Rosa woodsii*), common snowberry (*Symphoricarpos albus*), oceanspray, mallow ninebark (Physocarpos malvaceus), and Lewis' mock orange. Repeated fire may reduce shrub cover. Black cottonwood is injured by fire, but can also resprout from the root crown, and may regenerate well from seed in the freshly exposed soil if there is sufficient moisture (Steinberg 2001). The presence of cheatgrass (*Bromus tectorum*) in the area poses a threat for this site to transition to an altered, non-native, grassland state. Cheatgrass increases flammability and fire frequency. Frequent burns can eliminate shrub cover. Native bunchgrasses, such as Idaho fescue (*Festuca idahoensis*) bluebunch wheatgrass (*Pseudoroegneria spicata*), and basin wildrye (*Leymus cinereus*) may have been reduced on this site due to overgrazing, erosion, and exclusion of low intensity fires. Upland cycles are not included in the state and transition model for this riparian complex, due to the complexity of the model that would be needed to consistently incorporate these concepts.

Invasive weeds are a concern for this ecological site. Non-native species typically dominate in the understory and in canopy openings. Non-native species include: quackgrass (*Elymus repens*), orchardgrass (*Dactylis glomerata*), tall oatgrass (*Arrhenatherum elatius*), ripgut brome (*Bromus diandrus*), bulbous bluegrass (*Poa bulbosa*), medusahead (Taeniantherum caput-medusae), Fuller's teasel (*Dipsacus fullonum*), common viper's bugloss (*Echium vulgare*), gypsyflower (*Cynoglossum officinale*), Queen Anne's lace (*Daucus carota*), Scotch cottonthistle (*Onopordum acanthium*), and common dandelion (*Taraxacum officinale*).

Hydrologic factors:
This ecological site incorporates the longitudinal, lateral, and to some extent the vertical connectivity of the stream. Longitudinally, the stream includes variation of five to ten

percent channel gradients and associated channel morphologies that represent A type channels. The valley bottom is 15 to 50 feet wide, with an active channel width of 4 to 10 feet wide.

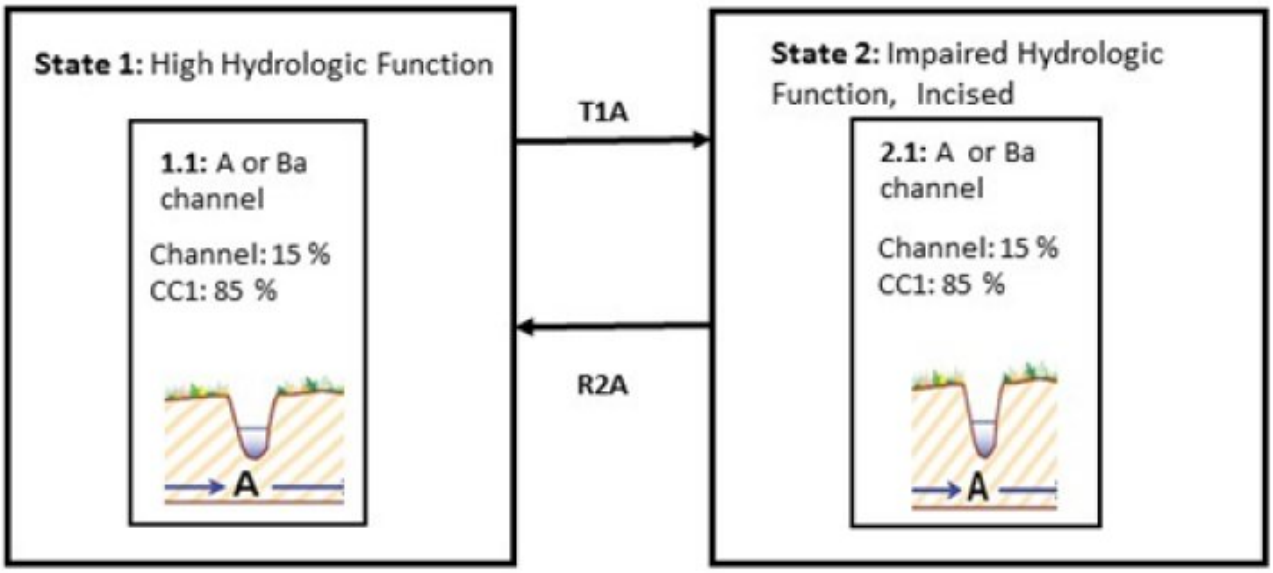
Unaltered reference conditions are not present in this project area, but based on valley slopes and historical literature, A type channel morphology was likely present prior to modern influences. A type channels have five to ten percent channel gradients and are naturally entrenched, with entrenchment ratios less than 1.4 and low sinuosity (< 1.2). A type channels are often in erosional or depositional valleys, with high energy and debris transport (Rosgen 1994). Present sinuosity measurements range from 1.02 to 1.1, and entrenchment ratio is 1.4. to 1.6, which does not classify clearly into a Rosgen stream type. It borders between an A3 or B3a type channel. Ba type channels have the channel morphology of a B type channel, but have greater than four percent channel gradients characteristic of A type channels. A3 type channels are very sensitive to disturbance, and have very poor potential for recovery. The influence of vegetation on channel stability is negligible (USDA NRCS 2007).

Climate change
Climate records for the Northwest United States show that average annual temperature has increased 1.5 degree F in the last 100 years, and it is predicted to increase by 3 to 10 degrees F in the next century (EPA 2013). Precipitation predictions are less clear, but warmer temperatures are expected to cause more winter precipitation to come as rain instead of snow, and cause the reduced snowpack to melt 20 to 40 days earlier in spring (EPA 2013). Snowpack is currently the primary water source for late spring and summer flows in these streams. A greater proportion of rain and earlier snowmelt could increase flood severity and frequency in winter and spring, and reduce flow in summer and fall. The Meacham Creek USGS station has already shown a significant increase in flow during March (Chang and Jones 2010), likely due to earlier snowmelt from warmer temperatures.

State and transition model

Moderately Sloping, Confined, Intermittent Riparian Complex

(Crataegus douglasii) – (Philadelphus lewisii)/ (Claytonia sp.)- (Bromus sp.)
Black hawthorn - Lewis' mock orange / springbeauty - brome



Note: (All possible states and phases are not shown. Refer to narratives for descriptions):
T1A. Increased erosion and channel incision.

I.D.	Plant Association	Fluvial Surface/Landform
1	Black hawthorn, Lewis' mock orange, oceanspray.	Terraces, rarely flooded

Figure 6. R009XY505OR STM

State 1

Reference

The historic or unaltered condition for this ecological site is based on current conditions and expected stream development in the associated valley type and valley slope (5 to 10 percent). It is presumed that historically these channels were less incised, with stable stream banks, and denser, more diverse riparian vegetation. Most of this ecological site has been disturbed by grazing, dirt roads, non-native species, and other disturbances, so it is difficult to find data to describe the unaltered state and phase.

Community 1.1
A or Ba

A and Ba type channels are defined by steep channel gradients, low sinuosity, high entrenchment, and low width to depth ratios. A type channels have limited floodplains, and are confined by narrow sloping valleys. Due to intermittent stream flow, this site does not support a wetland community. Where springs emerge, obligate or facultative wetland species such as willows and black cottonwood are present, but upland species are typical at the channel edge. The terrace community (CC1) occurs on the lower valley bottom along the stream channel. Plant Community Components I.D., Plant Association Fluvial Surface-Landform, Composition (%) C, Channel, Channel, Active channel 15 % CC1, Black hawthorn-Lewis' mock-orange, Terrace, 85 %

State 2
Impaired Hydrologic Function

This state develops as the channel incises and eventually reaches equilibrium, such as after channel straightening or following a major erosion event. As the channel establishes a new grade equilibrium, the banks may stabilize, but the new channel can be incised three to fifteen feet below the adjacent terrace. Because of the steep incision and limited extent of a floodplain or low terrace, riparian vegetation has changed composition. The majority of this ecological site currently exists in this state. There is one phase identified for this state, with one community component associated with the stream terrace.

Community 2.1
A or Ba, Incised

Figure 7. R009XY505OR area

Figure 8. Channel

Figure 9. CC1

Figure 10. CC1 soil

This state develops as the channel incises and eventually reaches equilibrium, such as after channel straightening or following a major erosion event. As the channel establishes a new grade equilibrium, the banks may stabilize, but the new channel can be incised three to fifteen feet below the adjacent terrace. Because of the steep incision and limited extent of a floodplain or low terrace, riparian vegetation has changed composition. The majority of this ecological site currently exists in this state. There is one phase identified for this state, with one community component associated with the stream terrace. Plant Community Components I.D., Plant Association Fluvial Surface-Landform, Composition (%) C, Channel, Channel, Active channel 15 % CC1, Black hawthorn-Lewis' mock-orange, Terrace, 85 % Description of Community COmponents Community component 1 occurs on rarely-flooded terraces. It is typically dominated by black hawthorn, Lewis' mock orange, and oceanspray. Other shrubs include blue elderberry, smooth sumac (*Rhus glabra*), Rocky Mountain maple (*Acer glabrum*), mallow ninebark (*Physocarpus malvaceus*), chokecherry (*Prunus virginiana*), Woods' rose (*Rosa woodsii*), arroyo willow (*Salix lasiolepis*), and common snowberry (*Symphoricarpos albus*). These shrublands may resemble upland communities, but their proximity to the stream channel and effect of rare

flood events create a more diverse plant community. In areas with additional moisture, such as springs or in sections where flow is persistent for longer durations, willows, black cottonwood (*Populus balsamifera* ssp. trichocarpa), bulrush (Scirpus sp.), and other facultative or obligate wetland species may be present. Black hawthorn is common and can form dense, nearly impenetrable thickets with a sparse herbaceous layer. Common snowberry and Woods' rose may be present in these thickets. Black hawthorn was more abundant on plots with a deeply-incised channel. The seeds of black hawthorn require scarification prior to germination. Information is lacking for regeneration requirements of black hawthorn, but fruits are most likely partially digested by birds, bear, deer, and other small mammals and dispersed in their feces. When cleared for grazing, non-native grasses and forbs dominate. These species may include tall oatgrass, brome, ripgut brome, orchardgrass, quackgrass, bulbous bluegrass, medusahead, Fuller's teasel, gypsyflower, common viper's bugloss, Scotch cottonthistle, and common dandelion. Native forbs are diverse but have low cover. Species include slender phlox (*Microsteris gracilis*), Oregon checkerbloom (Sidlelca oregana), water speedwell (*Veronica anagallis-aquatica*), common yarrow (*Achillea millefolium*), Lyall's angelica (*Angelica arguta*), small camas (*Camassia quamash*), small enchanter's nightshade (Cirea alpina), springbeauty (Claytonia sp.), western white clematis (*Clematis ligusticifolia*), cryptantha (Cryptantha sp.), mountain tansymustard (*Descurainia incana*), bedstraw (Galium sp.), monkeyflower (Mimulus sp.), sweetcicely (*Osmorhiza berteroi*), common selfheal (*Prunella vulgaris*), stinging nettle (*Urtica dioica*), vetch (Vicia sp.), and linanthus (Linanthus sp.)

Transition T1A
State 1 to 2

The most common trigger for this transition is a change in sediment supply or stream flow. Increased erosion may occur as a result of overgrazing along the channels or in the surrounding hills.

Restoration pathway R2A
State 2 to 1

Restoration from State 2 to State 1 would involve intensive stream surveying in order to determine the best restoration approach. Restoration may be difficult due to the deep incision that is present in throughout these channels. Riparian vegetation may benefit from grazing exclusion or intensified grazing management.

Additional community tables

Table 5. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
1	**Trees**			0–45	

	black cottonwood	POBAT	*Populus balsamifera ssp. trichocarpa*	0–45	1–40
Shrub/Vine					
1	**Shrubs**			550–1030	
	arroyo willow	SALA6	*Salix lasiolepis*	0–523	0–25
	Lewis' mock orange	PHLE4	*Philadelphus lewisii*	85–350	3–15
	black hawthorn	CRDO2	*Crataegus douglasii*	30–150	5–50
	oceanspray	HODI	*Holodiscus discolor*	50–135	6–12
	Rocky Mountain maple	ACGL	*Acer glabrum*	10–45	2–4
	common snowberry	SYAL	*Symphoricarpos albus*	0–35	0–15
	mallow ninebark	PHMA5	*Physocarpus malvaceus*	0–35	0–3
	Woods' rose	ROWO	*Rosa woodsii*	0–25	0–2
	blue elderberry	SANIC5	*Sambucus nigra ssp. cerulea*	0–20	0–2
	smooth sumac	RHGL	*Rhus glabra*	0–15	0–3
	chokecherry	PRVI	*Prunus virginiana*	0–5	0–1
	barberry	MAHON	*Mahonia*	0–1	0–1
Grass/Grasslike					
1	**Grass and grasslike**			75–225	
	brome	BROMU	*Bromus*	0–146	0–21
	tall oatgrass	AREL3	*Arrhenatherum elatius*	0–65	0–6
	medusahead	TACA8	*Taeniatherum caput-medusae*	0–60	0–2
	quackgrass	ELRE4	*Elymus repens*	0–25	0–6
	ripgut brome	BRDI3	*Bromus diandrus*	0–16	0–3
	orchardgrass	DAGL	*Dactylis glomerata*	0–6	0–2
	blue wildrye	ELGL	*Elymus glaucus*	0–5	0–2
	bulbous bluegrass	POBU	*Poa bulbosa*	0–1	0–2
	bentgrass	AGROS2	*Agrostis*	0–1	0–1
	rush	JUNCU	*Juncus*	0–1	0–1
	ryegrass	LOLIU	*Lolium*	0–1	0–1
Forb					
1	**Forbs**			150–290	
	Queen Anne's lace	DACA6	*Daucus carota*	0–84	0–12
	springbeauty	CLAYT	*Claytonia*	0–26	0–6

	water speedwell	VEAN2	*Veronica anagallis-aquatica*	0–8	0–3
	gypsyflower	CYOF	*Cynoglossum officinale*	0–6	0–2
	Fuller's teasel	DIFU2	*Dipsacus fullonum*	0–5	0–1
	mountain tansymustard	DEIN5	*Descurainia incana*	0–4	0–1
	sweetcicely	OSBE	*Osmorhiza berteroi*	0–3	0–3
	cryptantha	CRYPT	*Cryptantha*	0–2	0–1
	western white clematis	CLLI2	*Clematis ligusticifolia*	0–1	0–1
	common yarrow	ACMI2	*Achillea millefolium*	0–1	0–1
	Lyall's angelica	ANAR3	*Angelica arguta*	0–1	0–1
	small camas	CAQU2	*Camassia quamash*	0–1	0–1
	small enchanter's nightshade	CIAL	*Circaea alpina*	0–1	0–1
	spring draba	DRVE2	*Draba verna*	0–1	0–1
	common viper's bugloss	ECVU	*Echium vulgare*	0–1	0–1
	bedstraw	GALIU	*Galium*	0–1	0–1
	linanthus	LINAN2	*Linanthus*	0–1	0–1
	slender phlox	MIGR	*Microsteris gracilis*	0–1	0–1
	monkeyflower	MIMUL	*Mimulus*	0–1	0–1
	Scotch cottonthistle	ONAC	*Onopordum acanthium*	0–1	0–1
	common selfheal	PRVU	*Prunella vulgaris*	0–1	0–1
	dock	RUMEX	*Rumex*	0–1	0–1
	Oregon checkerbloom	SIOR	*Sidalcea oregana*	0–1	0–1
	common dandelion	TAOF	*Taraxacum officinale*	0–1	0–1
	stinging nettle	URDI	*Urtica dioica*	0–1	0–1
	vetch	VICIA	*Vicia*	0–1	0–1
Moss					
1	**Moss**			0–1	

Animal community

This ecological site provides valuable, structurally-diverse habitat for a variety of aquatic and upland animals. Bear, deer, birds, and small mammals find shelter within the riparian

forests along these streams. The surrounding hills are vegetated with grasslands or shrubs, which may offer limited cover and forage. The leaves and young stems of cottonwood and willows provide browse for deer, elk, and livestock.

Black hawthorn thickets provide shelter, thermal cover, and hiding places for small and large animals. The berries are eaten by birds, bear, deer, and small mammals. Livestock will graze the foliage, but it is considered poor browse (Habeck 1991). Common snowberry is an important browse for wildlife, domestic sheep and cattle. It also provides cover and food for a variety of bird species and small mammals (McWilliams 2000). Woods' rose provides forage, and the fruit is consumed by a variety of large and small mammals and birds.

Other products

Grass seeds provided a significant amount of food in some areas. The seeds can be harvested and utilized like wild rice. Some species that have been documented for this purpose include wildry (Leymus sp.), needlegrass (Achnatherum sp.), fescue (Festuca sp.), barley (Hordeum sp.), blue wildrye (Elymus glaucus), bromes (Bromus sp.), and wild oats (Avena sp.) (Anderson 2006).

Young green leaves were an important source of vitamins and minerals. Some plants documented as used for this purpose include, sweet cicely (Osmorhiza sp.), angelica (Angelica sp.), common cow parsnip (Heracleum maximum), wild onions (Allium sp.), clovers (Trifolium sp.), stinging nettle (Urtica Dioica), violets (Viola sp.), vetch (Vicia sp.), horsetail (Equisetum sp.), spring beauty (Claytonia sp.), and thistles (Cirsium sp.).

Many shrubs and forbs provide edible fruits, such as wild strawberry (Fragaria sp.), wild raspberry and blackberry (Rubus sp.), serviceberry (Almelanchier sp.), wild rose (Rosa sp.), western chokecherry (*Prunus virginiana*), blue elderberry (Sambucus nigra), gooseberries and currents (Ribes sp.) (Anderson 2006). Black hawthorn berries are also edible, and the flowering tops and berries are used to make a tincture used as a heart tonic (Moore 1993). Most of these fruits can be eaten raw, or they are used to make pies, jellies, and jams.

Historically, shrubs used for basketry were carefully managed to promote long unbranched stems. Common shrubs used for basketry include willows (Salix sp.), dogwoods (Cornus sp.), and maples (Acer sp.) (Anderson 2006).

Young shoots of cottonwood (Populus sp.) and maple were used to make cordage. Snowberry (Symphoricarpos sp.), gooseberries, willow, alder (Alnus sp.), and mock orange (Philadelphus lewisii), were pruned to collect material to make arrows (Anderson 2006).

There are many medicinal or ritual uses for plants that occur on this site. For example, cottonwood leave buds can be used to make tinctures or salves, and are also used as a

topical anti-inflammatory and antimicrobial medicine (Moore 1993). Willow bark, shoots, and twigs can be used as a fever reducer, pain-killer, and anti-inflammatory. The chemical compound salacin was isolated from willow and eventually used to develop Aspirin (Chatfield 1997).

Inventory data references

Vegetation data includes ocular cover, production estimates, and double weight sampling methods. Herbaceous production was collected in 4.8 sq. ft. circular hoops. Shrubland production was estimated by counting weight units in four (21' X 21') plots. Soil were described at the center of selected vegetation plots, and channel cross-section measurements were taken when possible to intersect soil and vegetation plots.

Cross section only and vegetation notes:
MS_XS2b
MS_XS2c
MS_XS2d
MS_XS3
MS_XS4

Community component 1 (CC1 and CC2 combined)
CW_XS1_CC1
CW_XS1_CC2
MN_X4_CC2_017
MS_XS2_CC2_510 (Type location)

Type locality

Location 1: Umatilla County, OR	
UTM zone	N
UTM northing	5054484
UTM easting	378971
General legal description	The type location is on Moonshine Creek on the CTUIR, approx. 0.9 miles upstream from the cattle gate on Burke Creek Road.

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Contributors

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Approval

Kirt Walstad, 4/21/2025

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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	05/20/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

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

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

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

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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:

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

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

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

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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:**
