USDA Natural Resources Conservation Service

Ecological site R024XY127NV
Lakeshore Marsh

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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): 024X–Humboldt Basin and Range Area

Major Land Resource Area (MLRA): 024X–Humboldt Area

Major land resource area (MLRA) 24, the Humboldt Area, covers an area of approximately 8,115,200 acres (12,680 sq. mi.). It is found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. Elevations range from 3,950 to 5,900 feet (1,205 to 1,800 meters) in most of the area, some mountain peaks are more than 8,850 feet (2,700 meters).

A series of widely spaced north-south trending mountain ranges are separated by broad valleys filled with alluvium washed in from adjacent mountain ranges. Most valleys are drained by tributaries to the Humboldt River. However, playas occur in lower elevation valleys with closed drainage systems. Isolated ranges are dissected, uplifted fault-block mountains. Geology is comprised of Mesozoic and Paleozoic volcanic rock and marine and continental sediments. Occasional young andesite and basalt flows (6 to 17 million years old) occur at the margins of the mountains. Dominant soil orders include Aridisols, Entisols, Inceptisols and Mollisols. Soils of the area are generally characterized by a mesic soil temperature regime, an aridic soil moisture regime and mixed geology. They are generally well drained, loamy and very deep.

Approximately 75 percent of MLRA 24 is federally owned, the remainder is primarily used for farming, ranching and mining. Irrigated land makes up about 3 percent of the area; the majority of irrigation water is from surface water sources, such as the Humboldt River and Rye Patch Reservoir. Annual precipitation ranges from 6 to 12 inches (15 to 30 cm) for most of the area, but can be as much as 40 inches (101 cm) in the mountain ranges. The majority of annual precipitation occurs as snow in the winter. Rainfall occurs as high-intensity, convective thunderstorms in the spring and fall.

Ecological site concept

The Lakeshore Marsh ecological site occurs on lake fringes where the water is ponded for much of the growing season. The dominant plants are wetland obligate species, such as broadleaf cattail (TYLA) and hardstem bulrush (SCAC3). This Lakeshore Marsh site is copied from a similar site in MLRA 28A R028AY025UT, Lakeshore Marsh.

Associated sites

R024XY043NV	**WET MEADOW 6-8 P.Z.** Site is found near seeps and springs on basin floors, as well as flood plains and lava plains associated with perennial streams. Soils are very deep, very poorly drained and formed in alluvium derived from mixed rocks. These soils are continuously saturated within 59 inches (150cm) of the surface. Year-long water table within 59 inches (150cm), proximity to perennial stream or water source and a landscape position that concentrates run-in moisture.

R024XY009NV	**SALINE MEADOW** This ecological site includes high sodicity, moderately high salinity and a water near the surface at during some part of the year. The soil profile is characterized by a fine sand surface texture, an ochric epipedon, a pH of 8.2 at the surface increasing with depth, an SAR of >13 and a water table between 2 to 35 inches (4 to 90cm).

Similar sites

R024XY007NV	**SALINE BOTTOM** A strong to moderate salinity throughout and a high-water table between 70-100cm at some time during the year. Dominant species greasewood (SAVE4) and basin wildrye (LECI4)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Typha latifolia* (2) *Schoenoplectus acutus*

Physiographic features

The Lakeshore Marsh site is found on silty lacustrine sediments on concave areas adjacent to open water areas.

Table 2. Representative physiographic features

Landforms	(1) Lakeshore (2) Alluvial flat
Runoff class	Low to negligible
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to rare
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Frequent
Elevation	1,300 ft
Slope	0–2%
Ponding depth	0–40 in
Water table depth	0–40 in
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding duration	Not specified
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	1,200–1,500 ft
Slope	Not specified
Ponding depth	Not specified
Water table depth	Not specified

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, somewhat dry summers. Average annual precipitation is 11 to 13 inches (28 to 33 cm).

Table 4. Representative climatic features

Frost-free period (characteristic range)	86-96 days
Freeze-free period (characteristic range)	130-135 days
Precipitation total (characteristic range)	11-13 in
Frost-free period (actual range)	83-99 days
Freeze-free period (actual range)	129-136 days
Precipitation total (actual range)	10-13 in
Frost-free period (average)	91 days
Freeze-free period (average)	133 days
Precipitation total (average)	12 in

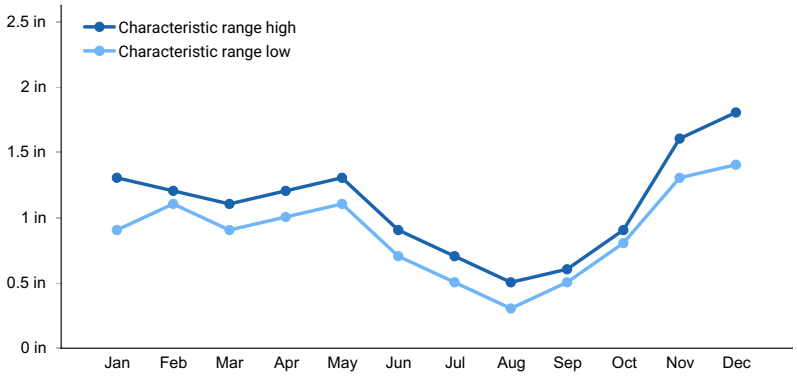


Figure 1. Monthly precipitation range

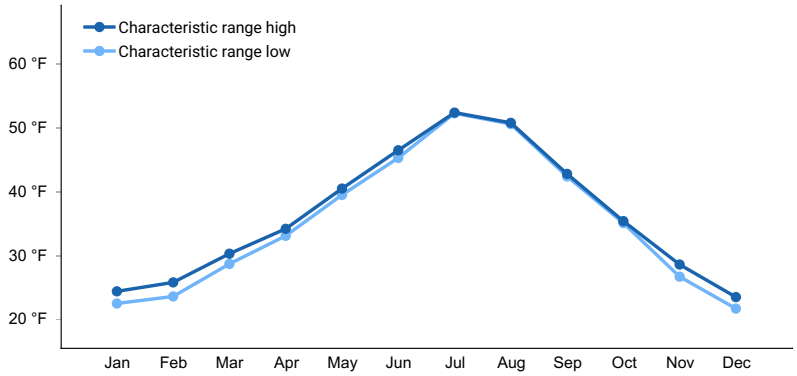


Figure 2. Monthly minimum temperature range

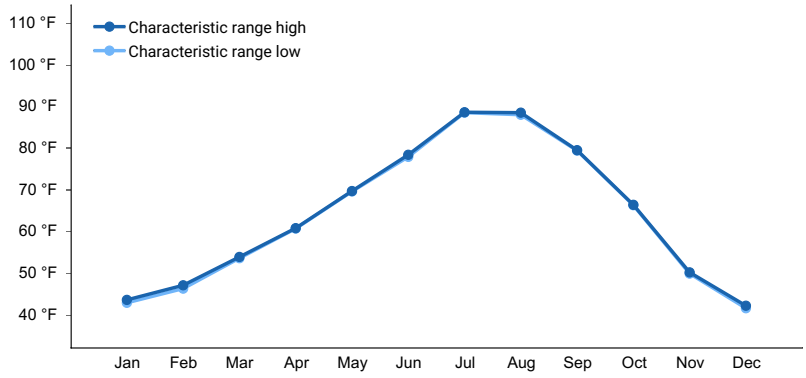


Figure 3. Monthly maximum temperature range

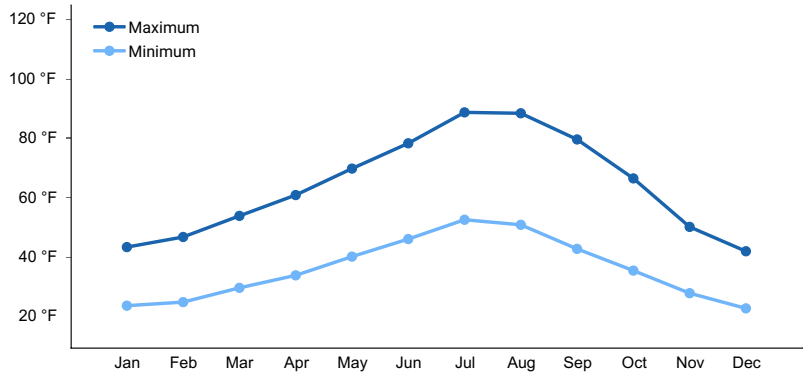


Figure 4. Monthly average minimum and maximum temperature

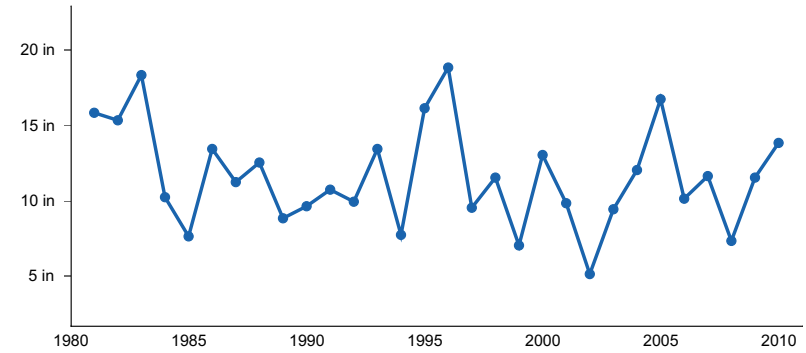


Figure 5. Annual precipitation pattern

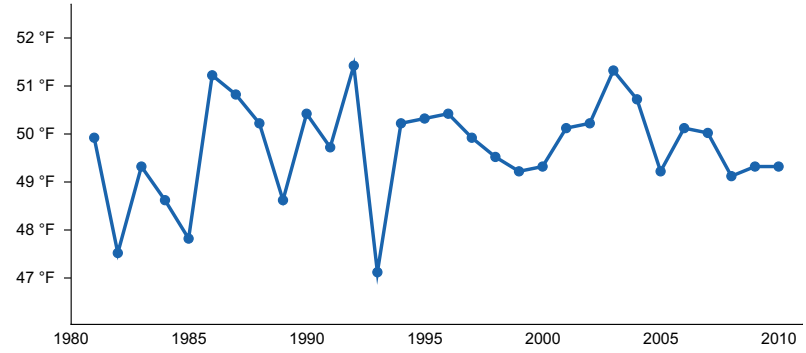


Figure 6. Annual average temperature pattern

Climate stations used

- (1) ADEL [USC00350036], Adel, OR
- (2) SUMMER LAKE 1 S [USC00358173], Paisley, OR

Influencing water features

The Lakeshore Marsh site frequently ponds for very long periods during the months of March through September.

Soil features

Soils formed in decomposed organic material over silty lacustrine sediments in concave areas adjacent to open water areas in lake basins. Soils are very deep and very poorly drained. Slopes are 0 to 1 percent. The mean annual temperature is about 47 degrees F. and the mean annual precipitation is about 9 inches. Soils associated with the site are Crump and Tulana.

Table 5. Representative soil features

Parent material	(1) Organic material (2) Lacustrine deposits (3) Pumice (4) Ash flow
Surface texture	(1) Muck (2)
Family particle size	(1) Fine-silty
Drainage class	Poorly drained to very poorly drained
Permeability class	Moderate
Soil depth	78 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–10 in
Soil reaction (1:1 water) (0-78in)	6–7.8
Subsurface fragment volume <=3" (0-78in)	0–5%
Subsurface fragment volume >3" (0-78in)	0–5%

Ecological dynamics

Vegetation is composed primarily of common cattail and various bulrush species, with hardstem and 3-square bulrushes found most often. The native sub-species of common reed is commonly found on the drier end of the site. On average years, plant growth begins after April 1st and continues throughout much of the summer and fall. The Lakeshore Marsh site typically has standing water up to 9 inches deep from March through September and on some sites, year round.

The Lakeshore Marsh site is of limited extent. The Lakeshore Marsh site typically ends with open water then the water depth becomes to great for plants to survive.

During periods of low standing water, total site production often decreases, but will return to normal amounts during years with average or above average site ponding.

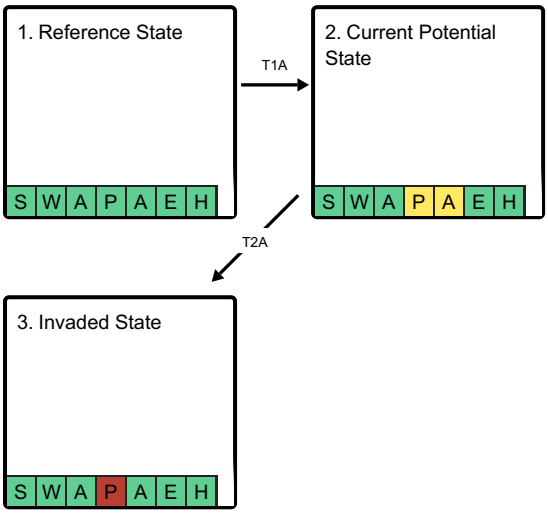
Common reed (*Phragmites australis*) is an invasive grass that has colonized many areas in this ecological site. Phragmites can form dense mono-cultures that reduce plant diversity (Chambers et al. 1999). Dominance of Phragmites can also reduce waterfowl and shorebird use, decrease diversity of macroinvertebrates, alter hydrology, and increase fire hazards (see citations in Cranney 2016). Management of invasive Phragmites stands may include chemical, burning, and/or grazing/mowing treatments. Each of those treatments has varying success and stands of Phragmites may need a combination of treatments to control the spread (Cranney 2016).

As vegetative communities respond to changes in management or natural influences that move them from one state to another, a return to previous states may not be possible. The amount of energy needed to affect these vegetative shifts depends on present biotic and abiotic features and the desired results.

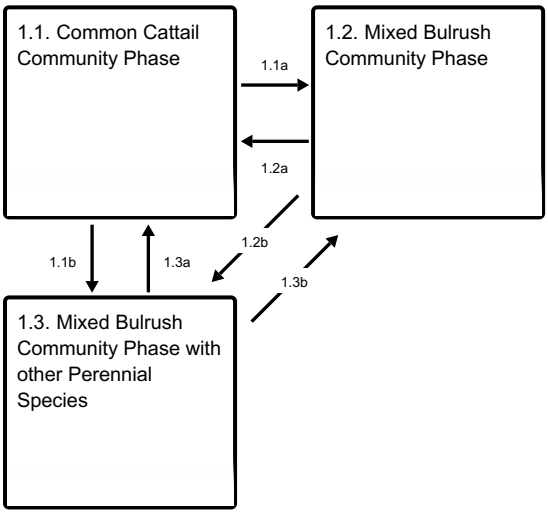
The following state and transition model diagram depicts some of the most commonly occurring plant communities found on this ecological site. These communities may not represent every possibility, but they are the most prevalent and repeatable. As more data are collected, some of these plant communities may be revised or removed, and new ones may be added.

State and transition model

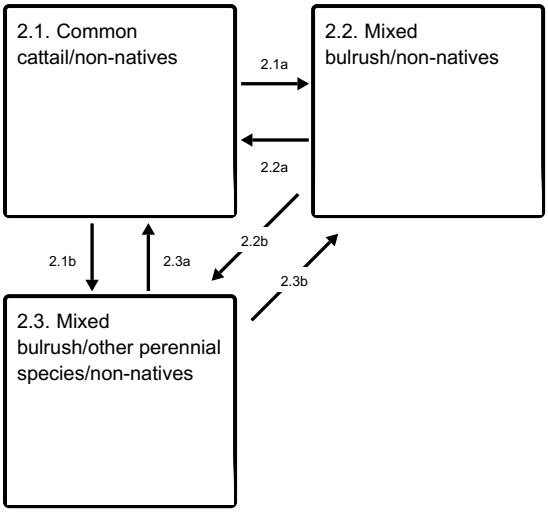
Ecosystem states



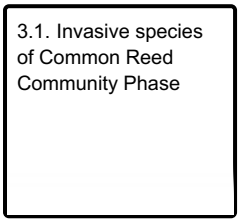
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Reference State

The Reference State describes the natural biotic communities that may become established on the Lakeshore Marsh - cattail bulrush ecological site when all successional sequences are completed under the natural disturbance regime. The Reference State is self sustaining and resistant to change due to its high resistance to natural disturbances and high resilience following natural disturbances. When natural disturbances occur, the rate of recovery is variable due to disturbance intensity. Prolonged flooding could cause a large plant die-off at any community phase. This community could become at risk where increased disturbance and/or the introduction of the invasive species of common reed occurs. Once this invasive species becomes established, return to the reference state may not be possible. Reference State: Community phases influenced by fluctuating water levels, natural disturbances, and weather. Indicators: A dense stand of common cattail, various bulrush species and the native sub-species of common reed dominant visual aspect. Feedbacks: Extended drought, lower standing water levels and/or other disturbances that reduce plant vigor which may allow invasive species to become established in the community. Properly managed water levels where possible help maintain the native perennial plant community. At-risk Community Phase: All communities in this state are at risk when native plants are stressed and/or nutrients become available for invasive plants to establish. Trigger: Introduction and establishment of non-native invasive plants such as the invasive sub-species of common reed.

Dominant plant species

- broadleaf cattail (*Typha latifolia*), grass
- chairmaker's bulrush (*Schoenoplectus americanus*), grass

Community 1.1
Common Cattail Community Phase

The community is characterized by a perennial forb community dominated by common cattail, other species including hardstem and 3-square bulrush are present in small amounts. The Common Cattail Community normally has standing water 6 to 12 inches deep during all of the growing season. When the water depth exceeds 12 inches, open water results. Ground cover is highly variable with perennial vegetative cover ranging from 30 to 60 percent and litter ranging from 25 to 60 percent. Ponded water is also variable (20 to 60 percent).

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	3000	4000	5000
Grass/Grasslike	100	200	300
Total	**3100**	**4200**	**5300**

Table 7. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	5-10%
Forb foliar cover	25-50%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	20-60%
Bare ground	0%

Community 1.2
Mixed Bulrush Community Phase

The community is characterized by a perennial sedge community dominated by hardstem and 3-square bulrush. Other species including fluted bulrush and common cattail are present in small amounts. The Mixed Bulrush Community Phase normally has standing water 3 to 6 inches deep during all of the growing season. When the water depth exceeds 6 inches, common cattail often dominates. Ground cover is highly variable with perennial vegetative cover ranging from 30 to 50 percent and litter ranging from 25 to 60 percent. Ponded water is also variable (20 to 60 percent).

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2200	3400	4200
Forb	100	150	250
Total	**2300**	**3550**	**4450**

Table 9. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	25-40%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-40%
Surface fragments >0.25" and <=3"	0%

Surface fragments >3"	0%
Bedrock	0%
Water	25-50%
Bare ground	0%

Community 1.3
Mixed Bulrush Community Phase with other Perennial Species

The Mixed Bulrush Community Phase is characterized by a perennial sedge community dominated by hardstem and 3-square bulrush. Other species including fluted bulrush and common cattail are present in small amounts. This site normally has standing water 1 to 3 inches deep during much of the growing season. Baltic rush, inland saltgrass, and the native sub-species of common reed are present and when conditions are right, may dominate the community. When the water depth exceeds 3 inches, these species are greatly reduced. Ground cover is highly variable with perennial vegetative cover ranging from 30 to 50 percent and litter ranging from 25 to 60 percent. Ponded water is also variable (20 to 60 percent).

Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2200	2600	3000
Forb	120	150	200
Total	**2320**	**2750**	**3200**

Table 11. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	25-40%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	15-20%
Bare ground	0%

Pathway 1.1a
Community 1.1 to 1.2

This community pathway occurs when the stable standing water level decreases from 6 to 12 inches to 3 to 6 inches. This allows bulrushes and other species to more effectively compete with deeper water species such as common cattail. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 1.1b
Community 1.1 to 1.3

This community pathway occurs when the stable standing water level decreases from 6 to 12 inches to 1 to 4

inches. This allows bulrushes and other species including rushes, grasses and forbs to more effectively compete with deeper water species such as common cattail. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 1.2a
Community 1.2 to 1.1

This community pathway occurs when the stable standing water level increases to 6 to 12 inches from 3 to 6 inches. This allows common cattail to more effectively compete with shallower water species such as bulrushes. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 1.2b
Community 1.2 to 1.3

This community pathway occurs when the stable standing water level decreases from 3 to 6 inches to 1 to 4 inches. This allows species such as Baltic rush, inland saltgrass and forbs to more effectively compete with deeper water species such as bulrushes. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 1.3a
Community 1.3 to 1.1

This community pathway occurs when the stable standing water level increases to 6 to 12 inches from 1 to 4 inches. This allows common cattail to more effectively compete with shallower water species such as bulrushes, baltic rush and inland saltgrass. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 1.3b
Community 1.3 to 1.2

This community pathway occurs when the stable standing water level increases to 3 to 6 inches from 1 to 4 inches. This allows bulrush species to more effectively compete with shallower water species such as baltic rush and inland saltgrass. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

State 2
Current Potential State

This state is similar to the Reference State with the addition of non-native species.

Community 2.1
Common cattail/non-natives

The Common cattail/non-natives community is characterized by a perennial forb community dominated by common cattail, other species including hardstem and 3-square bulrush are present in small amounts. This site normally has standing water 6 to 12 inches deep during all of the growing season. When the water depth exceeds 12 inches, open water results. Ground cover is highly variable with perennial vegetative cover ranging from 30 to 60 percent and litter ranging from 25 to 60 percent. Ponded water is also variable (20 to 60 percent).

Community 2.2
Mixed bulrush/non-natives

The Mixed bulrush/non-natives community is characterized by a perennial sedge community dominated by hardstem and 3-square bulrush. Other species including fluted bulrush and common cattail are present in small amounts. This site normally has standing water 3 to 6 inches deep during all of the growing season. When the water depth exceeds 6 inches, common cattail often dominates. Ground cover is highly variable with perennial

vegetative cover ranging from 30 to 50 percent and litter ranging from 25 to 60 percent. Ponded water is also variable (20 to 60 percent).

Community 2.3
Mixed bulrush/other perennial species/non-natives

The Mixed bulrush/other perennial species/non-natives community is characterized by a perennial sedge community dominated by hardstem and 3-square bulrush. Other species including fluted bulrush and common cattail are present in small amounts. This site normally has standing water 1 to 3 inches deep during much of the growing season. Baltic rush, inland saltgrass and the native sub-species of common reed are present and when conditions are right, may dominate the community. When the water depth exceeds 3 inches, these species are greatly reduced. Ground cover is highly variable with perennial vegetative cover ranging from 30 to 50 percent and litter ranging from 25 to 60 percent. Ponded water is also variable (20 to 60 percent).

Pathway 2.1a
Community 2.1 to 2.2

This community pathway occurs when the stable standing water level decreases from 6 to 12 inches to 3 to 6 inches. This allows bulrushes and other species to more effectively compete with deeper water species such as common cattail. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 2.1b
Community 2.1 to 2.3

This community pathway occurs when the stable standing water level decreases from 6 to 12 inches to 1 to 4 inches. This allows bulrushes and other species including rushes, grasses and forbs to more effectively compete with deeper water species such as common cattail. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 2.2a
Community 2.2 to 2.1

This community pathway occurs when the stable standing water level increases to 6 to 12 inches from 3 to 6 inches. This allows common cattail to more effectively compete with shallower water species such as bulrushes. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 2.2b
Community 2.2 to 2.3

This community pathway occurs when the stable standing water level decreases from 3 to 6 inches to 1 to 4 inches. This allows species such as Baltic rush, inland saltgrass and forbs to more effectively compete with deeper water species such as bulrushes. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 2.3a
Community 2.3 to 2.1

This community pathway occurs when the stable standing water level increases to 6 to 12 inches from 1 to 4 inches. This allows common cattail to more effectively compete with shallower water species such as bulrushes, baltic rush and inland saltgrass. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

Pathway 2.3b
Community 2.3 to 2.2

This community pathway occurs when the stable standing water level increases to 3 to 6 inches from 1 to 4 inches. This allows bulrush species to more effectively compete with shallower water species such as baltic rush and inland saltgrass. This change may be caused by natural lake fluctuations or by water management such as diking and water level manipulation.

State 3
Invaded State

The Invaded State is similar to the reference state, except that non-native and/or invasive species are present in all community phases. This state is generally dominated by the invasive sub-species of common reed; however, depending on disturbance history, species native to this site may be lacking resulting in pure stands of common reed. Primary disturbance mechanisms include climate fluctuations, water level changes, and surface disturbances such as road and pipeline development and off road vehicle (OHV) use. Timing of these disturbances dictates the ecological dynamics that can occur. The invaded state is losing resistance to change and lower resilience following disturbances. Indicators: A site dominated by common cattail and several bulrush species including hardstem and 3-square. Both the native and introduced subspecies of common reed are now present in the stand. Feedbacks: Extended drought resulting in a reduction of native perennial plant vigor. Normal fluctuations in weather allowing for the maintenance of both perennial sedges and grasses. At-risk Community Phase: This state is at risk when perennial plant cover is reduced and nutrients become available for invasive plants to flourish. Trigger: Spread of invasive plants to fill available niches.

Community 3.1
Invasive species of Common Reed Community Phase

The Invasive species of Common Reed Community Phase is characterized by a significant invasion of the non-native sub-species of common reed replacing perennial grass/sedge communities normally dominating this site. Hardstem and 3-square bulrush and other species including fluted bulrush and common cattail may still be present in small amounts. This site normally has standing water 1 to 6 inches deep during much or all of the growing season. Baltic rush, inland saltgrass and the native sub-species of common reed are present when conditions are right. All of these species are in danger of being eliminated and replaced by the non-native reed species. Ground cover is highly variable with perennial vegetative cover ranging from 30 to 60 percent and litter ranging from 25 to 50 percent. Ponded water is also variable (15 to 20 percent).

Table 12. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2200	2600	3000
Forb	120	150	200
Total	**2320**	**2750**	**3200**

Table 13. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	35-55%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%

Water	15-20%
Bare ground	0%

Transition T1A
State 1 to 2

This transition occurs when non-native species are introduced.

Transition T2A
State 2 to 3

This transition is from the native perennial plant communities in the reference state to a state that now contains invasive species. Events that allow for the establishment of invasive plant species include, prolonged drought, standing water level fluctuation, surface disturbances, etc. However, the invasive sub-species of common reed has been known to invade intact perennial plant communities with little to no disturbance. Once invasive species are found in the plant community a threshold has been crossed.

Additional community tables

Table 14. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Forb					
1	**Dominant Forbs**			3000–5500	
	broadleaf cattail	TYLA	*Typha latifolia*	3000–5000	–
	southern cattail	TYDO	*Typha domingensis*	200–400	–
Grass/Grasslike					
2	**Dominant Grasslikes**			150–300	
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	100–200	–
	hardstem bulrush	SCACA	*Schoenoplectus acutus var. acutus*	75–150	–

Table 15. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Grasslikes**			2000–4000	
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	1000–1500	–
	hardstem bulrush	SCACA	*Schoenoplectus acutus var. acutus*	500–1000	–
Forb					
2	**Dominant Forbs**			150–250	
	broadleaf cattail	TYLA	*Typha latifolia*	100–200	–
	broadleaf cattail	TYLA	*Typha latifolia*	100–200	–
	southern cattail	TYDO	*Typha domingensis*	20–40	–

Table 16. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Grasses/Grasslikes**			2000–3000	
	hardstem bulrush	SCACA	*Schoenoplectus acutus var. acutus*	300–500	–
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	300–500	–
	saltgrass	DISP	*Distichlis spicata*	100–300	–
	common spikerush	ELPA3	*Eleocharis palustris*	100–200	–
3	**Sub-dominant Grasses/Grasslikes**			100–200	
	foxtail barley	HOJU	*Hordeum jubatum*	0–40	–
	common reed	PHAU7	*Phragmites australis*	20–40	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	0–20	–
	weeping alkaligrass	PUDI	*Puccinellia distans*	0–20	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–20	–
	meadow barley	HOBRB2	*Hordeum brachyantherum ssp. brachyantherum*	0–20	–
Forb					
2	**Dominant Forbs**			150–250	
	broadleaf cattail	TYLA	*Typha latifolia*	50–74	–
	southern cattail	TYDO	*Typha domingensis*	20–40	–
	swamp milkweed	ASIN	*Asclepias incarnata*	0–20	–
	showy milkweed	ASSP	*Asclepias speciosa*	0–20	–
	seaside arrowgrass	TRMA20	*Triglochin maritima*	0–20	–

Table 17. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Grasses/Grasslikes**			2000–3300	
	common reed	PHAU7	*Phragmites australis*	1000–2000	–
	hardstem bulrush	SCACA	*Schoenoplectus acutus var. acutus*	200–400	–
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	200–400	–
	saltgrass	DISP	*Distichlis spicata*	100–200	–
	common spikerush	ELPA3	*Eleocharis palustris*	100–200	–
2	**Sub-dominant Grasses/Grasslikes**			50–150	
	foxtail barley	HOJU	*Hordeum jubatum*	0–40	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–20	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	0–20	–
	weeping alkaligrass	PUDI	*Puccinellia distans*	0–20	–
	meadow barley	HOBRB2	*Hordeum brachyantherum ssp. brachyantherum*	0–20	–
Forb					
3	**Forbs**			150–250	
	broadleaf cattail	TYLA	*Typha latifolia*	50–75	–
	southern cattail	TYDO	*Typha domingensis*	20–40	–
	swamp milkweed	ASIN	*Asclepias incarnata*	0–20	–
	showy milkweed	ASSP	*Asclepias speciosa*	0–20	–
	seaside arrowgrass	TRMA20	*Triglochin maritima*	0–20	–

Inventory data references

NASIS data for Crump (OR636: 194A, 51A, 52A, 53A, 54A, 55A, 56A) and Tulana (OR636: 253A) soils.

Other references

Chambers RM, LA Meyerson, K Saltonstall. 1999. Expansion of *Phragmites australis* into tidal wetlands of North America. Aquatic Botany 64: 261-273.

Cranney, CR. 2016. Control of large stands of *Phragmites australis* in Great Salt Lake, Utah wetlands. All Graduate Theses and Dissertations. 4988. https://digitalcommons.usu.edu/etd/4988

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Approval

Kendra Moseley, 3/06/2025

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	05/11/2025
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):

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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:**
