USDA Natural Resources Conservation Service

Ecological site R028AY131UT
Desert Salty Silt (Pickleweed)

Accessed: 05/10/2025

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): 028A–Ancient Lake Bonneville

MLRA-D28A, Great Salt Lake Area, occurs in the eastern portion of the the Basin and Range Province. This area is composed of nearly level basins located between widely separated mountain ranges that run mostly north and south. Basin edges are often bordered by gently sloping alluvial fans. The mountains are uplifted fault blocks with steep side slopes.

Classification relationships

MLRA 28A, LRU A, northern desert ecological zone

Ecological site concept

This site occurs in lake plains, lake terraces and depressions and typically has watertable within 20 inches of the soil surface and can have ponding. This site is saline and is dominated by pickelweed.

Associated sites

R028AY004UT	**Alkali Flat (Black Greasewood)**
R028AY024UT	**Wet Saline Meadow (Saltgrass)**
R028AY025UT	**Lakeshore Marsh**
R028AY322UT	**Upland Shallow Hardpan (Mountain Big Sagebrush)**

Similar sites

R028AY132UT	**Desert Salty Silt (Iodinebush)**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Salicornia utahensis* (2) *Hordeum jubatum*

Physiographic features

This site is typically located on lake plains, lake terraces and in depressional areas within lake terraces. It typically occupies the elevational area just above lake playas and just below the alkali flat ecological site. Slopes typically range from 0 to 1 percent but may occasionally reach 3 percent. This site may occasionally pond during the spring

months, it may also occasionally flood during runoff periods. Runoff ranges from negligible when the site is ponded to very high when it is not.

Table 2. Representative physiographic features

Landforms	(1) Lake plain (2) Lake terrace (3) Basin floor
Flooding duration	Extremely brief (0.1 to 4 hours) to long (7 to 30 days)
Flooding frequency	None to occasional
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	4,200–5,100 ft
Slope	0–1%
Ponding depth	2–6 in
Water table depth	8–10 in
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is dry subhumid and semiarid. It is characterized by cold, snowy winters and warm, dry summers. The average annual precipitation ranges from 13 to 19 inches. April and May are typically the wettest months with July and August being the driest. The most reliable sources of moisture for plant growth are the snow that accumulates over the winter, and spring rains, that in combination, wet the sites soil throughout the spring and early summer months. Summer thunderstorms are intermittent and sporadic in nature, and thus are not reliable sources of moisture to support vegetative growth on this site. The mean annual air temperature is 45 to 54 degrees.

Table 3. Representative climatic features

Frost-free period (average)	172 days
Freeze-free period (average)	207 days
Precipitation total (average)	16 in

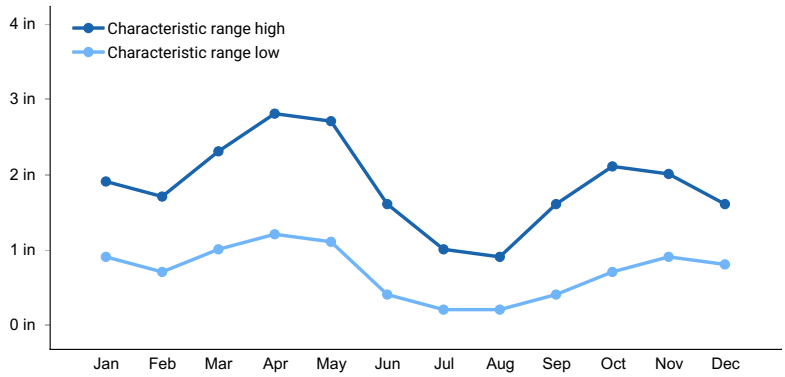


Figure 1. Monthly precipitation range

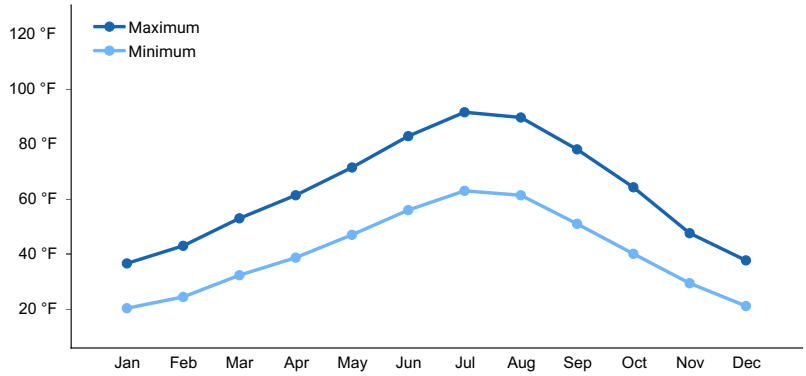


Figure 2. Monthly average minimum and maximum temperature

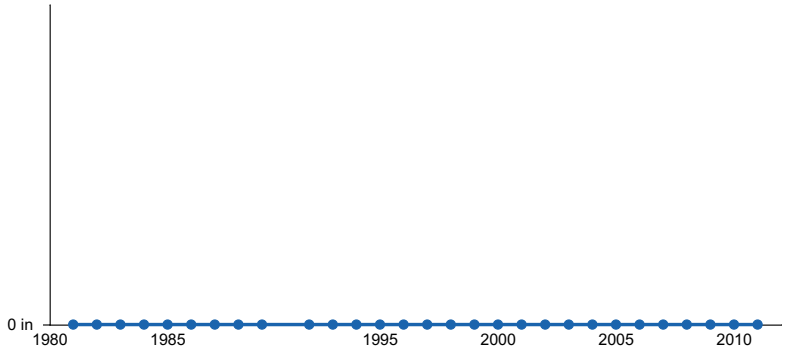


Figure 3. Annual precipitation pattern

Influencing water features

This site may occasionally pond for brief periods during the months of March thru June. Ponding depth is typically 2 to 6 inches. A water table is present during much of the year at a depth of 8 to 10 inches.

Soil features

Characteristic soils in this site are very deep and poorly or very poorly drained. The soil moisture and temperature regimes are typic aquic and mesic respectively. The dry surface color is typically a dark grayish brown. These soils formed in lacustrine deposits derived mainly from limestone, shale or quartzite parent material. Soil textures are typically silt loams and silty clay loams. They are strongly saline (100 to 250 mmhos/cm) and moderately to strongly alkaline. Available water capacity is highly variable ranging from 0.0 to 7.1 inches.

This site has been used in the following soil surveys and has been correlated to the following components:

UT601 – Box Elder County, Western Part – Saltair.
UT602 – Box Elder County, Eastern Part – Saltair.
UT607 – Davis-Weber Area – Saltair.
UT612 – Salt Lake Area – Saltair.

Typical Profile (Saltair):
Az – 0-1 inches; silt loam; strongly effervescent; strongly saline; moderately alkaline.
Czgl – 1-4 inches; silty clay loam; strongly effervesent; strongly saline; strongly alkaline.
Czg2 – 4-9 inches; silty clay loam; strongly effervesent; strongly saline; strongly alkaline.
Czg3 – 9-20 inches; silty clay loam; strongly effervesent; strongly saline; strongly alkaline.
Czg4 – 20-32 inches; silt loam; strongly effervesent; strongly saline; strongly alkaline.
2Czg5 – 32-44 inches; silty clay loam; strongly effervesent; strongly saline; strongly alkaline.
2Czg6 – 44-60 inches; silty clay loam; strongly effervesent; strongly saline; strongly alkaline.

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits–limestone and shale
Surface texture	(1) Silt (2) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained to very poorly drained
Permeability class	Slow to very slow
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0–7.1 in
Calcium carbonate equivalent (0-40in)	5–40%
Electrical conductivity (0-40in)	100–250 mmhos/cm
Sodium adsorption ratio (0-40in)	100–1,000
Soil reaction (1:1 water) (0-40in)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site developed under the natural ecological conditions found in the Great Basin portion of the Basin and Range Province, and includes the influence of the Great Salt Lakes natural water level fluxuations, waterfowl foraging, and climate. Vegetation is composed primarily of forbs with Utah pickleweed dominating the aspect. Red pickleweed, seepweed and low goosefoot may also be present. Grasses are less common but desert saltgrass and foxtail barley are sometimes present. On average years, plant growth begins after seasonal ponding recedes and ends when available moisture is gone.

This site is of limited extent and is usually found just above lake playas and just below the Alkali Flat (Greasewood) 028AY004UT site. Plants common on the Alkali Flat site such as black greasewood may increase on this site where it adjoins the Alkali Flat site.

During periods of drought, total site production often decreases, but returns to normal levels during years with average or above average precipitation.

The Great Salt Lake is an inland water body with no outlet and is thus highly affected by weather patterns that cause it the grow or shrink in size. As its shoreline moves up or down, ecological sites found along its shore must also migrate in their relationship to its shore. Man has caused additional changes to the areas ecology by developing a series of canals, dikes and diversions designed to control and manage the lakes incoming water. In spite of these natural and human caused impacts, distinct ecological sites can be found surrounding this body of water.

This ecological site has been grazed by domestic livestock since they were first introduced into the area around 1860. This livestock introduction, including the use of fencing, and the development of reliable water sources, has influenced the disturbance regime historically associated with this ecological site. This site often served as wintering pastures for sheep and cattle producers.

Improperly managed livestock grazing (continuous season long grazing, heavy stocking rates, repeated early spring grazing, etc.) can cause this site to depart from its reference plant community. During periods of continous winter

grazing by sheep, alkail seepweed and any perennial grasses present will also decrease leaving Utah and red pickleweed as the principle remaining species.

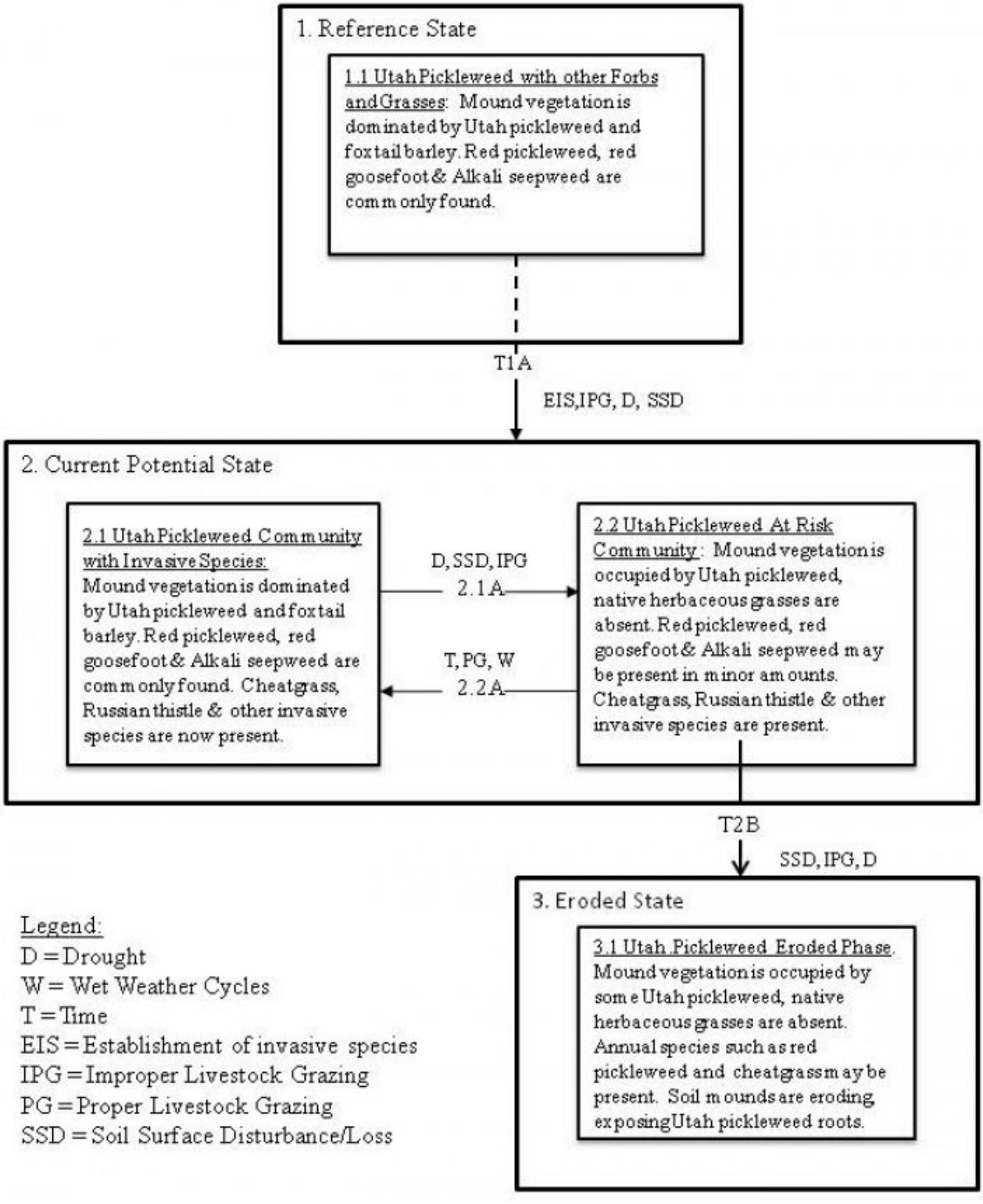
Waterfowl, including many species of geese and ducks prefer pickleweed as forage and will feed on it during much of the year. The common name given to pickleweed by local ranchers is goose weed because of its use by geese.

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. This model was developed using range data collected for publication of the Box Elder County, Eastern Part, Soil Survey and the recent Eastern Shores update. Both ocular and measured data was collected and utilized. Range data collected by the NRCS since 1983 was also used.

State and transition model

State and Transition Model
State: Utah
Site Type: Rangeland
MLRA: D-28A - Basin and Range Province
R028AY131UT – Desert Salty Silt (Utah pickleweed)



Legend:
D = Drought
W = Wet Weather Cycles
T = Time
EIS = Establishment of invasive species
IPG = Improper Livestock Grazing
PG = Proper Livestock Grazing
SSD = Soil Surface Disturbance/Loss

State 1
Reference State

This reference state describes the natural biotic communities that may become established on the Desert Salty Silt - Utah pickleweed 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. This community could become at risk where increased disturbance frequencies allow for the introduction of annuals, such as cheatgrass and Russian thistle. Once invasive plants become established, return to the reference state may not be possible. Reference State: Community phases influenced by native herbivore grazing, insect herbivory, and weather. Indicators: A sparse perennial cool and warm season understory with Utah pickleweed and foxtail barley forming the dominant visual aspect. Feedbacks: Extended drought and/or improper grazing that result in a reduction of native perennial plant vigor which may cause invasive species to become established in the community, increased bare ground, erosion, and soil loss. Properly managed grazing that maintains the 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 cheatgrass and Russian thistle.

Community 1.1
Utah pickleweed with other forbs and grasses.

Figure 5. Community Phase 1.1

Figure 6. Site Showing Spring Ponding

This community phase is characterized by a perennial forb layer dominated by Utah pickleweed, with other native forbs and perennial grasses commonly present. Common species include red pickleweed, low goosefoot, foxtail barley and desert saltgrass. Where grass cover increases, forb interspaces are filled and vegetative production significantly increases. Other perennial grasses, shrubs, and forbs may also be present and cover is variable. Bare ground is also variable (20-60%). The following tables provide an example of the typical vegetative floristics of a commumity phase 1.1 plant community.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	40	70	100
Grass/Grasslike	40	60	90
Shrub/Vine	10	20	40
Total	**90**	**150**	**230**

State 2
Current Potential State

The current potential 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 Utah pickleweed and foxtail barley; however, depending on disturbance history, native grasses, forbs, or other shrubs may be lacking on the site. Primary disturbance mechanisms include climate fluctuations, waterfowl grazing, domestic livestock grazing, 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 current potential state is still self- sustaining; but could be losing resistance to change due to increased disturbance and lower resilience following disturbances. Indicators: A site dominated by Utah pickleweed and foxtail barley. Red pickleweed and desert saltgrass are also commonly present. Non-native species 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 forbs 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 2.1
Utah pickleweed with invasive species.

Figure 8. Community Phase 2.1

This community is characterized by a perennial forb layer dominated by Utah pickleweed, with other native forbs and perennial grasses commonly present. Common species include red pickleweed, low goosefoot, foxtail barley and saltgrass. Invasive species including cheatgrass and Russian thistle are now present. Where grass cover increases, forb interspaces are filled and vegetative production significantly increases. Other perennial grasses, shrubs, and forbs may also be present and cover is variable. Bare ground is also variable (20-60%). The following tables provide an example of the typical vegetative floristics of a commumity phase 2.1 plant community.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	40	70	100
Grass/Grasslike	40	60	90
Shrub/Vine	10	20	40
Total	**90**	**150**	**230**

Community 2.2
Utah pickleweed At Risk Community.

Figure 10. Community Phase 2.2

This community is characterized by a perennial forb layer occupied by Utah pickleweed, with other native forbs and perennial grasses present in limited amounts. Common species include red pickleweed, low goosefoot, foxtail barley and saltgrass. Invasive species including cheatgrass and Russian thistle are now present. Where grass cover decreases, forb interspaces become void of vegetation, production significantly decreases. Other grasses, shrubs, and forbs may be present in very minor amounts and cover is variable. Bare ground is also variable (40-80%). The following tables provide an example of the typical vegetative floristics of a commumity phase 2.1 plant community.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	20	40	70
Grass/Grasslike	20	30	50
Shrub/Vine	0	10	20
Total	**40**	**80**	**140**

Pathway 2.1A
Community 2.1 to 2.2

Utah pickleweed with invasive species.

Utah pickleweed At Risk Community.

When perennial plants are reduced as a result of soil surface disturbance, improper livestock grazing and/or dry climate, annual invasive grasses and forbs may increase. As the soil becomes exposed, and the perennial plants are removed, there is more opportunity for cheatgrass and other invasive annuals to dominate the site. Soil stability decreases, and interspaces between perennial native plants increase, changing the vegetative dynamics of the site.

Pathway 2.2A
Community 2.2 to 2.1

Utah pickleweed At Risk Community.

Utah pickleweed with invasive species.

Over time, without additional disturbance and in the presents of proper livestock management and average or above average weather periods, Utah pickleweed and perennial grasses may increase.

State 3
Eroded State

This community phase is characterized by sparse stand of Utah pickleweed associated with a few annuals such as red pickleweed, cheatgrass and Russian thistle. Total site vegetation is significently reduced. Cryptogamic crust, where present, and the roots of Utah pickleweed may be all that are holding the soil in place. When these conditions persist, the sites soil mounds begins to erode away turning the area into a lake playa. Indicators: A site occupied by a sparse stand of Utah pickleweed. Red pickleweed may also be present. Non-native species may or may not be 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 forbs and grasses. At-risk Community Phase: This state is at risk when perennial plant cover is reduced and soil begins to erode and move into surrounding lake playas. Trigger: Loss of soil sufficient to destroy the sites integrity.

Community 3.1
Utah pickleweed eroded phase.

Figure 12. Community Phase 3.1

Figure 13. Community Phase 3.1 Close-up.

This community is characterized by a remnant forb layer occupied by Utah pickleweed, with other native forbs and perennial grasses present in very limited amounts. When present, species may include red pickleweed, low goosefoot, foxtail barley and saltgrass. Invasive species including cheatgrass and Russian thistle may also be present when conditions allow. Forb interspaces are nearly void of vegetation, production significantly decreases. Other grasses, shrubs, and forbs may be present in very minor amounts and cover is variable. Bare ground is also variable (60-90%). The following tables provide an example of the typical vegetative floristics of a commumity phase 3.1 plant community.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	10	30	50
Grass/Grasslike	0	10	20
Shrub/Vine	0	5	10
Total	**10**	**45**	**80**

Transition T1A
State 1 to 2

This transition is from the native perennial forb and grass community in the reference state to a state that now contains invasive species. Events that allow for the establishment of invasive plant species include, improper livestock grazing that reduces perennial vegetation, prolonged drought, surface disturbances, etc. However, invasive species such as cheatgrass have 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.

Transition T2A
State 2 to 3

This transition is from the Current Potential State Community 2.2 - Utah picklweed/At Risk Phase to State 3 - eroded state which has a very sparse stand of Utah pickleweed, red pickleweed and annual invasive plants. This transition occurs as events favor the reduction of perennial species and the increase of annual invasive plants. Typically, this occurs as total site production continues to decline due to surface disturbance, improper livestock grazing and/or drought. Once vegetative cover is reduced to the point where plants can hold the sites soil in place, a threshold has been crossed.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				60–90	
	foxtail barley	HOJU	*Hordeum jubatum*	25–45	–
	saltgrass	DISP	*Distichlis spicata*	10–20	–
	meadow barley	HOBRB2	*Hordeum brachyantherum ssp. brachyantherum*	10–20	–
2	**Sub-dominant**			20–40	
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	10–20	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	10–20	–
	weeping alkaligrass	PUDI	*Puccinellia distans*	10–20	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	10–20	–
Forb					
3	**Forbs**			40–100	
	Utah swampfire	SAUT2	*Sarcocornia utahensis*	40–80	–
	red swampfire	SARU	*Salicornia rubra*	20–30	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	10–20	–
	Mojave seablite	SUMO	*Suaeda moquinii*	10–20	–
	low goosefoot	CHCH	*Chenopodium chenopodioides*	5–10	–
	ribseed sandmat	CHGL13	*Chamaesyce glyptosperma*	5–10	–
	povertyweed	IVAX	*Iva axillaris*	5–10	–
Shrub/Vine					
4	**Dominant Shrubs**			20–40	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	15–30	–
	iodinebush	ALOC2	*Allenrolfea occidentalis*	10–20	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	10–20	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Grasses**			60–90	
	cheatgrass	BRTE	*Bromus tectorum*	30–60	–
	foxtail barley	HOJU	*Hordeum jubatum*	25–45	–
	saltgrass	DISP	*Distichlis spicata*	10–20	–
	meadow barley	HOBRB2	*Hordeum brachyantherum ssp. brachyantherum*	10–20	–
2	**Sub-dominant**			20–40	
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	10–20	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	10–20	–
	weeping alkaligrass	PUDI	*Puccinellia distans*	10–20	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	10–20	–
Forb					
3	**Forbs**			40–100	
	Utah swampfire	SAUT2	*Sarcocornia utahensis*	40–80	–
	Russian thistle	SAKA	*Salsola kali*	20–50	–
	saltlover	HAGL	*Halogeton glomeratus*	20–40	–
	red swampfire	SARU	*Salicornia rubra*	20–30	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	10–20	–
	Mojave seablite	SUMO	*Suaeda moquinii*	10–20	–
	povertyweed	IVAX	*Iva axillaris*	5–10	–
	low goosefoot	CHCH	*Chenopodium chenopodioides*	5–10	–
	ribseed sandmat	CHGL13	*Chamaesyce glyptosperma*	5–10	–
Shrub/Vine					
4	**Dominant Shrubs**			20–40	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	15–30	–
	iodinebush	ALOC2	*Allenrolfea occidentalis*	10–20	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	10–20	–

Table 11. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Grasses**			20–50	
	cheatgrass	BRTE	*Bromus tectorum*	15–30	–
	foxtail barley	HOJU	*Hordeum jubatum*	10–20	–
	saltgrass	DISP	*Distichlis spicata*	5–10	–
	meadow barley	HOBRB2	*Hordeum brachyantherum ssp. brachyantherum*	5–10	–
2	**Sub-dominant**			10–20	
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	5–10	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	5–10	–
	weeping alkaligrass	PUDI	*Puccinellia distans*	5–10	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	5–10	–
Forb					
3	**Forbs**			20–70	
	Russian thistle	SAKA	*Salsola kali*	20–50	–
	Utah swampfire	SAUT2	*Sarcocornia utahensis*	20–50	–
	saltlover	HAGL	*Halogeton glomeratus*	20–40	–
	red swampfire	SARU	*Salicornia rubra*	20–30	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	10–20	–
	Mojave seablite	SUMO	*Suaeda moquinii*	10–20	–
	povertyweed	IVAX	*Iva axillaris*	5–10	–
	low goosefoot	CHCH	*Chenopodium chenopodioides*	5–10	–
	ribseed sandmat	CHGL13	*Chamaesyce glyptosperma*	5–10	–
Shrub/Vine					
4	**Dominant Shrubs**			0–20	
	iodinebush	ALOC2	*Allenrolfea occidentalis*	0–10	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–10	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–10	–

Table 12. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Grasses**			0–20	
	cheatgrass	BRTE	*Bromus tectorum*	10–20	–
	foxtail barley	HOJU	*Hordeum jubatum*	0–15	–
	saltgrass	DISP	*Distichlis spicata*	0–10	–
	meadow barley	HOBRB2	*Hordeum brachyantherum ssp. brachyantherum*	0–10	–
2	**Sub-dominant**			0–20	
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–10	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	0–10	–
	weeping alkaligrass	PUDI	*Puccinellia distans*	0–10	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–10	–
Forb					
3	**Forbs**			10–50	
	Utah swampfire	SAUT2	*Sarcocornia utahensis*	10–20	–
	red swampfire	SARU	*Salicornia rubra*	5–10	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–5	–
	Mojave seablite	SUMO	*Suaeda moquinii*	0–5	–
	low goosefoot	CHCH	*Chenopodium chenopodioides*	0–5	–
	ribseed sandmat	CHGL13	*Chamaesyce glyptosperma*	0–5	–
	saltlover	HAGL	*Halogeton glomeratus*	0–5	–
	povertyweed	IVAX	*Iva axillaris*	0–5	–
	Russian thistle	SAKA	*Salsola kali*	0–5	–
Shrub/Vine					
4	**Dominant Shrubs**			0–10	
	iodinebush	ALOC2	*Allenrolfea occidentalis*	0–5	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–5	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–5	–

Animal community

--Threatened and Endangered Species--
This section will be populated as more information becomes available.

--Wildlife Interpretation--

This ecological site and associated other wetlands associated with the Great Salt Lake provide critical habitat for migrating birds from both the Pacific and Central Flyway of North America. This area contains abundant food for birds. Birds come to the Refuge by the millions to eat and rest during migration.

The following statistics were provided by the Bear River Migratory Bird Refuge where much of this ecological site is located:

1. Breeding colonies of white-faced ibis contain as many as 18,000 birds.

2. Up to 10,000 American avocets breed at the Refuge annually.

3. One of North America’s three largest American white pelican breeding colonies, containing in excess of 50,000 birds, is found on Gunnison Island in Great Salt Lake.

4. Northern Utah marshes host up to 60 percent of the continental breeding population of cinnamon teal.

5. The Great Salt Lake boasts the largest fall staging concentration of Wilson’s phalaropes in the world, at approximately 500,000 birds. Red-necked phalaropes number nearly 100,000.

6. The Great Salt Lake area hosts greater than 50 percent of the continental breeding population of snowy plovers.

7. The Great Salt Lake area hosts 26 percent of the global population of marbled godwits during migration.

8. Bear River Refuge may attract over 65,000 black-necked stilts in the fall, more than anywhere else in the country.

--Grazing Interpretations--
This site has somewhat limited potential for livestock grazing. It is primarily perennial forbs, with the majority of canopy cover being attributed to Utah pickleweed. Pickleweed can serve as forage for livestock, especially as winter range. When present, grasses, primarily Foxtail barley and saltgrass, can provide good forage for horses, cattle, and sheep; however, many times these species are not abundant enough to support livestock. Grazing must be carefully planned and managed to prevent damage to the site. Before making specific grazing management recommendations, an onsite evaluation should be conducted as part of a science based grazing management plan.

Hydrological functions

The soils associated with this ecological site are generally in Hydrologic Soil Group D due to their high runoff potential when dry and a water table during much of the year at 8 to 10 inches (NRCS National Engineering Handbook). Hydrologic groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning watershed-protection and flood-prevention projects and for designing structures for the use, control and disposal of water. Surface disturbance can alter the hydrology by decreasing plant cover and increasing bare ground. Fire can also affect hydrology, but it is rare on this site. Fire intensity, fuel type, soil, climate, and topography can each have different influences. (National Range and Pasture Handbook, 2003)

Recreational uses

This ecological site provides forage for several species of both residential and migratory waterfowl as they pass through the area. These waterfowl reside and nest in marshes and open water but often travel to this site to forage. This movement back and forth creates opportunities for recreational hunting during open seasons.

Wood products

None.

Other information

--Poisonous and Toxic Plant Communities--
Russian thistle can be an invasive toxic plant on this site, causing nitrate and to a lesser extent oxalate poisoning, which affects all classes of livestock. Livestock rarely consume this plant species unless other forage is not available. The buildup of nitrates in these plants is highly dependent upon environmental factors, such as after a rain storm during a drought, during periods with cool/cloudy days, and on soils high in nitrogen and low in sulfur and phosphorus. Nitrate collects in the plant stems and can persist throughout the growing season. Clinical signs of nitrate poisoning include drowsiness, weakness, muscular tremors, increased heart and respiratory rates, staggering gait, and death. Conversely, oxalate poisoning causes kidney failure; clinical signs include muscle tremors, tetany, weakness, and depression. Poisoning generally occurs when livestock consume and are not accustomed to grazing oxalate containing plants. Animals with prior exposure to oxalates have increased numbers

of oxalate degrading rumen microflora and thus are able to degrade the toxin before clinical poisoning can occur (Knight and Walter, 2001).

--Invasive Plant Communities--
As ecological conditions deteriorate and native vegetation decreases due to disturbance (improper livestock grazing, drought, off road vehicle overuse, erosion, etc.) invasive species can establish on the site. Of particular concern in arid environments are the non-native annual invaders including cheatgrass, Russian thistle, kochia, halogeton, common sunflower and mustards. The presence of these species will depend on soil properties and moisture availability; however, these invaders are highly adaptive and can flourish in many locations. Once established, complete removal is difficult but suppression may be possible.

--Fire Ecology--
The ability for any ecological site to carry fire depends primarily on its present fuel load and plant moisture content. Sites with small fuel loads will burn more slowly and less intensely than sites with large fuel loads.

This ecological site, like many found in semi-desert communities in the Basin and Range Province may have evolved without a significant influence of fire. Because this ecological site is comprised of scattered low stature Utah pickleweed and similar associated species which are located on mounds surrounded by bare interspaces, it is unlikely to carry a fire even when high winds, high temperatures, and low humidity are present.

Inventory data references

This site description was developed from an old pickleweed site concept that was dropped from the list of NRCS ecological site descriptions several years ago.

It was developed using new data and photos collected during the East Shore Soil Survey udate and includes a state and transition model. A significant portion of this ecological site was inventoried during the survey. This site description will need to be updated as more data are collected.

Type locality

Location 1: Box Elder County, UT	
UTM zone	N
UTM northing	4609616
UTM easting	0392773
General legal description	East of Little Mountain; along public access road leading to DWR public hunting preserve.

Other references

US Fish and Wildlife Service; Bear River Migratory Bird Refuge; BearRiver@fws.gov

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Contributors

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V. Keith Wadman, Brock Benson

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)	V. Keith Wadman (NRCS, Ret.)
Contact for lead author	shane.green@ut.usda.gov
Date	06/10/2011
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Very minor rill development should be apparent in reference community under normal conditions. A slight increase may be observed following significant storm or snow melt events. Any rills should be short (< 1') and spaced 2' – 4'. The very few rills will run from the soil mounds comprising this site onto the interspaced playas and will travel in random directions. Evidence of rills will slowly decrease in the months following major weather events. Rills development may also be slightly more pronounced on the edges of this site where run-off onto the playa occurs.

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2. **Presence of water flow patterns:** Flow patterns are confined to the playa interspaces within this site, which will also often have standing water after storm events. Playa flow patterns are normally <25 feet long, flow around pickleweed mounds, and are typically spaced 12 to 15 feet apart.

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3. **Number and height of erosional pedestals or terracettes:** Very slight evidence of pedestals or terracettes caused by accelerated water erosion may be evident in the reference community. 1 – 2 inches of depositional mounding within Pickleweed clumps is normal and may not be water erosion caused.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 50% - 60% in the reference community.

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5. **Number of gullies and erosion associated with gullies:** Developed gully channels are a normal component of this

site. Gullies associated with reference areas will typically have stable, partially vegetated sides and bottoms with no evidence of head-cutting. Some evidence of disturbance may be apparent following significant weather events or when gullies convey runoff from higher elevation rocky or naturally eroding areas

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6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of wind generated soil movement is present in reference communities. Wind caused blowouts are also not present. Slight depositional mounding within Saltgrass patches and under pickleweed canopies is a normal characteristic of this site.

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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place within grass patches or under plant canopies. Some movement of the finest material (< 1/8" or less) may move (1' – 2') in the direction of prevailing winds or down slope if being transported by water. Little accumulation is observed behind obstructions.

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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):** This site should have a soil stability rating of 3 to 4 under plant canopies and 2 to 3 in interspaces. Surface textures are typically silts containing no coarse fragments.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface is 1 inch deep and structure is weak, thick platy. The A-horizon color is very light colored. Where surface soil is lost, increased clay and silt percentages are common in the remaining soil material.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The presence of healthy Utah Pickleweed/ foxtail barley patches in the reference community provides for the best infiltration and least runoff from storm events and snow melt. As perennial vegetation decreases and bare ground increases, runoff increases and soil loss is accelerated.

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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):** None. Soils are deep to very deep. Increases in clay or silt content in subsoil layers could be mistaken for compaction.

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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: Utah pickleweed > Foxtail barley.

    Sub-dominant: Red pickleweed > saltgrass > meadow barley.

    Other: Dominance by average annual production: Non-sprouting perennial forbs > Cool season perennial grasses > other perennial and annual native forbs. Biological soil crust is variable in its expression where present on this site and is measured as a component of ground cover.

    Additional: Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions. Functional/structural groups may appropriately contain non-native

species if their ecological function is the same as the native species in the reference state.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All age classes of perennial grasses and forbs should be present on an average to above average precipitation year with age class expression likely subdued during below average years, or on sites with high (usually greater than 65%) similarity index (late seral to historic climax). In general, a mix of age classes may be expected with some dead and decadent plants present.

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14. **Average percent litter cover (%) and depth (in):** Litter amount will vary based on pickleweed mound size and long-term weather patterns.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 150-250 #/acre on an average year.

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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:** Cheatgrass, Russian thistle, halogeton, kochia.

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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually in most years, except in drought years.
