

Ecological site group ESG048A18

Saline Bottoms

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Key Characteristics

- Additional water
- Ephemeral water
- Subsurface EC >4 - 28 soil components
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- Ephemeral water
- Subsurface EC >4 - 28 soil components

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.

Physiography

This ESG is located on floodplains.

Soil features

This ESG is characterized by subsurface EC >4.

Vegetation dynamics

The modal ecological site for this ESG is R048AY005UT.

Major Land Resource Area

MLRA 048A
Southern Rocky Mountains

Subclasses

- R048AA241CO–Mountain Meadow Gunnison Basin LRU
- R048AY003NM–Mountain Valley
- R048AY005UT–Semiwet Fresh Streambank (Narrowleaf Cottonwood)
- R048AY008UT–Wet Fresh Meadow (Willow-Sedge)
- R048AY010UT–Wet Fresh Streambank (Willow)
- R048AY241CO–Mountain Meadow
- R048AY243CO–Swale Meadow
- R048AY285CO–Foothill Swale
- R048AY287CO–Stony Foothills
- R048AY306UT–Upland Loam (Wyoming Big Sagebrush)
- R048AY323UT–Upland Shallow Hardpan (Black Sagebrush)

Correlated Map Unit Components

21070418, 21070433, 20992119, 21343818, 21287065, 21287105, 21287106, 21262285, 21276865, 21276659, 21244804, 21243332, 21242884, 21242943, 21242924, 21242956, 21243066, 21978870, 21408290, 21407404,

Stage

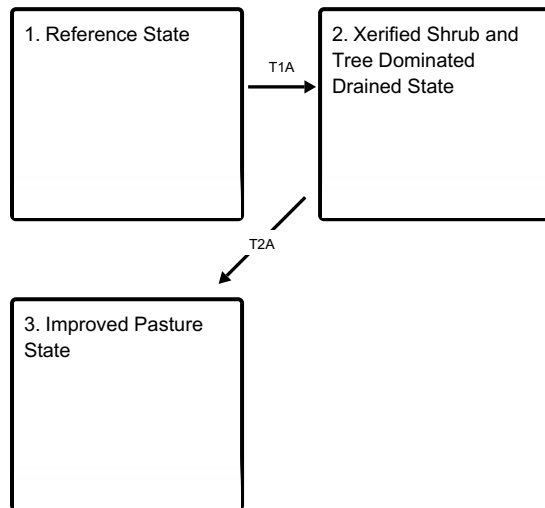
Provisional

Contributors

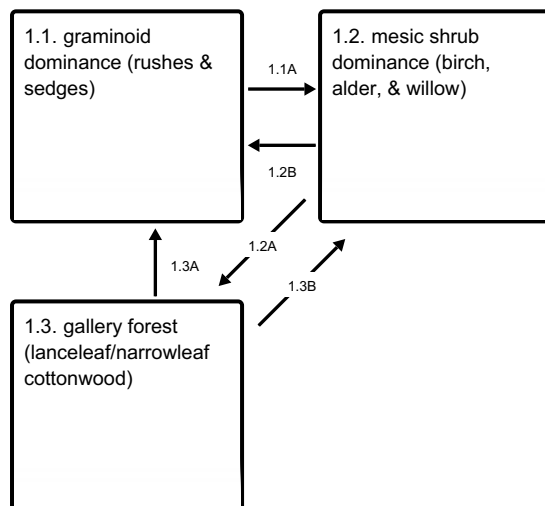
Travis Nauman

State and transition model

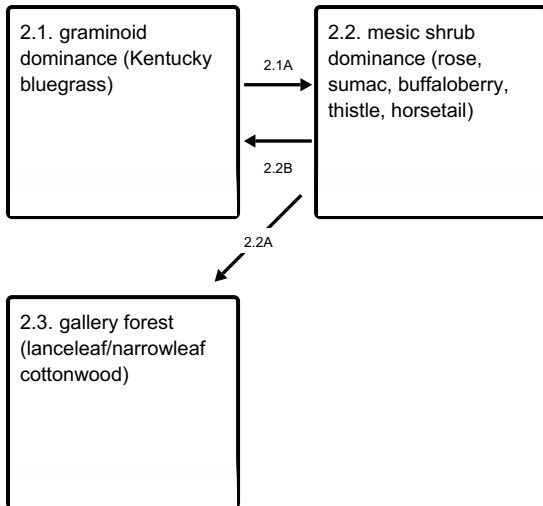
Ecosystem states



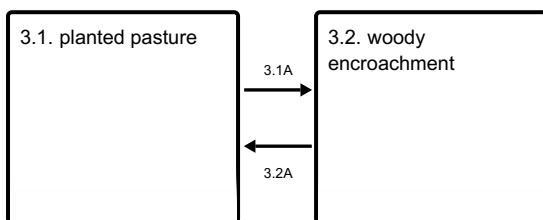
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1 Reference State

The Reference State is a description of this ecological site just prior to Euro-American settlement but long after the arrival of Native Americans. The description of the Reference State was determined by NRCS Soil Survey Type Site Location information and familiarity with rangeland relict areas where they exist. The Reference State would have been in any of three phases depending on stream gradient and how recently fire had occurred or when beavers had last been present. Along steeper stream gradients, succession would have rapidly proceeded from low-statured graminoids (1.1), to shrubs (1.2), and lastly to trees that reproduce in their own shade (1.3). A complete list of species by lifeform for the Reference State is available in accompanying tables in the "Plant Community Composition by Weight and Percentage" section of this document. Along gentle gradients beavers would have consumed all the largely deciduous woody stems and constructed dams. Once the nearby food and building materials were exhausted, the colony of beavers would have moved to another reach of the stream, making the abandoned dams and depleted stretch vulnerable to blow out from the next large convectional storm. This phase is short since most of the woody species re-sprout and are dominant again within a decade or so. The resulting drop in the water table would have stressed the moisture-demanding woody species and favored the graminoids, allowing the graminoids to eventually reclaim the drier streamside banks. Thus, rather than one plant community becoming stable, these stretches of stream would have been in a continual state of change. Fur trapping in the 1820s-1830s resulted in the reduction of beaver by about 95% (Parson 1996). Without these animals to maintain their stair-step configuration of dams, the whole hydrologic regime of these drainages changed. What were once small perennial streams became ephemeral, and succession was truncated. Beaver have not returned in number until recent decades (when the fur trade diminished and furbearers began to be raised on farms). Thus, by the time of the European settlement period, huge changes in these systems had already taken place.

Community 1.1 graminoid dominance (rushes & sedges)

This early seral phase would have been dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), and native perennial water-demanding species such as reed canarygrass (*Phalaris arundinacea*), and mountain brome (*Bromus marginatus*). Heavy local utilization by moose or beaver would have kept back the woody species, allowing this graminoid phase to persist.

Community 1.2

mesic shrub dominance (birch, alder, & willow)

A set of mesic shrubs including water birch, yellow willow, and gray alder would have quickly overtopped the graminoids, unless shrubs were cropped by moose or beaver.

Community 1.3

gallery forest (lanceleaf/narrowleaf cottonwood)

Without beaver, tree cutting, and/or fire, a thick streamside (gallery) forest dominated by shade-tolerant lanceleaf and/or narrowleaf cottonwood would have developed.

Pathway 1.1A

Community 1.1 to 1.2

Along gentler stream gradients, ponding caused by construction of beaver dams would have brought the water table up in areas that would have otherwise been dry. Heavy grazing by bison and/or elk would have reduced the graminoids, giving way first to some taller forbs such as Missouri goldenrod (*Solidago missouriensis*) and feathery false lily of the valley (*Maianthemum racemosum*). Quickly following were a set of water-loving shrubs and small trees including water birch (*Betula occidentalis*), willow (*Salix* spp.), and gray alder (*Alnus incana*). The same successional process would have taken place along steeper gradients, but at a more rapid rate.

Pathway 1.2B

Community 1.2 to 1.1

As the supply of palatable deciduous shrubs and trees increased, beaver numbers would also have increased. With time, a heavy concentration of beaver and moose would have reduced the woody component, with the exception of the less palatable shrubs (e.g. Woods' rose (*Rosa woodsii*) and hawthorn (*Crataegus douglasii*)), causing the canopy to open up.

Pathway 1.2A

Community 1.2 to 1.3

The presence of lanceleaf cottonwood (*Populus ×acuminata*) and/or narrowleaf cottonwood (*Populus angustifolia*) seeds being carried by water would have provided for the rapid succession from shrubs to a gallery forest.

Pathway 1.3A

Community 1.3 to 1.1

Without beaver, tree cutting, and/or fire, a thick streamside (gallery) forest dominated by shade-tolerant lanceleaf and/or narrowleaf cottonwood would have developed.

Pathway 1.3B

Community 1.3 to 1.2

This community pathway would be similar to 1.2b, except less intense. Flash flooding may blow out existing beaver dams following convectional storm events, but some smaller-statured trees and shrubs would persist, leaving enough woody material such that beavers could subsist and rebuild their dams.

State 2

Xerified Shrub and Tree Dominated Drained State

State 2 is similar to State 1 in form and function, with the exception of the presence of non-native plants and animals, possible extinctions, and a different climate. State 2 is a description of the ecological site shortly following Euro-American settlement. This state can be regarded as the current potential. Depending on the size of the watershed above, the stream could well have changed from a perennial to ephemeral drainage. Many of the same species of plants found in the Reference State continue to exist in the latter situation because of hyporheic (i.e.

below ground) movement of water, although the period of greenery and its productivity are lessened. The introduction of cattle put pressure on the graminoids (2.1a) and hastened the conversion to shrubs (2.2). The lack of beaver dams meant that sediment moved more rapidly downstream with flashy (short duration, high intensity) precipitation events. Stream channelization occurred with increased rates of flow, leading to xerification of the streamside. With beaver temporarily absent, livestock numbers relatively reduced due to lack of forage, and lack of natural disturbances (2.2a), the shrubs and trees grow larger and shade out many of the forage species favored by livestock (2.3). The most disturbed phase of this State would be the graminoid-dominant phase (2.1), which occurs if moose effectively browse out the shrubby vegetation (2.2b). Kentucky bluegrass (*Poa pratensis*) was introduced at some sites for livestock forage; however it is not capable of holding the stream banks together during convectional storms.

Community 2.1 graminoid dominance (Kentucky bluegrass)

This graminoid-dominated phase is frequently dominated by Kentucky bluegrass. The Forest Service regards this as an introduced species, but it is preferred by livestock over other native graminoids. It is, however, less able to protect stream banks than its native counterparts because of its shallower, weaker roots.

Community 2.2 mesic shrub dominance (rose, sumac, buffaloberry, thistle, horsetail)

This plant community will be dominated by unpalatable mesic shrubs such as Woods' rose, sumac, and silver buffaloberry, with an understory of unpalatable herbs including thistles and horsetail. Species composition will depend upon the type of livestock utilizing the area.

Community 2.3 gallery forest (lanceleaf/narrowleaf cottonwood)

This plant community is dominated by lanceleaf and/or narrowleaf cottonwood, a shade-tolerant species, which will persist in the absence of wildfire, wood cutting, and/or large storm events.

Pathway 2.1A Community 2.1 to 2.2

Heavy season-long use by cattle will diminish the grass component and allow an increase in tall forbs. Sheep will consume most of the forbs and shrubs, but will leave the thistles (*Cirsium* spp.), horsetail (*Equisetum* spp.), Woods' rose, skunkbush sumac (*Rhus trilobata*), and silver buffaloberry (*Shepherdia argentea*).

Pathway 2.2B Community 2.2 to 2.1

Moose have become more abundant of late and focus their attention on yellow willow and water birch, especially during the winter. This will cause a retardation of the shift to shrub and tree dominance.

Pathway 2.2A Community 2.2 to 2.3

Without moose and/or beaver consumption of shrubs and sapling trees, the shrub phase quickly transforms to a gallery forest.

State 3 Improved Pasture State

Some private land owners have bulldozed the streamside vegetation to remove trees needed by beavers to pond up the stream and/or to remove shade to increase forage production for livestock. Introduced species such as orchardgrass and smooth brome have been planted as the site became xerified, but more conducive to cattle grazing. The early seral vegetation created constitutes Phase 3.1. With time and heavy cattle grazing (3.1a), the

tendency is for the original shrubs and trees to return (3.2). If introduced grass dominance is desired, mechanical or chemical retreatment to reduce the woody plants will be required (3.2a).

Community 3.1 planted pasture

This plant community will be dominated by introduced species such as orchardgrass and smooth brome.

Community 3.2 woody encroachment

This plant community will be a mix of introduced grasses and native shrubs that have re-established following a period of heavy continuous season-long grazing.

Pathway 3.1A Community 3.1 to 3.2

In order to maintain an herbaceous-dominant phase, the native woody species may require re-treatment using mechanical or chemical means.

Pathway 3.2A Community 3.2 to 3.1

Some re-establishment of native shrubs will occur if the site is heavily grazed during the growing season of the grasses.

Transition T1A State 1 to 2

The simultaneous introduction of European livestock and exotic plant species, the near extirpation of beaver along with its influence on the hydrologic regime, and a warmer drier climate were all factors involved in the transition to State 2. A return to State 1 would not be impractical because of these issues.

Transition T2A State 2 to 3

Since there is diminished forage production in the woody plant-dominated phases of State 2, some private landholders have, through prescribed fire and mechanical treatments, cleared out the streamside vegetation and planted exotic species such as smooth brome (*Bromus inermis*) or orchardgrass (*Dactylis glomerata*) to replace the native species.

Citations