10710
Sierra Nevada Alpine Dwarf-Shrubland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None

Vegetation Type
Shrubland

Map Zone
6

Geographic Range
This widespread ecological system occurs above upper timberline throughout the Sierra Nevada and Southern Cascades, including alpine areas of ranges in California and Oregon.

Biophysical Site Description
Elevations are above 2,800m. This system occurs in areas of level or concave glacial topography, with late-lying snow and sub-irrigation from surrounding slopes. Soils have become relatively stabilized in these sites, are moist but well drained, strongly acidic, and often have substantial peat layers.

Vegetation Description
The system is commonly comprised of a mosaic of plant communities that include *Arenaria kingii*, *Ericameria discoidea*, *Artemisia arbuscula*, *Phlox covillei*, *Eriogonum incanum*, *Eriogonum ovalifolium*, *Eriogonum roseum*, *Polygonum shastense*, *Leptodactylon pungens*, and *Phyllodoce breweri*. Floristically, communities within this system have desert affinities rather than cordilleran affinities. Vegetation in these areas is controlled by the absence of persistent snow, wind desiccation, permafrost, and a short growing season.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ARKI	*Arenaria kingii*	King's sandwort
ERDI14	*Ericameria discoidea*	Whitestem goldenbush
ARAR8	*Artemisia arbuscula*	Little sagebrush
PHCO12	*Phlox covillei*	Coville's phlox
ERIN9	*Eriogonum incanum*	Frosted buckwheat
EROV	*Eriogonum ovalifolium*	Cushion buckwheat
ERRO6	*Eriogonum roseum*	Wand buckwheat
POSH	*Polygonum shastense*	Shasta knotweed

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description
Vegetation in these areas is controlled by snow retention, wind desiccation, permafrost, and a short growing season. Dry summers associated with major drought years (mean return interval, 100yrs) favor grasses over forbs, whereas wet summers cause a more diverse mixture of forbs and graminoids.

Avalanches on steeper slopes where soil accumulates can cause infrequent soil slips that expose bare ground.

Very small burns of a few square meters (replacement fire) caused by lightning strikes were included as a rare disturbance, although lighting storms are frequent at those elevations. The calculation of lightning strike frequency was not based on fire return intervals, but on the number of strikes (in this case, five) per 1,000 possible locations per year.

Native herbivores (Rocky Mountain bighorn sheep, mule deer, and elk) were common in the Alpine but probably did not greatly affect vegetation cover because animals move frequently as they reduce vegetation cover.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	227	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	227	100		

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description
This ecological system occurs sporadically in variable-size patches of the Alpine. Patch size varies from a few acres to 100ac in mountain basins. Stand-replacement fires may be caused by lightning strikes that do not spread due to the sparse cover of fine fuels and extensive barren areas acting as fire breaks.

Adjacency or Identification Concerns
Adjacent to and inter-mixed with Sierra Nevadan Dry Tundra.

Issues or Problems
Scarce information on this system.

Native Uncharacteristic Conditions

Comments
Reviewer modified the description to fit the Sierran geography.

Succession Classes

Mapping Rules

Upper Layer Lifeform	Height (m)	Canopy Cover (%)									
		0-10	11-20	21-30	31-40	41 - 50	51-60	61-70	71-80	81-90	91-100
Herb	0-0.5	A	A	A	A	A	A	A	A	A	A
Herb	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Herb	>1.0	A	A	A	A	A	A	A	A	A	A
Shrub	0-0.5	B	B	B	B	B	B	B	B	B	B
Shrub	0.5-1.0	B	B	B	B	B	B	B	B	B	B
Shrub	1.0-3.0	B	B	B	B	B	B	B	B	B	B
Shrub	>3.0	B	B	B	B	B	B	B	B	B	B
Tree	0-5	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	10-25	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	>50	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A 13 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARKI	Arenaria kingii	King's sandwort	Upper
ERDI14	Ericameria discoidea	Whitestem goldenbush	Upper
ARAR8	Artemisia arbuscula	Little sagebrush	Upper
PHCO12	Phlox covillei	Coville's phlox	Upper

Description

Very exposed (barren) state following a lightning strike. Soil (not rock) may dominate the area. Grasses are more common than forbs or shrubs.

Canopy closure originally input as 0-10%; however, due to mapping rules, it was changed to 0-20%.

Maximum Tree Size Class

None

Class B 87 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARKI	Arenaria kingii	King's sandwort	Upper

ERDI14	Ericameria discoidea	Whitestem goldenbush	Upper
ARAR8	Artemisia arbuscula	Little sagebrush	Upper
PHCO12	Phlox covillei	Coville's phlox	Upper

Description
Alpine community is dominated by semi-continuous layer of ericaceous shrubs. Plant cover may vary from 10% on exposed sites to as much as 50% on mesic and more protected sites. Infrequent replacement fire in the form of lightning strikes, severe summer droughts, and rare avalanches on steeper slopes with soil cause a transition.

Maximum Tree Size Class
None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Late1:CLS	9
Late1:CLS	10	Late1:CLS	999

Probabilistic Transitions

Disturbance Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Optional 1	Late1:CLS	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.01	100	Yes	0

Optional Disturbances
Optional 1: Avalanches

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