

24. Devil's Garden (Keeler-Wolf 1984a)

Location

This established RNA is on the Modoc National Forest. It lies 23 miles (36 km) NNW. of Alturas, occurring in portions of sects. 28, 29, 32, and 33 T46N, R12E MDBM (41°48'N., 120°36'W.), USGS South Mtn. 15' quad (fig. 49). Ecological subsection – Devil's Garden (M261Gb).

Target Element

Western Juniper (*Juniperus occidentalis* ssp. *occidentalis*)

Distinctive Features

Western Juniper Woodland: The Devil's Garden RNA contains the only specifically designated scientific reserve of this major plant association in NE. California. The RNA is positioned within the most extensive single stand of western juniper anywhere, and it is within its zone of optimal development (fig. 50).

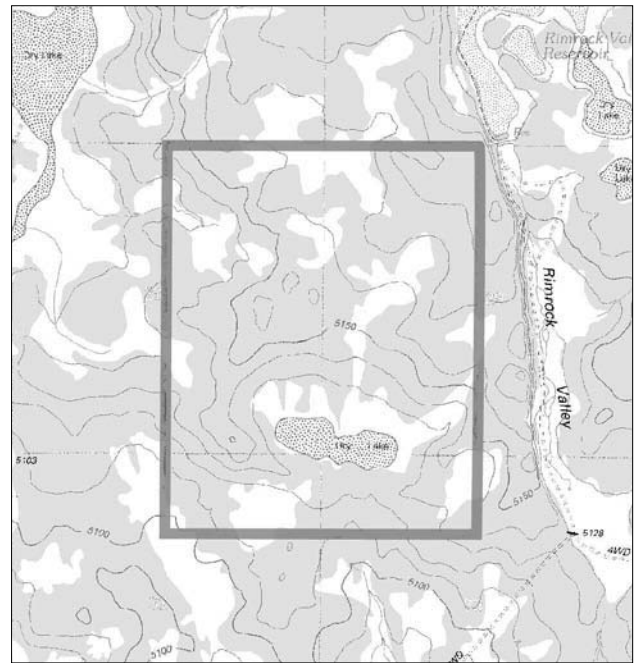
Artemisia Shrub-Steppe: This widespread trans-montane vegetation, characterized by a mixture of shrubs and grasses, is not well represented in the California RNA system (see Babbitt Peak, Cahuilla Mountain, Indiana Summit, McAfee, Mud Lake, Sentinel Meadow, Whippoorwill Flat, and White Mountain), but it is extensive in this RNA. The low grazing pressure in this type locally has preserved a diversity of native grasses and herbs frequently reduced in other sagebrush communities in the region.

High Plant Diversity in a Stressful Environment: The Devil's Garden RNA has a substantially higher diversity of vascular plants (up to 52 species/0.1 ha) than has been listed for other western juniper and sagebrush-steppe associations (West 1988). This raises questions about the origins of this diversity within an area of such habitat uniformity, yet high environmental stress.

Succession on the 1959 Burn: Little is known about succession in western juniper woodland. Twenty-four years after a fire in the SE. part of the area, there was a surprisingly high density of juniper saplings as well as young shrubs of *Artemisia tridentata* and *Purshia tridentata*. Comparisons with descriptive accounts of the vegetation from 10 years after the burn indicate distinct trends such as replacement of once extensive ruderal vegetation (e.g., *Verbascum*, *Cirsium*) by later successional native species.

Patterned Ground: Frost mounds and frost lines occur in several places within and adjacent to the RNA. These features are usually associated with periglacial activity, and these NE. California examples are among the lowest elevation of any known in the state. The cold, dry, continental climate of the area and the predominantly heavy clay soil, subject to much expansion and contraction during freezing and thawing, may be responsible for their presence.

Rare Flora: *Erigeron elegantulus* (List 4), *Hackelia cusickii* (List 4), *Penstemon cinereus* (List 4), *Poa fibrata* (List 3), and *Polygonum polygaloides* ssp. *esotericum* (List 1B, type locality, Devil's Garden) are considered rare by CNPS.



**Figure 49—
Devil's Garden
RNA**

Physical Characteristics

The area covers 800 acres (324 ha). Elevations range from 5100 ft to 5190 ft (1555-1582 m). Topography is very gradual and gently-rolling, with one shallow, vernaly flooded depression located in the S.-central portion. A small area of fault-raised rimrock escarpment occurs on the NE. corner. Patterned ground related to frost heaving occurs in portions of the area.

Rocks are entirely late Pliocene to early Pleistocene volcanics (Devil's Garden Basalt). Soils vary from haplargids to haploxerolls and vertisols. Climate is relatively harsh. Annual precipitation is estimated between 15 and 20 inches (380-500 mm). It is mostly snow, which is often blown clear over large areas. Temperatures range from January minima of about 14 °F (-10 °C) to July maxima of about 86 °F (30 °C).

Association Types

Two 0.1-ha plots were sampled in the western juniper woodland.

Western Juniper Woodland (72110): 592 acres (240 ha). This major association may be broken down into three phases locally: rimrock juniper, open juniper, and successional juniper. Rimrock juniper covers 7 acres (3 ha); this phase has the highest density of western juniper and other large woody species such as *Cercocarpus ledifolius* and *Prunus virginiana* var. *melanocarpa* (average stem density; 600/ha). Other representative shrubs and herbs include *Artemisia tridentata*, *Amelanchier pallida*, *Chrysothamnus viscidiflorus*, *C. nauseosus* ssp. *albicaulis*, *Ribes cereum*, *Sambucus caerulea*, *Cirsium utahense*, *Elymus triticoides*, and *Scrophularia lanceolata*.

Open juniper covers 505 acres (204 ha). On 0.2 ha of sampled area, juniper densities are 200-340 trees/ha. Shrub layer is dominated by *Artemisia arbuscula* with occasional *Ribes velutinum*. A surprising diversity of herbs and grasses are encountered on the sample plots, including 11 species of grasses and 40 species of herbs. The majority of these species are shared with *Artemisia arbuscula* shrub-steppe, but several shade and duff-tolerant species characteristic beneath junipers include *Senecio integerrimus*, *Fritillaria pudica*, *Hackelia cusickii*, *Lithophragma tenellum*, *Plectritis macrocera* var. *grayi*, and *Collinsia parviflora*. The openings are generally rockier than true *Artemisia arbuscula* shrub-steppe and contain certain species that are less common on the open, treeless *A. arbuscula* flats, including *Agropyron spicatum*, *Arabis holboellii* var. *retrofracta*, *Cordylanthus ramosus*, *Crepis modocensis*, *Erigeron elegantulus*, *Eriogonum douglasii*, *Penstemon laetus*, and *Thelypodium flexuosum*.

Successional juniper occupies about 80 acres (32 ha) that burned in 1959. Although this association type is not presently dominated by juniper, the density of stumps and snags indicates that it once had a heavy juniper cover. Several herbaceous species appear restricted to this area, including *Geum ciliatum*, *Cirsium vulgare*, *Achillea millefolium*, *Crepis acuminata*, *Phacelia imbricata*, *Madia citriodora*, and *Arenaria nuttallii* ssp. *fragilis*. Regeneration of juniper is better here than on typical undisturbed open woodland (about 70 vs. 30 saplings and seedlings/ha). Also characteristic of the burned area is a lower diversity of grasses and herbs than in adjacent undisturbed juniper woodland.



Figure 50—Devil's Garden, open western juniper woodland looking west from northeast corner of Devil's Garden RNA. (1983)

Artemisia Shrub-Steppe (35300, 35400, 44131): 208 acres (84 ha). This association generally occurs on less rocky and more poorly drained sites than the juniper woodland. It may also be divided into three phases: rocky scabland, upland, and closed basin.

The rocky scabland type covers 5 acres (2 ha) and has the lowest cover of *A. arbuscula* and other species, including *Eriogonum umbellatum*, *E. douglasii*, *Arenaria congesta*, *Festuca idahoensis*, and *Sitanion hystrix*. These species are scattered among nearly continuous outcroppings of basalt, with only small pockets of soil.

The upland phase is the most diverse and extensive, covering 160 acres (65 ha). *Artemisia arbuscula* is the dominant woody species. However, cover is often exceeded by perennial grasses, including *Festuca idahoensis*, *Koeleria macrantha*, *Poa juncifolia*, *Stipa columbiana*, *Danthonia unispicata*, and *Sitanion hystrix*. This phase may be flooded briefly in spring. Scattered rocks pepper the surface of the soil, which is intermediate in depth between the other two phases of shrub-steppe. Drainage channels leading into the small basin contain several vernal hydrophilic species such as *Perideridia bolanderi*, *Polygonum polygaloides* ssp. *esotericum*, and *Navarretia minima*. Other typical species of this modal *A. arbuscula* type include *Penstemon speciosus*, *Lomatium triternatum*, *L. nudicaule*, *Zigadenus paniculatus*, *Blepharipappus scaber*, *Poa fibrata*, *Phlox douglasii* ssp. *rigida*, *Antennaria luzuloides*, *Plagiobothrys cusickii*, *Gilia leptalea*, and *Erigeron linearis*.

The closed basin type is dominated by *Artemisia arbuscula* and *Chrysothamnus viscidiflorus* ssp. *pumilus* (43 acres, 17 ha). Grasses are substantially less important than in other *A. arbuscula* types. Diversity is low with *Lomatium leptocarpum*, *Polygonum polygaloides* ssp. *esotericum*, *P. douglasii*, *Gayophytum* sp., *Poa juncifolia*, *Blepharipappus scaber*, and *Perideridia bolanderi* among the few species. Parts of this basin are almost devoid of vegetation. The summer-dry, deeply cracked vertisol is probably flooded and saturated with water for at least a month in spring and remains moist for perhaps two additional months in most years.

Plant Diversity

One hundred and four taxa are listed.

Conflicting Impacts

Cattle grazing has some impact, particularly on the NE. corner and E.-central part of the RNA. The size of the RNA has been reduced by half since originally established in 1933. Bulldozers were used to fight the 1959 fire on the RNA, and resulting trails were still obvious in 1984.