mte and a midge, are approved for the control of rush skeletonweed (Cullen 1974). The rust, *Puccinia chondrillina*, infects form A, and has shown positive results in limiting the flowering capability and seed production. Rust strains for forms B and C of rush skeletonweed have not been successful in field experiments (Shelley and Petroff 1999). The gall mite, *Aceria chondrillae*, is the most destructive of all the bioagents. The gall mite causes stunting of the plant and greatly reduces seed production (Cullen 1974). The gall only infects form A of rush skeletonweed, therefore limiting its success at controlling all infestations. The only bioagent that infects all three forms of rush skeletonweed is the gall midge, *Cystiphora schmidti* (Grosve and Cullen 1981). The gall midge’s impact on the weed is less than that of the rust or the mite, which could be explained by its sensitivity to climatic conditions. The mite may not be able to overwinter in areas of extreme cold.

Keep in mind that no control method is flawless, and long-term success is only reached through years of consistent effort. Land managers should be aware of all invasive weeds and take the necessary steps to protect their land from infestations. Remember, the least expensive and most effective invasive weed to control is the first one! If you have any questions regarding procedures and warnings, contact Dr. Wayne S Johnson at (775) 784-1931, or your local extension office.

**Internet Invasive Weed Resources**

- University of Montana [http://invaledbs.montana.edu/](http://invaledbs.montana.edu/)
- Western Society of Weed Science [www.wwesd.org](http://www.wwesd.org)
- Colorado State University [www.arcsearch.colostate.edu/agronomy2.htm](http://www.arcsearch.colostate.edu/agronomy2.htm)

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**Literature Cited**


Cover photograph credits: clockwise from top left: rush skeletonweed infested hillside, Jerry Adler; rush skeletonweed mature plant, University of Idaho; rush skeletonweed infested rangeland, Washington State University.

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**COOPERATIVE EXTENSION**

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**Rush Skeletonweed: Prevention and Control in Nevada**

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**In Idaho, Rush Skeletonweed increased from a few plants in 1954 to 4 million acres in 2001.**

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**The value of a weed infested ranch in North Dakota recently was reduced by 60 percent.**

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A 1,300 acre ranch near Klamath Falls, Oregon was recently abandoned due to weed infestations and was later sold at auction for a tenth of the value of surrounding property.
Rush skeletonweed (Chondrilla juncea) is a tap-rooted perennial. This noxious weed is native to Asia Minor and the Mediterranean and has invaded Australia, Argentina, Brazil, New Zealand, Portugal, Spain, and the former Yugoslavia. It was first reported in the United States near Spokane, WA in 1938 (Parsons and Cuthbertson 1992). Since then, rush skeletonweed has invaded productive range and pasture lands, creating dense monocultures and displacing native plants. It currently infests more than 6.2 million acres of rangeland in the Pacific Northwest and California. In Nevada, only Elko county has reported the presence of skeletonweed. Rush skeletonweed quickly invades disturbed or open sites and can infest undisturbed rangelands and croplands. In the Pacific Northwest alone, its annual rate of spread is approximately 98,000 acres. Although, it is primarily spreading on rangelands, rush skeletonweed is a serious threat to agricultural crops because it competes aggressively for light, water, and soil nutrients (Schuman and Robuck 1967, Zimdahl 1980).

Monitoring weed invasions is time consuming and expensive because of the vast expanses of wilderness that must be explored. Many counties simply do not have the ability to effectively monitor invasive weeds. Consequently, rush skeletonweed has more than likely infested a larger number of acres in Nevada than are reported. Regardless of the total amount of infested acres, only judicious monitoring, prevention, eradication and habitat restoration will keep rush skeletonweed from spreading across Nevada. This fact sheet is intended to provide relevant information on why and how to prevent weed invasions and to supply land managers with the necessary knowledge needed to control and eradicate rush skeletonweed.

There is still time to try to stop Nevada against an invasion of rush skeletonweed. Many control measures have proven effective in suppressing and eradicating the weed in areas where it has become established. With all control measures, use caution, seek professional advice where necessary, and use rotational grazing with all other ruminants. Competitive grazing with sheep has shown some success in depressing rush skeletonweed infestations, and is most effective when it is used in a continuous grazing schedule. As mentioned previously, do not overgraze, and use rotational grazing with all other ruminants. Competitive grazing is a compliment to grazing with other native plant species effectively. In crop pasture rotations, it reduced the infestation of rush skeletonweed and increased soil fertility (Wells 1969).

Chemical control is generally more expensive and less effective in controlling rush skeletonweed. The following provides current information collected on chemical herbicides that are used on rush skeletonweed with application rates and trade names. Picloram (Pathway®) can be used at 2 lb/acre, although, picloram at 1 lb/acre plus 24-D at 1 lb/acre (Tordon 101®) is known to give better control (Sheley and Petroff 1999). Single applications of clopyralid (Stinger®) at 0.2 lb/acre reduced rush skeletonweed shoots by 60% three years after treatment (Heap 1993). A mixture of clopyralid at 0.2 lb/acre, and dicamba (Banvel DMA®) at 1 lb/acre was most successful for long-term control, reducing the weed infestation by 75% after three years and by 95% with yearly application (Sheley and Petroff 1999). All herbicides are most effective when applied to weeds infested with biological control agents. Nitrogen fertilizer alone and in combination with some herbicides has decreased the density of some infestations, apparently by increasing plant competition.

**Management Operations:**

- **Mechanical control** through hand pulling when the plant is young, preferably in the first spring, is most effective. Do not mow or cultivate rush skeletonweed infestations. Those are very unsuccessful methods and usually lead to a greater increase in the weed population. Hand pulling provides effective control of rush skeletonweed, however, it requires removal of plants and new growth two or three times per year for 6 to 10 years because new plants will grow from the severed roots. Hand pulling can be made easier if you wet the soil first. Thoroughly burn the plant after it is pulled and make sure the fire is very hot to ensure complete plant destruction (Sheley and Petroff 1999).

- **Cultural control** with grazing and competitive legume planting is effective in controlling rush skeletonweed. Grazing with sheep has shown some success in decreasing rush skeletonweed infestations, and is most effective when it is used in a continuous grazing schedule. As mentioned previously, do not overgraze, and use rotational grazing with all other ruminants. Competitive grazing is a compliment to grazing with other native plant species effectively. In crop pasture rotations, it reduced the infestation of rush skeletonweed and increased soil fertility (Wells 1969).

**Prevention:**

The best recommendation when prescribing a weed prevention program is to turn an unhealthy plant community into an ecologically sound unit and avoid disturbing and damaging healthy functioning systems. To control any invasive weed, seed production and dispersal must be stopped. Seeds are dispersed mainly by wind, water, animals, and vehicles. Sometimes, natural forces and events that distribute seeds cannot be controlled.

As a land manager however, there are several important guidelines that can help to slow the dispersal of weed seeds. First, avoid driving vehicles in infested areas during the seedling period, and always wash the undercarriage of vehicles before leaving an infested area. Livestock grazed in an infestation should be moved to a holding area for 10 to 14 days before they are moved to land absent of weeds (Sheley and Petroff 1999). Grazing should also be properly utilized in areas free from weeds. This means using a rotational grazing schedule and allowing native plants time to recover. Placing stress on a native plant community by overgrazing or disturbing the soil creates an invasive weed pathway.

**Management begins by simply evaluating and monitoring the landscape for the presence of rush skeletonweed. Consider the following questions: Where is the infestation? What is the infestation size? What is the weed density? What type of land does it occupy? What is the soil type? From where is the infestation coming? What is the local ecological adapt, survive and reproduce at every site where they are released. Rush skeletonweed has three biological enemies that affect the weed’s expansion. A rust, a

During the rosette stage (pictured above) in the first year, rush skeletonweed grows a deep tap root. Over time the roots can reach depths of eight feet, and if severed by digging, cultivating, etc., they produce shoots that can reach the surface from depths of up to four feet. Root fragments as small as one inch in length have been known to grow from the severed roots. Hand pulling can be made easier if you wet the soil first. Thoroughly burn the plant after it is pulled and make sure the fire is very hot to ensure complete plant destruction (Sheley and Petroff 1999).