



Lemhi Penstemon and Spotted Knapweed Monitoring

Big Hole National Battlefield



Lemhi penstemon (*Penstemon lemhiensis*) from basal rosettes to flowering plant



Why are Lemhi penstemon and Spotted knapweed important?

Lemhi penstemon (*Penstemon lemhiensis*) is a short-lived perennial flowering plant that is endemic to Lemhi County in eastern Idaho and 4 counties in southwest Montana, including Beaverhead County where Big Hole National Battlefield (BIHO) is located. Over 50% of known populations are made up of 30 plants or less and there are only three large populations known with over 300 plants. Results of inventory and monitoring efforts from 2009-2015 confirm the population at the battlefield to be the largest reported of the species, making Big Hole National Battlefield a crucial place for Lemhi penstemon conservation. Lemhi penstemon is listed as a sensitive species and is ranked as at risk of extinction due to habitat loss from invasion of spotted knapweed (*Centaurea stoebe* L.) and from altered fire regimes. Seedlings requires bare soil microsites to become established and prescribed burning may be effective in stimulating germination and population growth. In the absence of fire, other vegetation may compete for resources and occupy potential germination sites.

Why do we monitor lemhi penstemon?

- To provide status and long-term trends of the total number of established lemhi penstemon and spotted knapweed plants
- To detect changes in the lemhi penstemon population (e.g., number of seedlings, plant establishment, survival of mature plants)

How do we use the monitoring data?

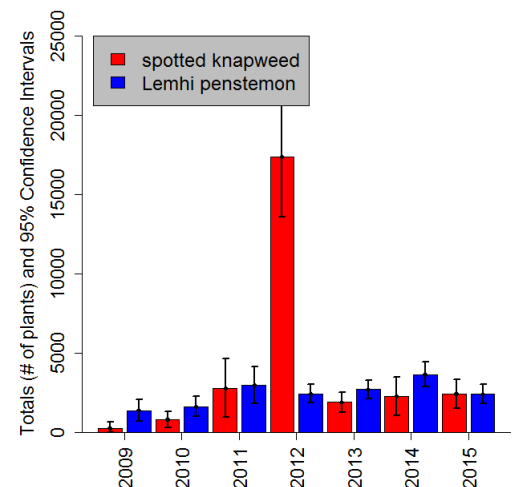
- To assist park management with restoration decision-making, including guiding potential management options, such as prescribed fire
- To enable park managers to avoid critical penstemon habitat during management activities, such as herbicide application
- To support park resource planning and land health reporting efforts

What have we found?

Results of monitoring for the past 7 years have shown an overall increase in the Lemhi penstemon populations on both study sites (Horse Pasture and Howitzer Hill). However, extremely dry weather in 2015 resulted in higher than normal mortality and a small decline in the population from 2014. The invasive spotted knapweed population declined dramatically following a 2012 spike on the Horse Pasture, presumed to be a result of successful treatments with herbicide. But knapweed continues to present a serious management challenge and has increased again in recent years. In September 2014 a prescribed fire was conducted in a portion of the study site to help maintain the cultural landscape of the Battlefield and mimic the historic role of fire on the mountain slope. We hypothesize that fire will also stimulate penstemon population growth but monitoring is essential to verify this and assess how the knapweed responds.



Botanist surveying for Lemhi penstemon plants along a 50-m transect in the Horse Pasture at BIHO.



Population estimates for spotted knapweed and Lemhi penstemon plants on the Howitzer Hill and Horse Pasture hillslope study areas of BIHO, 2009-2015.