

2018

Flowers Penstemon Monitoring

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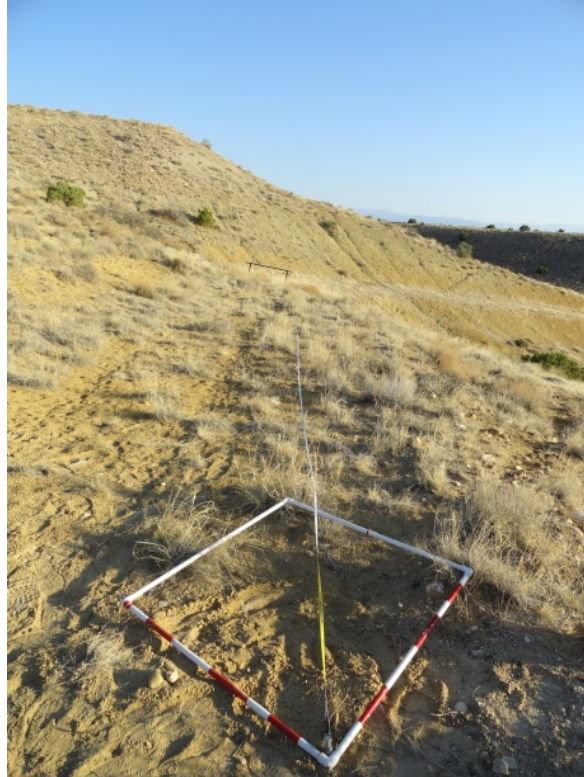


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Introduction

Monitoring of overall survival, health, and plant herbivory for Flowers Penstemon (*Penstemon flowersii*) in the Uinta Basin, Utah, was conducted by the Plants, Soils and Climate Department at Utah State University during 2018 for The Nature Conservancy. The 2018 monitoring season was the fourth monitoring year for Flowers Penstemon at the Dude Young and Collier properties, and was completed on the 7th and 13th of July. Monitoring was conducted on 35 tagged plants, plots, and transects (Boyd & Jones, 2015). No fruiting plants were observed and many of the plants had underdeveloped or no leaves. However, tap roots were examined on underdeveloped or no leaves tagged plants and all appeared to be alive.

The winter of 2017-2018 was unseasonably warm with only 0.08 inches of precipitation from October of 2017 to July of 2018 (US climate). Due to concerns of low moisture, observance of penstemon plants began in late April and early May, which revealed late sprouting and slow growth. Monitoring was postponed in the hope that late spring rains would allow the plants to grow. By early June, the plants had reached less than 2 inches in height. The plants began to die back so monitoring was planned and conducted.

The overall threat to Flowers Penstemon continues to be habitat destructions and invasive species. Our recommendations are to continue working with stakeholders to protect Flowers Penstemon habitat and list it as sensitive species with the Bureau of Land Management (BLM). This report documents the results of 2018 monitoring season.

Plant Monitoring

Tagged Plant Survival and Growth

Of the 35 tagged plants, 26 were vegetative and 9 were dormant.

The determination of dormant versus dead was made by examining the tap root. All 9 were pliable with evidence of some early growth that never progressed to the surface.

Stem counts were taken and found to be significantly less during 2018 due to lack of development (Figures 1 & 2). Even the plants which had good growth, showed no evidence of having bloomed and no seed capsules were observed.

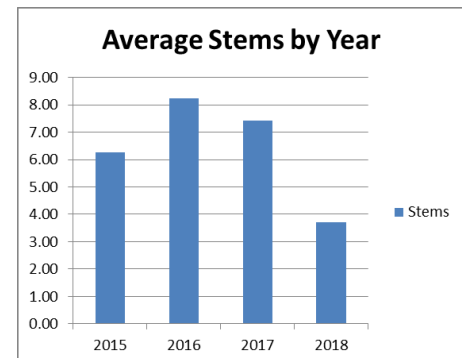


Figure 1 - Average number of stems for each year of monitoring (Boyd & Jones, 2015, 2016, and 2017).

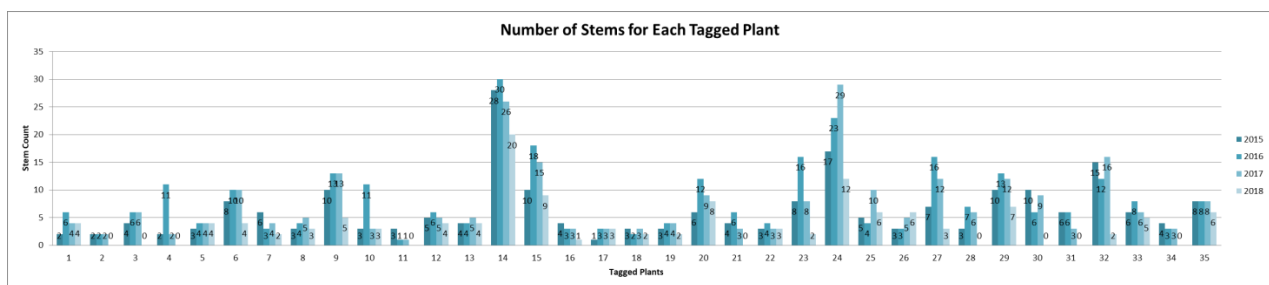


Figure 2 - Number of stems per plant for each year of monitoring (Boyd & Jones, 2015, 2016, and 2017).

Tagged Plant Health

The majority of the plants had already dried-up and were stunted in growth. Those plants still having green growth were also stunted and in fair condition. These plants were yellowing, wilting, and preparing to die back for the year. Tagged plant #14 showed the most growth, but was extremely wilted.

Tagged Plant Herbivory

Only four tagged plants showed signs of herbivory, which is not surprising given the minimal growth of many plants. The herbivory was on the leaves and caused by insects. Of note, there has been significant prairie dog herbivory in the past, especially on the east end of the Dude Young property. However, over the last two years there has been evidence of predators preying on prairie dogs. During monitoring, badger mounds were found with prairie dog skulls in them. Coyote tracks and digging around the prairie

dog mounds were observed during 2017 monitoring, but were not observed this year (Boyd & Jones 2017).

Study Plots

Survival

Mature survivorship was 52.5%, and overall survivorship was 51% due to the loss of two seedlings. Study plots showed 102 plants in 2017 but only 52 plants in 2018. An additional 49 plants are either dormant or dead. This is a significant decrease and is most likely a result of the drought currently being experienced in the area.

Seedling Recruitment

Only two seedlings were found during monitoring in 2017; neither were observed this year, making seedling recruitment zero. Future monitoring will assess whether either of these seedlings were able to survive. No new seedlings were observed in 2018.

Population Life Stage

There was a total of 52 vegetative plants and 49 were either dead/dormant. No seedlings or fruiting plants were identified (Figure 3).

Unfortunately, where no plants were fruiting, the reproductive output for this season is zero.

Without seed capsules it was not possible to

estimate the number of seeds per capsule. This will be necessary in the future along with the average number of capsules per stem to calculate reproductive potential.

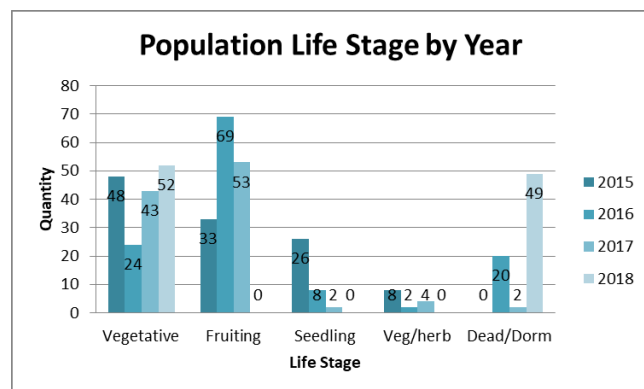


Figure 3 – Number of plants for each life stage by year Boyd & Jones, 2015, 2016, and 2017).

Transects

Transect counts were completed with a total of 91 plants counted. This is a significant drop compared to the previous three years (Figure 4). This is also most likely due to the extremely dry year.

Where the transects are a representation of overall population counts and growth, future monitoring will be important to see if there is any correlation between winter and spring moisture received, and transect counts.

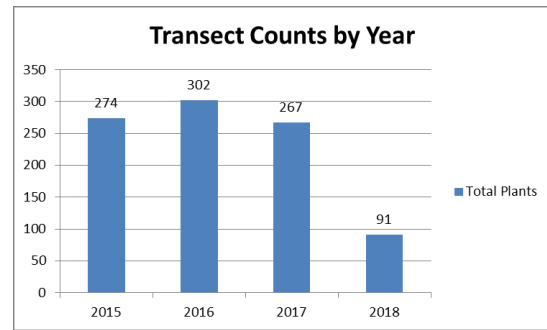


Figure 4 – Total number of plants counted in transects by year Boyd & Jones, 2015, 2016, and 2017).

Threats

Habitat

The continuing oil and gas development on Windy Ridge and the areas surrounding Myton, Utah; has further reduced the available habitat for Flowers penstemon (Figure 5). A new road has been



constructed north of the Dude Young property with well pads being constructed to the west and north of the property.

Additionally, ongoing recreation activities including shooting, partying, and off-road vehicles continue to impact plants and available habitat on the Dude Young property. One new threat was also found - people have begun dumping trash on the property (Figure 6).



Figure 6 - A trash pile found on the Dude Young property.

Invasive Species

Invasive species continue to be somewhat of a threat on both the Collier and Dude Young properties.

There is abundant cheat grass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*) and Russian thistle (*Salsola tragus*). There is one noxious weed species present, Russian knapweed (*Acroptilon repens*).

Treating both properties for the invasive species is not feasible, but the Russian knapweed should be treated. Coordination with Duchesne County to treat the roadside infestations of the knapweed will provide the best opportunity to success.

The best way to prevent the further spread of both invasive and noxious weed species would be to prevent the off-road traffic occurring on the Dude Young property, and to spray the Russian Knapweed on both locations.

Climate Change

Changes in temperature and precipitation continue to be a long-term concern for Flowers penstemon.

Weather data was reviewed over the last 100 years, when a trend line was added it showed minimum temperatures increasing by approximately 4°, and maximum temperatures increasing by approximately 2° (Figure 7). Average annual precipitation has decreased by approximately 25 mm over the last 100 years (Figure 8).

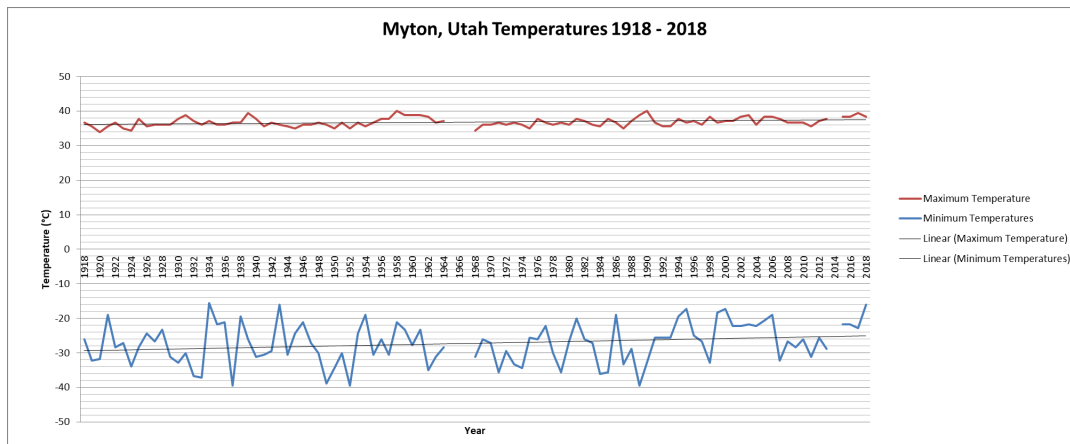


Figure 7 - Maximum and minimum temperatures for Myton, Utah 1918 – 2018.

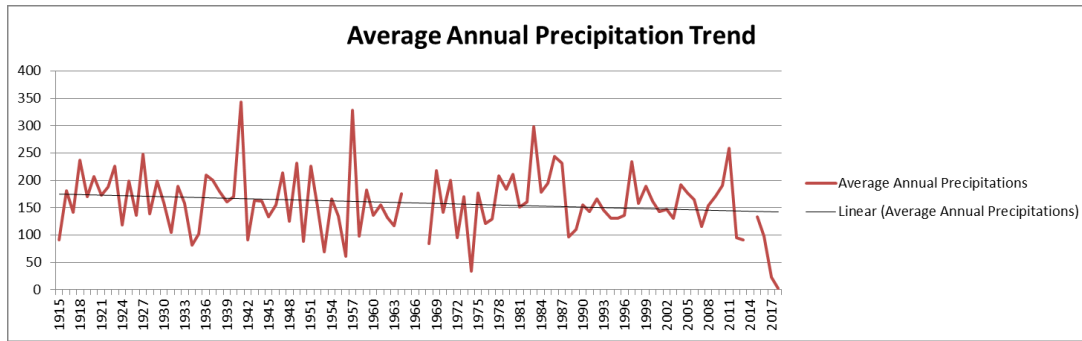


Figure 7 - Trend of average annual precipitation for Myton, Utah 1918 - 2018.

Comparison of plot counts and transect counts shows a downward trend for both with the most dramatic drop being from 2017 to 2018.

Monitoring over the next few years will be essential to see if these trends continue and to measure any correlation of between precipitation and population growth (Figure 9 and 10).

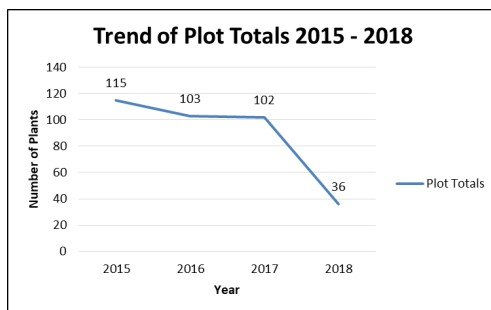


Figure 9 - Trend for the total number of plants in plots 2015 - 2018.

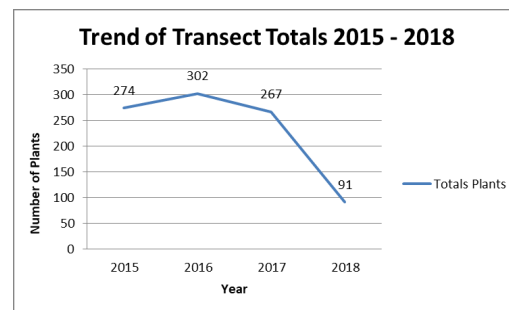


Figure 10 - Trend of the total number of plants in transects 2015 - 2018.

Summary and Recommendations

Monitoring of plants, plots, and transects showed very little plant growth during 2018, and no reproductive output. These conditions most likely correspond to the extremely dry winter and spring in the Uintah Basin. This may demonstrate the importance of moisture in the long-term success for this plant and continued weather data monitoring is recommended.

The extremely dry conditions did allow for some additional insights. Tagged plants that did not show growth during 2018 were all still able to be located and it was possible to determine that the tap roots

were alive. Continued monitoring is recommended to determine how long plants can remain dormant and to assess whether the ability to remain dormant for multiple years is perhaps an essential survival technique for this plant, especially given the recurrent drought cycles in the Uinta Basin.

Noxious and invasive weeds are an ongoing issue and treatment of the Russian knapweed is recommended. Coordination with Duchesne County to help treat roadside infestations is also recommended. Preventing off-road traffic on the Dude Young property is also highly recommended as this will most certainly be spreading the infestations.

Immediate action should be taken to protect the Dude Young property. Suggestions in the past have included placing boulders along the small hill where there is extensive off-road traffic, signage, and transferring ownership of the property to the BLM for management. There are multiple natural resources on the property that need active management including: *Sclerocactus wetlandicus* and *Sclerocactus brevispinus*, which are a federally listed threatened species under The Endangered Species Act. Additional resources that need to be protected on this site are archaeologic sites and potential yellow-billed cuckoo habitat.

Concerns have been raised about oil and gas drilling on the Dude Young property, but the property should be designated as an area of critical environmental concern with no surface occupancy, which would prevent oil and gas development. Additionally, with the well pads already being constructed around the Dude Young property, there would be no need to construct well pads on the property as the production zones could be or already have been accessed from the pads around the Dude Young property.

One additional benefit of BLM management would be to list Flowers penstemon as a BLM sensitive species, which allow the BLM to bring attention and possibly some protection to the species when permitting oil and gas drilling in the area. While BLM would not have jurisdiction to prevent drilling

based on the presence of Flowers penstemon, it would open the door to surveys which would allow for improved population estimates and for recording losses being suffered with oil and gas development.

Surveys in 2019 will be important to assess if the dormant plants were able to survive the winter. Due to the possibility of plants remaining dormant for multiple years, a new category was added to the life stage tables to track the reemergence of any plants previously marked dead/dormant. If new plants are identified in the plots but are not seedlings, previous drawing and photos should be reviewed for reemergence of a previously dead/dormant plant.

Literature Cited

Boyd, L., & Jones, C. (2015). *Monitoring Plan for Flowers Penstemon (Penstemon flowersii)*. Vernal, Utah, USA.

Boyd, L., & Jones, C. (2016). 2016 *Flowers Penstemon (Penstemon flowersii) Monitoring Report*. Vernal, Utah, USA.

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