

PINES TRACT VEGETATION STUDY

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The purpose of the “Pines Tract Vegetation Study” continues to be to determine if the under-mining of the coal reserves of the (“Pines Tract”) has had any affect on the Link Canyon Trail Columbine (*Aquiligia flavescens var. rubicunda*) and the riparian area within the Pines Tract coal lease area.

On July 19, 2010, the Pine Tract Area was visited by Keith Zobell (Environmental Specialist) and Mike Davis (Mining Engineer for Canyon Fuel Company, SUFCO Mine). The purpose of this trip was to revisit all of the original photographic points that have been established and to retake photographs at each of the sites and to determine the general vegetative growth, plant vigor, and plant condition at each of the established photographic sites. These sites are revisited each year at approximately the same date each year, so as to minimize any possible seasonal variations, Photographs of each site are identified and included in this report.

The weather records at the SUFCO Mine site show that approximately 68% of the normal moisture had be received through the end of June 2010 for this moisture year. The months of May and June each received 93% of the normal average precipitation for these months. The below average moisture for the past several is still influencing the overall growth and vigor of the vegetation as well as the unusually warm temperatures for the last part of June and early July. The overall growth is fair and somewhat below that of last year. The stream in Box Canyon continues to be basically dry above station 090. The perennial flow starts just below the station 090. There are some small intermittent flows above station 090 up to station 219, with the creek being totally dry above this station. The small “Pond Area” at the Grotto continues to be dry, however there is some seeping water on the cliff faces just above the pond area. This “seepage” appears to less than that observed last year. The spring (Pines 105) and the area at Photo point 10 continues to be dry. However, the riparian area at Photo point 10 continues to be green and growing which indicates that the area is still receiving some moisture for these riparian plants.

The “Pines Tract” was not grazed this spring, although there is evidence of some grazing in the Study area. The poor plant growth and vigor can be attributed to the lack of moisture and warm weather.

The stakes marking the location of stations 1,2,8 and 9 have been removed. New stakes were installed at stations 1 and 8. Rock piles were installed at stations 2 and 9.



Photo Point 1a

There are three columbine plants at this site. The plants have fair vigor. Two plants have some inflorescences, which are 15-18 inches in length. The third plant has no inflorescences.



Photo Point 1b

At this photo point there is only one living plant. This plant has good vigor and 15-18 inch inflorescence. The second plant that was at this site appears to be dead. These plants are up on the cliff face so close examination can not be made. There appears to be some moisture coming from the rock fracture that they are growing in.



Photo Point 1c

At this photo point there is only one columbine plant and it now appears to be dead. The plant is located approximately 20-25 feet up on the cliff face, so no measurements or examinations can be made.



Photo Point 2

At this photo point there is only one plant still alive. Originally there were three. The surviving plant is small with poor vigor. It has several flowering heads that appear to be 6-8 inches long. The plant is located 20-25 feet up on the cliff face so exact measurements cannot be made. There does not appear to be any moisture coming from the rock fracture that the plant is growing in. The lack of moisture is probably the cause of the poor vigor and the other plants dieing.



Photo Point 3

There is one small plant at this photo point, which is growing behind the log and at the base of the rock. Last year this plant appeared to be a seedling. This year the plant is still small with fair vigor but has no inflorescence.



Photo Point 4

At this photo point there are several columbine plants. Only one columbine plant has any inflorescence, which is 7 inches long. All of the other columbine plants have 3-4 inches of basal growth and have low vigor. *Carex* (*Carex spp.*) plants are sparse and have 3-4 inches of basal growth. Woods Rose (*Rosa spp.*) has 4-5 inches of new growth but have no flowering or seed heads. *Potentilla* (*Potentilla spp.*) has 2-4 inches of new growth. Aspen (*Populus tremuloides*) has new growth of 4-5 inches. This is a very dry site. The overall vigor at this site is poor and is probably due to lack of moisture and being a very dry site.



Photo Point 5

At this photo point there are still three main columbine plants, however there are two new seedling columbine plants. The inflorescence on the main columbine plants are 12-14 inches in height, with both flowers and seed heads. The new seedlings have 3-4 inches of basal growth. There are a few Bluegrass (*Poa pratensis*) plants with 12-14 inch seed heads. Carex (*Carex spp.*) has 3-4 inches of growth. Yarrow (*Achillea millefolium*) plants have 10 inch seed heads. Geranium (*Geranium spp*) plants have 3-4 inches of basal growth. The site has not been grazed but is in poor condition. Overall vigor is poor to fair. There is some leaf litter on the ground. There is 35-40% bare ground at this site. There is no water in the creek bed.



Photo Point 6

This photo point site has been lightly grazed this year. The site has 40% bare ground with some leaf litter. The Aspen has 6-8 inches of new growth. There are very few Bluegrass plants which have 3-4 inches of basal growth and 10 inch seed heads. There are a few scattered Carex plants that have 2-3 inches of new basal growth. The Yarrow plants have 3-4 inches of basal growth with a few 10-12 inch seed heads. There are only a few Big Sage (*Artemisia tridentate*) plants which have 1-3 inches of new growth. There are a few Herbaceous Sage (*Artemisia ludoviciana*) on the site which have a current growth of 8-10 inches. The Woods Rose (*Rosa woodsii*) have new growth of 3-4 inches. Joint Grass (*Equisetum spp.*) have shown up in significant numbers and are 4-7 inches in height. The overall condition of the site is very poor. There is no water in the Creek at this site.



Photo Point 7

At this photo point there are still no columbine plants. There are a few Geranium plants that have 3-4 inches of new growth but no inflorescence. There are a few Yarrow plants with 3-4 inches of new growth but no seed heads. There are also a few Carex plants with 5-7 inches of new growth with no seed heads. There is no Bluegrass plants at the site. The site is 95 % bare ground. There is no water in the creek at this site.



Photo Point 8

This photo point is a hanging garden area located in the “Grotto” area. The ferns and the lichens receive moisture that is coming from the fractures in the cliff face. The fern and lichen density is low and approximately the same as last year. The current fern growth is 2-3 inches. There is some moisture on the face of the cliff but there is no flowing or dripping moisture.



Photo Point 9a

At this photo point there is no dripping or flowing moisture, however there is some dampness in the alcove area. Lichen growth is poor. The fern growth is 3-4 inches.



Photo Point 9b

The rock face is damp but there is not dripping or flowing water. The lichen and fern density is low. Fern growth is 3-4 inches.



Photo Point 10

At this photo point the vegetative condition and vigor is very poor. The overall trend is down. There is no apparent grazing at the site. The site is 95% bare ground with very little (if any) litter. The Aspen growth is 12-15 inches. Woods Rose growth is 4-6 inches. Wire Grass (*Juncus spp.*) is sparse and has 4-6 inches of new growth.



Riparian Area adjacent to Photo Point 10

This photo point shows a fence line contrast between the protected area (on the left) and the area open to grazing (on the right). The area open to grazing has been lightly grazed but still has good density. The current willow growth is 5-8 inches and the current Carex growth is 5-7 inches.

