

Report on the Status of the 1996 and 1997 Monitoring Plots
J. Andrew Alexander
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BPCB01 (Formerly: BP)
Bristlecone Pine; Cedar Breaks; Plot 01

Baseline Azimuth: 172°
Transect Azimuth: 82° (recommended azimuth if the baseline is correct)

Status

This plot was only measured in 1996. Relocating it has not been attempted since it was established.

The plot was setup with a baseline azimuth of 172°. Transects 1-4 were setup at an azimuth of 84° and transect 5 was setup with an azimuth of 81°. It is not known whether these azimuths are accurate or whether these azimuths were taken with the correct declination. When measured in the future, the baseline azimuth should be retaken, noting whether declination was used, and the correct perpendicular azimuth for the transects should be determined. It is possible that the 1996 data will not be directly comparable to future data because of these potential problems.

Species Identification

1996	2001 Verification	Voucher
<i>Abies lasiocarpa</i>	<i>Abies lasiocarpa</i>	Y
<i>Arenaria cf. fendleri</i>	<i>Arenaria fendleri</i>	Y
<i>Astragalus sp.</i>	ID not confirmed	N
<i>Draba sp.</i>	<i>Draba subalpina</i>	Y
<i>Erigeron cf. eatonii</i>	<i>Erigeron ursinus</i>	Y
<i>Eriogonum sp.</i>	<i>Eriogonum panguincense</i>	Y
<i>Frasera sp.</i>	<i>Swertia radiata</i>	Y
<i>Gentiana sp.</i>	<i>Gentiana affinis</i>	Y
<i>Haplopappus cf. clementis</i>	<i>Haplopappus clementis</i>	Y
<i>Lomatium sp.</i>	<i>Lomatium minimum</i>	Y
<i>Mertensia sp.</i>	<i>Mertensia arizonica</i>	N
<i>Oxytropis deflexa</i>	ID not confirmed	N
<i>Phlox sp.</i>	<i>Phlox hoodii</i>	N
<i>Ribes sp.</i>	<i>Ribes montigenum</i>	Y
<i>Senecio sp.</i>	<i>Solidago multiradiata</i>	Y
<i>Trifolium cf. repens</i>	<i>Trifolium longipes var. rusbyi</i>	Y
<i>Trisetum spicatum</i>	<i>Trisetum spicatum</i>	Y

PJCH01
Pinyon/Juniper; Crater Hill; Plot 01

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was only measured in 1997. Relocating it has not been attempted since it was established. Many juniper on this plot have multiple (up to 5) major, upright trunks that are split below DBH. A protocol needs to be written on how to handle trees such as these.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1997	2001 Verification	Voucher
<i>Centrostegia thurberi</i>	<i>Centrostegia thurberi</i>	N
<i>Linanthus</i> sp.	ID not confirmed	N
<i>Swertia albomarginata</i>	ID not confirmed	N

PJCTB (Formerly: PJB)

Pinyon/Juniper; Chinle Trail; along the Bird transect

Baseline Azimuth: 204°
Transect Azimuth: 294° (recommended azimuth if the baseline is correct)

Status

This plot was only measured in 1996. Relocating it has not been attempted since it was established. If the yucca on this plot has deeply constricted pods, it is *Y. angustissima*. If not, it is *Y. utahensis*. A determination and a voucher of the species of *Gutierrezia* (*G. sarothrae*, *G. microcephala* or both) should be made when this plot is remeasured.

The plot was setup with a baseline azimuth of 204°. Transects 1 (301°), transect 2 (298°), transect 3 (297°), transect 4 (299°), and transect 5 (300°) were setup with different azimuths. It is not known whether these azimuths are accurate or whether these azimuths were taken with the correct declination. When measured in the future, the baseline azimuth should be retaken, noting whether declination was used, and then the correct perpendicular azimuth for the transects should be determined. It is possible that the 1996 data will not be directly comparable to future data because of these potential problems.

Species Identification

1996	2001 Verification	Voucher
<i>Echinocereus</i>	<i>Echinocereus engelmannii</i>	N
<i>Ephedra</i>	<i>Ephedra nevadensis</i> (probably)	N
<i>Gutierrezia sarothrae</i>	<i>Gutierrezia microcephala</i>	Y
<i>Pinus monophylla</i>	<i>Pinus monophylla</i>	Y
<i>Rhus aromatica</i> var. <i>trilobata</i>	<i>Rhus aromatica</i> var. <i>trilobata</i>	Y
unknown	<i>Bromus rubens</i>	Y
<i>Yucca angustissima</i>	<i>Yucca utahensis</i> (probably)	N
unknown	<i>Cordylanthus parviflorus</i>	Y

Microplots-2001

The microplots were also done incorrectly in 1996. When estimating the cover a species, the current year's annuals, as long as an individual is rooted in the ground (alive or dead), are not counted as litter. They should be listed under species cover section and an estimate of the cover should be made. All dead annuals in this plot were counted as litter and not as species cover. As a result, these microplot data, will not be directly comparable to future microplot data.

Tree List-2001

From the tree map from 1996, it also appears that at least 6 *Pinus monophylla* trees, and 2 juniper trees were excluded because they had a small DBH. If any of these trees have a DBH, they should be added to this tree list for this plot.

PJKC01

Pinyon/Juniper; Kolob Canyon; Plot 01

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was only measured in 1997. Relocating it has not been attempted since it was established.

The above azimuths are likely to be with declination of 13-14°, but I do really sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1997	2001 Verification	Voucher
<i>Antennaria</i> sp.	ID not confirmed	N
<i>Carex</i> sp.	ID not confirmed	N
<i>Penstemon</i> sp.	ID not confirmed	N

PJMSLIZ

Pinyon/Juniper; Mountain Shrub; on a Lizard transect

Baseline Azimuth: 160° (with declination)
Transect Azimuth: 70° (with declination)

Status

This plot was only measured in 1996. It was relocated in 2001. A UTM for the 0m end of plot was obtained in August 2001.

If the yucca on this plot has deeply constricted pods, it is *Y. angustissima*. If not, it is *Y. utahensis*.

The lizard grid markers used to identify the location of the plot are missing or illegible. It has been three years or so since they were in use. The entire directions to the plot need to be rewritten since it is based on locating these grid markers.

Since the plot was originally setup incorrectly and without permanent baseline rebar, the 1996 data are not comparable to the 1997 data.

Species Identification

1996	2001 Verification	Voucher
<i>Cryptantha sp.</i>	<i>Plagiobothrys tenellus</i> (probably)	N
<i>Erigeron religiosus</i>	<i>Erigeron religiosus</i>	Y
<i>Haplopappus villosus</i>	<i>Heterotheca villosa</i>	N
<i>Lotus cf. plebius</i>	<i>Lotus utahensis</i>	N
<i>Machaeranthera canescens</i>	<i>Machaeranthera canescens</i>	Y
<i>Oenothera pallida</i>	<i>Oenothera pallida</i>	Y
<i>Opuntia sp.</i>	ID not confirmed	N
<i>Penstemon sp.</i>	ID not confirmed	N
<i>Sporobolus flexuosus</i>	<i>Sporobolus cryptandrus</i> (probably)	N
<i>Yucca angustissima</i>	<i>Yucca utahensis</i> (probably)	N

Plot Layout Changes-1997

This transect was totally restructured from the setup in 1996. The plot corners were originally not permanently staked with rebar. The corners only had flagging marking the edges. Since the transects were setup going downhill, the baseline was moved downhill to the lower boundary line. The plot was restructured so that the baseline now runs 160° from 0m rebar to the 20m rebar. Transects now run at 70° from the baseline. The 20m rebar is marked with a round aluminum tag stamped 87 and the 0m rebar is marked with another tag stamped 88. All trees and rebar are marked with round aluminum tree tags.

Line Intercept-1997

No significant change

Microplots-1997

The annual species composition changed drastically from the 1996 data. This is partly due to the changing of the structure of the plots and partly due to the increased rainfall. Laura reported *Sporobolus flexuosus* and *Erigeron religiosus*. I did not see these species on the plot in 1997. This sighting of *Sporobolus flexuosus* was probably a misidentification because most of the *Sporobolus* I have seen in the park on or near these plots were *Sporobolus cryptandrus*.

Tree List-1997

1 tree, a *Pinus edulis*(#89), was added this year. No trees were deleted from the plot.

PJSE02

Pinyon/Juniper; SE boundary; near mammal transect point 02

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was only measured in 1997. This plot was relocated but not remeasured in 2001. A UTM coordinate was obtained for the 0m corner of the plot.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1997	2001 Verification	Voucher
<i>Artemisia ludovicinana</i>	<i>Artemisia campestris</i> (probably)	N
<i>Cryptantha cinerea</i> var. <i>arenicola</i>		Y
<i>Gilia</i> sp.	ID not confirmed	N

PJSE15

Pinyon/Juniper; SE boundary; near mammal transect point 15

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was only measured in 1997. This plot was relocated but not remeasured in 2001. A UTM coordinate was obtained for the 0m corner of the plot.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1997	2001 Verification	Voucher
<i>Carex</i> sp.	ID not confirmed	N
<i>Gilia</i> sp.	ID not confirmed	N
<i>Hymenopappus filifolius</i> var. <i>cinereus</i>	<i>Haplopappus filifolius</i> var. <i>cinereus</i>	Y
<i>Mentzelia</i> sp.	ID not confirmed	N
<i>Muhlenbergia pungens</i>	<i>Muhlenbergia pungens</i>	Y

PPE1

***Pinus ponderosa*; East edge of woodland along K-T Road; Plot 01**

Baseline Azimuth: 140° (w/o declination)
Transect Azimuth: 50° (w/o declination)

Status

This plot was measured in 1996, 1997 and 2001. A UTM coordinate needs to be obtained for the 0m corner of the plot.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Arabis</i> sp.	<i>Arabis holboellii</i>	not observed	N
<i>Artemisia nova</i>	<i>Artemisia tridentata</i>	<i>Artemisia tridentata</i>	N
<i>Astragalus amphioxys</i>	<i>Astragalus piutensis</i>	not observed	Y
<i>Astragalus</i> cf. <i>amphioxys</i>	<i>Astragalus piutensis</i>	not observed	N
<i>Bromus inermis</i>	not observed	not observed	Y
<i>Heterotheca villosa</i>	<i>Heterotheca villosa</i>	<i>Heterotheca villosa</i>	Y
<i>Hymenopappus filifolius</i>	<i>Chaenactis douglasii</i>	<i>Chaenactis douglasii</i>	N
<i>Juniperus osteosperma</i>	<i>Juniperus scopulorum</i>	<i>Juniperus scopulorum</i>	N
not observed	<i>Navarretia breweri</i>	not observed	Y
not observed	not observed	<i>Collomia grandiflora</i>	Y
not observed	<i>Plagiobothrys tenellus</i>	<i>Plagiobothrys tenellus</i>	Y
not observed	unkann2	<i>Epilobium brachycarpum</i>	Y

Plot Layout Modifications-2001

When this plot was originally setup in 1996, the transects were not run perpendicular to the baseline. In addition, the plot tape was lain on the ground parallel to a line running from the 3rd rebar (see 2001 plot map) and the 20m rebar. This does not follow even the protocols setup in 1996. In 1997, this was one of the first plots I ran, so I was trying to get the transects to match what was previously done, whether or not is followed protocols. For all future measurements of this plot, the transect azimuths should run 50° (w/o declination) and the baseline should run 140° (w/o declination), but even these values should be verified since I did not have a compass with a sight in 2001 when I did this plot.

Plot Layout Modifications-1997

No modifications were made to the layout of this plot. All trees and the 0 m and 20 m rebar aluminum foil tags need to be replaced with aluminum tree tags.

Line Intercept-1997

Laura misidentified the *Artemisia* and *Juniper* species on this plot. She originally identified the *Artemisia* as *Artemisia nova*. This *Artemisia* on this plot is dwarfed probably due to growth limiting factors of the basalt bedrock and being shaded by ponderosa. All of the *Artemisia* surrounding the plot are normal sized for *Artemisia tridentata*. *Artemisia nova* is also a higher elevation species, more likely to be found on the basalt plateau at Lava Point than here.. The specimens in the plot also match other characteristics, such as leaf size and texture, of *Artemisia tridentata* better than *Artemisia nova*. The one juniper in this plot was not *Juniperus osteosperma*. I identified it as *Juniperus scopulorum*.

Microplots-1997

The report of *Hymenopappus filifolius* in this plot is a misidentification. I have identified this plant to be *Chaenactis douglasii*, which looks fairly similar. *Astragalus amphioxys* was also a misidentification. The plant was *Astragalus piutensis*. I tried to identify the species of *Opuntia* on this

plot and I came up with *Opuntia polyacantha*. It is listed in the Utah Flora as being in Washington County and I could be right, but I am not completely confident that this identification is correct.

Tree List-1997

The change of the identification of the juniper tree to *Juniperus scopulorum* was the only change made.

PPGFLIZ

Pinus ponderosa; Grass/Forb; near a Lizard transect

Baseline Azimuth: 203° (with declination)

Transect Azimuth: 113° (with declination)

Status

This plot was only measured in 1997 and 2001. A UTM coordinate was obtained for the 0m corner of the plot.

Species Identification

1997	2001 Verification	Voucher
<i>Leptodactylon pungens</i>	<i>Linanthastrum nuttallii</i> (probably)	N
<i>Penstemon</i> sp.	<i>Penstemon</i> sp. (needs ID)	N

Plot Layout Modifications-1997

The plot was not actually setup in 1996. It seems this plot was just an afterthought. The only thing accomplished was tagging and measuring the trees. In 1997, the whole transect was setup using the trees as a reference point to setup the baseline. All tags and rebar are marked with permanent aluminum tree tags.

Line Intercept-1997

No changes

Microplots-1997

No changes

Tree List-1997

A large ponderosa with a split below DBH was added when the plot was correctly setup.

PPMOSN01 (Formerly Wildcat 3)

Pinus ponderosa; Mountain Oak Shrub; Northern plot 01

Baseline Azimuth: 291-296°
Transect Azimuth: 201-206°

Status

This plot was measured twice in 1996 (pre-wildcat and post-wildcat burn), and once in 1997.

The plot baseline azimuth will have to be retaken next time this plot is measured. The transect azimuths will have to be calculated at 90° from the baseline azimuth. These two values will need to be recorded so that the same azimuth for all of the transects will be used.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1997	2001 Verification	Voucher
None		

Plot Layout Modifications-1997

No changes.

Line Intercept-1997

The ponderosa overstory was also not measured last year on this plot.

Microplots-1997

In 1996, the only grass listed in the microplots was *Poa fendleriana*. I did not see any of this grass in any of the microplots this year. I did observe *Oryzopsis hymenoides* and *Stipa comata*.

Tree List-1997

Only one tree was left out last year. I added a dead *Juniperus scopulorum* tree. This tree needs to be tagged.

PPMOSW1 (Formerly Wildcat 2)

Pinus ponderosa; Manzanita/Oak Scrub; Western plot 01

Baseline Azimuth: 328°
Transect Azimuth: 238°

Status

This plot was measured twice in 1996 (pre-wildcat and post-wildcat burn), and once in 1997.

The confusion of which plot is Wildcat 1 or Wildcat 2 lies not on the data sheets, but on the maps. Some maps shows that Wildcat 2 (PPMOSW1) overlaps PPOSKH. In reality, Wildcat 1 (PPOSSE1) overlaps PPOSKH and Wildcat 2 (PPMOSW1) is farther south near the drainage. Because of this error, the names make do not make sense.

Ignore the plot directions listed on 1996 sheets. They take you to the wrong plot.

The plant identified in 1997 as unkERI. ericaceous plant was a post-fire, very green, larger version of *Pachystima myrsinites*.

Species Identification

1996	1997	2001 Verification	Voucher
ARA (Astragalus?)	?	?	N
Cacti	<i>Opuntia</i> sp.	<i>Opuntia</i> sp.	N
Grass 1	?	?	N
Grass A	?	?	N
Grass B	?	?	N
Grass	?	?	N
<i>Juniperus utahensis</i>	<i>Juniperus scopulorum</i>		N
not observed	<i>Arabis perennans</i> ?	ID not confirmed	N
not observed	<i>Cymopterus</i> sp.	ID not confirmed	N
not observed	unk. ericaceous plant	<i>Pachystima myrsinites</i> (probably)	N
not observed	unk. malvaceous plant	<i>Illiamna rivularis</i> Y	
Sene	?	<i>Senecio multilobatus</i> (probably)	N

Plot Layout Modifications-1997

In 1996, this plot was labeled Wildcat 2, but on the data sheet the name PPMOSW1 was listed first in the plot id field. I prefer to stick to her pattern of plot names, so in 1997 I used the acronym instead, for consistency. Another significant problem occurred with this plot this year. Last year, the fire monitoring crew mixed up the data sheets for this plot and Wildcat 1. This year when I went to measure the plots, Wildcat 1 appeared to have the trees listed on the Wildcat 2 data sheets and Wildcat 2 had the trees listed on the Wildcat 1 data sheets. As for the rest of the data, there is no way to know if it was switched also. This year, the plot formerly labeled on the maps as Wildcat 1 is now PPMOSW1 (Wildcat 2) and the plot formerly labeled Wildcat 2 on the maps is now called PPOSSE1 (Wildcat 1).

No changes were made to the layout of this plot. All tree tags and rebar are marked with round aluminum tree tags.

Line Intercept-1997

Last year's crew did not measure the overhead canopy of *Pinus ponderosa* before or after the Wildcat Fire. The crew also misidentified the junipers as *Juniperus utahensis*. I have identified these junipers as *Juniperus scopulorum*. This plot also has a plant on both the line intercepts and microplots that I have not been able to identify. This plant is labeled UNKERI which stands for Unknown ericaceous plant. I believe this plant to be a barberry (*Vaccinium* spp.), but I am troubled by the fact that no *Vaccinium* species is documented as occurring in Washington County. It is not even listed as occurring in Iron County, which has similar habitat to the Lava Point area. It is low growing decumbent shrub which grows near to the ground like *Mahonia*. The leaves are alternate and coriaceous. The bud hang downward in a pendant fashion with one flower to a leaf axil. This plant was only in bud and I looked extensively for any that were open when I was up there August 12, 1997 without much luck, so I did not make a voucher collection. It is quite abundant in the pine needle duff throughout Horse Pasture Plateau, so there is plenty of chances to attempt a recollection. I initially

identified the plant as *Chimaphila umbellata*, but the leaves are not whorled and the plant does not grow upright. This plant also occurs on the PPS2 and Wildcat 3 plots.

Microplots-1997

Several plants in this plot have been identified. Last year the grasses were labeled just Grass A and Grass B. I found that *Poa fendleriana* was most commonly in the microplots this year, so It might have been the grass A. Grass B could either have been *Oryzopsis hymenoides*, *Stipa thurberiana* or *Bouteloua gracilis* which were all common in the area, but not in the microplots of this plot. The plant simply labeled as cacti last year is *Opuntia* spp.. I could not make an identification because there were no flowers or fruit available to make a reliable identification.

Tree List-1997

Eleven trees were added this year to the tree list. These trees were mostly dead and clumped together near the baseline. It would be impossible to miss these trees, so I think that they were overlooked. Tree #953 was a stump that was completely burned in the Wildcat Fire, but it was not eliminated from the data sheets in 1996. I have marked this tree as missing and eliminated it from the data sheet.

PPOSE

Pinus ponderosa; Oak Scrub; East side of Zion near Stave Spring

Baseline Azimuth: 184°

Transect Azimuth: 94°

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since it was established.

Relocating this plot after September of 2001 will be difficult since a prescribed fire will likely burn it.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
?	not observed	<i>Euphorbia fendleri</i>	Y
?	not observed	<i>Gilia congesta</i>	Y
?	not observed	<i>Tetradymia canescens</i>	Y
<i>Amelanchier alnifolia</i>	<i>Amelanchier utahensis</i>	<i>Amelanchier utahensis</i>	Y
<i>Aster</i>	<i>Solidago canadensis</i>	<i>Solidago canadensis</i>	Y
<i>Carex occidentalis</i>	not observed	<i>Carex praeegracilis</i>	Y
<i>Lotus utahensis</i>	not observed	<i>Lotus utahensis</i>	Y
<i>Prunus virginiana</i>	not observed	<i>Prunus virginiana</i>	
var. <i>melanocarpa</i>		var. <i>melanocarpa</i>	Y

<i>Rosa woodsii</i>	<i>Rosa woodsii</i>	<i>Rosa woodsii</i>	Y
<i>Sporobolus flexuosus</i>	not observed	<i>Agrostis exarata</i>	Y
<i>Thermopsis montana</i>	<i>Thermopsis montana</i>	<i>Thermopsis montana</i>	Y

Plot Layout Modifications-1997

Several changes were made to the layout of this plot. When I measured the azimuth of the baseline, I found that the direction of last years transects were not perpendicular, so I changed the transect azimuth to 94°. I also replaced the old aluminum foil tags marking the 0 m and 20 m rebar with the oval aluminum tree tags. Now, tag #27 marks the 0 m rebar and tag #28 marks the 20 m rebar.

Line Intercept-1997

In 1996, Laura did not measure the overhead canopy of the *Pinus ponderosa*. It turned out to be significant cover because of the closeness of the canopy in the area. Nearly every transect had between 16 and 20 m of ponderosa cover. I also had more intercepts of perennial species in 1997 than she measured including *Mahonia repens* and *Rosa woodsii*. She misidentified the *Amelanchier* in this plot. I have identified it as *Amelanchier utahensis* instead of *Amelanchier alnifolia*. I did not find any *Prunus virginiana* on any of the line intercepts. Most of these discrepancies is most likely due to the change in azimuth for the transects.

I have not identified any *Amelanchier alnifolia* on any of the plots studied and setup this year. I have examined every individual and I find these characteristics for each. The leaf size varies between individual and between branches in the same individual. The highest leaves at the top of the shrub are generally the smallest, around 1 cm. The lowest leaves, which receive the least amount of sunlight, are usually larger, around 2.5-3 cm. According to the Utah Flora and the UNLV Herbarium, the leaves on *Amelanchier utahensis* will have leaves that range from 1 cm to 2.5 cm while *Amelanchier alnifolia* will have leaves from 2 cm to 5 cm. I have not found any normal leaves larger than 3 cm on any of the individuals I have examined this year, so I have concluded that all of the species of *Amelanchier* on the plots in the project setup to date are *Amelanchier utahensis*.

Microplots-1997

In 1996, microplots had more annual species than 1997. I did see most of the species listed last in 1996 in the area except *Taraxacum* sp. and *Sporobolus flexuosus*. The only grass I saw in the plot was *Elymus elymoides*. She also misidentified the *Amelanchier* as *Amelanchier alnifolia* when it should be *Amelanchier utahensis*. In 1997, the *Pterospora andromeda* was extremely abundant. Nearly every ponderosa had a population of *Pterospora* in the duff underneath it canopy.

Tree List-1997

This year, I nailed the aluminum tree tags to the trees in the plot and left the old aluminum tags on the trees. On the data sheet I listed last years identification number and this years new number. The new number appears in this years database. I also tagged 4 new trees missed last year and eliminated 4 that were out of the plot.

PPOSKH

Pinus ponderosa; Oak Scrub; Kimball Harper plot on West Rim Trail

Baseline Azimuth: 229° ? (written on 1996 datasheets)
Transect Azimuth: 240-243°

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since it was established.

This plot and PPOSSE1 overlap. The overlap is not great, only around 4 meters, but it is enough so that half of the trees on in plot PPOSKH are also in PPOSSE1. Trees #938, #939, #940, and #941 are measured in both plots. In 1997, I measured PPOSKH first, so the data for these trees is located on this set of data sheets not on the PPOSSE1 data sheets. In the database, I also only entered these trees in one time in the records for PPOSKH.

In 1996, transect one was setup at 240° and transects 2-5 were setup at 243°. Although I wrote these values on the data sheet as the azimuth, I would have only setup the transects again at one azimuth consistently. Since I did not write down the baseline azimuth, I do not know what the azimuth was that I chose to use in 1997. It is not known exactly what is the baseline azimuth for this plot. The transect's azimuth should be modified to be perpendicular to the baseline when the plot is remeasured.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Ash was measured in the Species Cover column in 1996. Ash should be considered bare ground, if it is well burned into carbon. If plant material is still visible in the ash, it should be considered litter.

Species Identification

1996	1997	2001 Verification	Voucher
Grass sp.	?	?	N
<i>Penstemon lar?</i>	<i>Penstemon linarioides</i>	<i>Penstemon linarioides</i>	N
<i>Phlox</i>	<i>Leptodactylon pungens?</i>	Either <i>Linanthastrum nuttallii</i> or <i>Phlox hoodii</i>	N

Plot Layout Modifications-1997

No modifications to the structure of the plot were made this year.

Line Intercept-1997

Laura did not measure the ponderosa overhead canopy on this plot in 1996. I also recorded more species than she recorded, which is mostly due to the abundant growth from the effects of the fire.

Microplots-1997

The abundant growth this year also produced more species for the microplots than Laura observed last year. I have had a problem identifying the genus of a polemoniaceous plant that grows in this area. I believe it to be *Leptodactylon pungens*. I have not been able to collect a voucher specimen that would verify my identification. She called it an unknown species of *Phlox* last year. This species needs to be collected when flowering to determine the identification. She also recorded mistletoe on

Transect 1, microplot 4. This was a mistake on her part because mistletoe does not grow on the ground and was probably disarticulated from a tree above; therefore, it should not have been recorded.

Tree List-1997

This year, I nailed the aluminum tree tags to the trees in the plot and left the old aluminum tags on the trees. On the data sheet I listed last years identification number and this years new number. The new number appears in this years database. I also tagged 4 new trees missed last year and eliminated 4 that were out of the plot.

PPOSNNE

Pinus ponderosa; Oak Scrub; NNE side of Zion near Observation Point

Baseline Azimuth: 331° (with declination)

Transect Azimuth: 61° (with declination)

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since it was established.

In 1996, transects 1-4 were setup at 35° and transect 5 was setup at 36°. In 1997, the baseline was determined to be at an azimuth of 331° with declination. The transects were changed to 61° so that they were perpendicular to the baseline.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption.

Species Identification

1996	1997	2001 Verification	Voucher
?	<i>Muhlenbergia montana</i>	<i>Muhlenbergia montana</i>	Y
<i>Amelanchier alnifolia</i>	<i>Amelanchier utahensis</i>	<i>Amelanchier utahensis</i>	N
Grass sp.	?	?	N
<i>Peraphyllum ramosissimum</i>	<i>Peraphyllum ramosissimum</i>	<i>Peraphyllum ramosissimum</i>	Y
<i>Pinus edulis</i>	<i>Pinus edulis</i>	<i>Pinus edulis</i>	Y

Plot Layout Modifications-1997

The baseline as measured in 1997 runs 331°. Laura setup the plot with the transects running at 35° to 36° which is not perpendicular to the baseline. I modified the plot so that the transects run perpendicular to the plot at 61°. The 0 m rebar and the 20 m rebar foil tags need to be replaced with brass tags. The trees added this year, mainly tree tag #38, #39, #40, #41, and #42, need their aluminum foil tags replaced with brass tree tags.

Line Intercept-1997

The ponderosa overhead canopy was not measured in 1996 on this plot either. I also measured canopy from *Juniperus scopulorum* that she did not get last year. Laura also misidentified *Amelanchier utahensis* as *Amelanchier alnifolia* on both the line intercepts and the microplots. In

general I have encountered more perennial species this year than she did in 1996. Part of this problem is most likely the change in azimuth of the transects.

Microplots-1997

The only significant difference that happened this year was that I was able to identify the grasses in the microplots this year. Laura was not able to accurately identify the grasses and on the data sheets she just entered grass or *Poa fendleriana*. She thought that some of the grass may be *Elymus elymoides*. I identified several grasses: *Koeleria macrantha*, *Bromus tectorum*, *Vulpia octoflora*, *Muhlenbergia montana*, and *Poa fendleriana*. I did not see any *Elymus elymoides* on the plot this year, but it may have been too early. I would expect it to be present in the area.

Tree List-1997

The trees added this year were ones that the DBH was smaller than 7.5 cm. She did not measure trees with that small of a DBH. The procedure was changed this year, so that all trees with a DBH, ones that are taller than 4.5 ft, were measured. The trees with tags #38, #39, #40, #41, and #42 all were added.

PPOSSE1 (Formerly Wildcat 1)

Pinus ponderosa; Oak Scrub; SE plot West Rim Trail

Baseline Azimuth: 320° ?

Transect Azimuth: 230°

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since it was established.

In 1997, I nailed the aluminum tree tags to the trees in the plot and left the old aluminum tags on the trees. On the data sheet I listed 1996's identification number and 1997's new number. The new number appears in 1997's database.

This plot was measured twice in 1996 (pre-wildcat and post-wildcat burn), and once in 1997.

This plot's location is mislabeled on the maps (See PPMOSW1).

Since this plot overlaps PPOSKH from around the 15m point, one of these two should be eliminated.

In 1996, this plot was labeled Wildcat 1. The data sheets were also mixed up with Wildcat 2 (See PPMOSW1). In 1997, I changed the name to PPOSSE1 for consistency and because it was listed as the name of the plot in the PLOT ID field on the original data sheet.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Astragalus</i> sp.	not observed		N
Grass 1	?	?	N
<i>Phlox</i>	<i>Leptodactylon pungens</i> ?	Either <i>Linanthastrum nuttallii</i> or <i>Phlox hoodii</i>	N

<i>Symphoricarpos alnifolia?</i>	<i>Symphoricarpos oreophilus</i>	N
<i>Wyethia</i> sp.	<i>Wyethia amplexicaulis</i> (not observed)	N

Plot Layout Modifications-1997

No significant changes were made to the layout of this plot. All of the trees except one marked with tag #1 and the rebar tags are marked with brass tree tags. Tree #1 needs a permanent tag.

Line Intercept-1997

The ponderosa overhead canopy was not measured in 1996. I think in general on most plots done in 1996, the canopy cover of ponderosa or other tree species was not measured.

I have noticed a problem with the identification between two species of plants in the burned areas. Since none of the species are flowering in the plots I had to rely on the leaf size and the branching patterns of the shrubs to identify the species. In the burned area, *Symphoricarpos oreophilus* and *Pachystima myrsinites* look much the same, especially the first year growth. They both have opposite leaves and the leaves are somewhat ovate with serrulate margins. *Pachystima* has much larger leaves than the *Symphoricarpos*. *Symphoricarpos* also has white berries, but since none of the individual were blooming, I could not rely on this feature. Only the *Pachystima* is a shrub with sprawling branches and the *Symphoricarpos* has upright intricately branched stems. I have followed this difference in branching patterns as my main characteristic for identification. The possibility exists that I have misidentified some of the individuals both along the line intercepts and in the microplots in all of the plots where these two grow together.

Microplots-1997

The unidentified grass in the transects on this plot is most likely *Stipa thurberiana*, although I saw both *Poa fendleriana* and *Oryzopsis hymenoides* outside the plot. The *Phlox* identified last year is most likely *Leptodactylon pungens*. I did not get this species in the microplots this year.

Tree List-1997

Since I measured the overlapped trees while I did the PPOSKH plot, I did not put the data on this set of data sheets. I did record 1 new tree in this plot: #1. It was a dead ponderosa that they must have missed last year.

PPRCLIZ

Pinus ponderosa; Rock Crevice; Lizard transect near Fire Pit Knoll

Baseline Azimuth: 217°
Transect Azimuth: 127°

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since it was established.

This plot has one major problem. The whole plot is on bedrock, and the current way the plot is setup, there is no place to put rebar in the ground to make the plot boundary permanent.

The plot was also setup so that the baseline runs down slope instead of upslope. I do not think that the data from year to year is going to be very accurate with this current setup. I tried to get the tape lined up with the one tree in the plot like shown on the tree map on the reverse side of the transect 1 data sheet. I suggest reconstructing the layout of this plot so it follows the 2001 revised protocols.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
Forb A?	<i>Eriogonum davidsonii</i>	<i>Eriogonum davidsonii</i>	Y

Plot Layout Modifications-1997

No significant changes were made to the layout of this plot.

Line Intercept-1997

More species and more cover were measured this year than last year. This is most likely due to the lack of a permanent boundary stake at the 0 m and 20 m end of the baseline.

Microplots-1997

No significant changes occurred.

Tree List-1997

No significant changes occurred

PPRCN1

Pinus ponderosa; Rock Crevice; Northern plot 01, East side of Zion

Baseline Azimuth: 90°

Transect Azimuth: 0°

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since 1997.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
------	------	-------------------	---------

<i>Chrysothamnus nauseosus</i>	<i>Chrysothamnus nauseosus</i>	<i>Chrysothamnus nauseosus</i>	Y
<i>Cryptantha</i> sp.	<i>Cryptantha</i> sp.	<i>Cryptantha</i> sp.	Y
<i>Draba asprella</i> var. <i>zionensis</i>	<i>Draba asprella</i> var. <i>zionensis</i>	<i>Draba asprella</i> var. <i>zionensis</i>	
Y			
<i>Erigeron religiosus</i>	<i>Erigeron religiosus</i>	<i>Erigeron religiosus</i>	Y
<i>Eriogonum</i> cf. <i>alatum</i>	<i>Eriogonum alatum</i>	<i>Eriogonum alatum</i>	Y
not observed	<i>Eriogonum ovalifolium</i> ?	ID not confirmed	N
<i>Eriogonum racemosum</i>	<i>Eriogonum racemosum</i>	<i>Eriogonum racemosum</i>	
var. <i>zionis</i>	var. <i>zionis</i>	var. <i>zionis</i>	Y
<i>Eriogonum umbellatum</i>	not observed	<i>Eriogonum umbellatum</i>	Y
<i>Hymenopappus filifolius</i>	<i>Hymenopappus filifolius</i>	<i>Hymenopappus filifolius</i>	
var. <i>cinereus</i>	var. <i>cinereus</i>	var. <i>cinereus</i>	Y
<i>Juniperus scopulorum</i>	<i>Juniperus scopulorum</i>	<i>Juniperus scopulorum</i>	Y
<i>Muhlenbergia pungens</i>	<i>Muhlenbergia pungens</i>	<i>Muhlenbergia pungens</i>	Y
<i>Polygonum douglasii</i>	<i>Polygonum douglasii</i>	<i>Polygonum douglasii</i>	
var. <i>johnstoni</i>	var. <i>johnstoni</i>	var. <i>johnstoni</i>	Y
<i>Talinum parviflorum</i>	<i>Talinum parviflorum</i>	<i>Talinum parviflorum</i>	Y
<i>Yucca angustissima</i>	<i>Yucca utahensis</i>	<i>Yucca utahensis</i>	N

Plot Layout Modifications-1997

The baseline runs directly at 90°, but Laura last year ran the transects at 352°. I changed the azimuth of the transects to 0° to make them run perpendicular to the baseline.

Line Intercept-1997

Ponderosa canopy was again missed last year, but she recorded cover for *Juniperus scopulorum*. I also recorded more cover and more species per transect than she measured last year.

Microplots-1997

The yucca on this plot was identified last year as *Yucca angustissima*. I have changed the identification to *Yucca utahensis*.

Tree List-1997

In addition to her original 5 trees, I have added 6 other trees that were within the plot boundary. These trees are tagged with numbers 94, 95, 96, 97, 98, and 99.

PPRCN2

Pinus ponderosa; Rock Crevice; Northern plot 02, East side of Zion

Baseline Azimuth: 270°

Transect Azimuth: 180°

Status

This plot was measured in 1996 and 1997. Relocating it has not been attempted since 1997.
The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Arenaria</i> cf. <i>macradenia</i>	not observed	<i>Arenaria macradenia</i>	Y
<i>Cercocarpus montanus</i>	<i>Cercocarpus intricatus</i>	<i>Cercocarpus intricatus</i>	
N			
<i>Draba</i>	not observed	<i>Draba asprella</i> var. <i>zionensis</i>	
(probably) N			
<i>Erigeron</i> cf. <i>canaani</i>	not observed	<i>Erigeron canaani</i>	Y
<i>Eriogonum racemosum</i>	<i>Eriogonum racemosum</i>	<i>Eriogonum racemosum</i>	
var. <i>zionis</i>	var. <i>zionis</i>	var. <i>zionis</i>	Y
<i>Haplopappus scopulorum</i> ?	not observed	<i>Haplopappus</i> ?	Y
not observed	<i>Cryptantha</i> sp.	ID not confirmed	N
<i>Opuntia</i> sp.	<i>Opuntia</i> sp.	ID not confirmed	N
<i>Pediocactus</i> sp.	<i>Echinocereus</i>	<i>Echinocereus</i>	
	<i>glochidiatus</i>	<i>glochidiatus</i>	N
<i>Penstemon humilis</i>	<i>Penstemon</i> spp2	ID not confirmed	N
<i>Poa fendleriana</i>	<i>Poa fendleriana</i>	<i>Poa fendleriana</i>	Y
var. <i>obtusifolius</i> ?			
<i>Yucca angustissima</i>	<i>Yucca utahensis</i>	<i>Yucca utahensis</i>	N

Plot Layout Modifications-1997

The baseline was setup directly at 270°. Laura ran the transects at 150°. I changed the transect direction to 180°. Neither rebar is tagged. The trees are tagged with aluminum foil tags. These need to be changes to brass tree tags. The 20 m rebar is near a tree tagged with a #4 tree tag.

Line Intercept-1997

Ponderosa and juniper canopy was again missed last year, Last year, the *Cercocarpus* on the line intercept on transect 1 was identified as *Cercocarpus montanus*. I have changed that identification. I found the shrub to be *Cercocarpus intricatus*.

Microplots-1997

Even though I did not get the cactus in any microplots, I observed *Echinocereus glochidiatus* in the plot. This is the cactus that last year Laura identified as *Pediocactus*.

Tree List-1997

Three trees were added to the plot this year: tree tag #7, #8, and #9. Tree #4 was not within the boundary of the plot, so it was eliminated.

PPRCSSW

***Pinus ponderosa*; Rock Crevice; South-southwest plot, south of Job's Head**

Baseline Azimuth: 145° (w/o declination)
Transect Azimuth: 55° (w/o declination)

Status

This plot was measured in 1996, 1997 and 2001. The baseline was not able to be placed in 2001 in exactly the same position as it was originally setup. Only 1 rebar was found, and it was lying in the sand on top of the lower bench. Not having the information written in my report in 1997, I resetup the baseline above the 3-5 foot terrace described in 1997. The baseline runs in approximately the same direction. A diagram was drawn on the back of the 2001 data sheets so that in the future, the plot baseline will be relocated easier. A photo from the 20m location to the 0m rebar was also taken.

In 1997, the azimuths were not verified because flags marked the endpoints of each transect. The transects looked perpendicular, so I did not think to find out the discrepancy between the azimuths on the 1996 datasheets and the correct azimuth (obtained in 2001 above). I have since found that occasionally, Laura read the opposite side of her compass when taking azimuths, so that some of her data are 180° from what it should be.

A UTM coordinate was taken at the 0m rebar.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Erigeron religiosus</i>	<i>not observed</i>	<i>Erigeron religiosus</i> (not observed)	Y
<i>Linanthastrum nuttallii</i>	<i>Leptodactylon pungens?</i>	<i>Linanthastrum nuttallii</i>	Y
not observed	not observed	<i>Leptodactylon pungens</i>	Y
<i>Penstemon</i> sp2 or sp3	<i>not observed</i>	<i>Penstemon rostriflorus</i>	Y
<i>Penstemon</i> sp2 or sp3?	<i>Penstemon spp3</i>	<i>Penstemon humilis</i> var. <i>obtusifolius</i>	Y
<i>Zaushneria latifolia</i>	<i>Zauschneria latifolia</i>	<i>Zauschneria latifolia</i> (not observed)	Y

Plot Layout Modifications-1997

No modifications were made to the plot layout. The plot itself is an awkward plot. The baseline is setup at the base of a 3-5 ft terrace. In the middle near the 20 m rebar is another 6 foot sandstone terrace. The transect tapes must first, go up over the first terrace and then down the other side. None of the transects are actually 20 m long because of the small vertical sandstone cliffs. All tree tags are aluminum, but the 0 m rebar and the 20 m rebar are not marked. These end points need to be marked with brass tags.

Line Intercept-1997

No significant changes occurred on the line intercepts this year.

Microplots-1997

In 1996, Laura identified the polemoniaceous plant *Linanthastrum nuttallii*. I have identified it as potentially being *Leptodactylon pungens*. A voucher specimen for this species will clear up this discrepancy. In transect 4, she also misidentified the cactus species. *Opuntia basilaris* does not grow at elevation. I saw this species on the plot and it looks like the rest of the typical *Opuntia* I have been labeling *Opuntia* sp.. I was not able to identify the species of *Penstemon* that occurs on this plot. I did see *Penstemon rostriflorus* and *Penstemon eatonii* in the area surrounding Jobs Head.

Tree List-1997

Since Laura was measuring all trees with a diameter greater than 7.5 cm, some of the dwarf ponderosa on this plot were tagged and measured even though they did not have a DBH. I was unsure about how to cope with this problem when I measured the plot, so I measured all of the tagged trees. I measured all of the trees that had a DBH at DBH. Most of these trees, Laura measured at 15 to 60 cm from the base instead of at DBH. Next year, the trees need to be remeasured and those that do not have a DBH need to be eliminated from the plot.

PPS1

Pinus ponderosa; Southern plot 01, near Pocket Mesa

Baseline Azimuth: 310-318° (w/o declination)

Transect Azimuth: 40-48° (w/o declination)

Status

This plot was measured in 1996 and 1997. This was the first plot I surveyed in 1997, so the problems that existed on the plot were not fixed. Relocating the plot may be difficult not only because the area was burned in 1998, but also because I remember walking down the Hop Valley Connector Trail to the plot, and not the Northgate Peaks Trail as described in the plot directions. Both trails will have to be searched to find the plot. In addition, I think Laura counted every step for the paces listed in the plot directions.

The plot baseline azimuth will have to be retaken next time this plot is measured. The transect azimuths will have to be calculated at 90° from the baseline azimuth. These two values will need to be recorded so that the same azimuth for all of the transects will be used.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Agropyron cristatum</i>	<i>Koeleria cristatum</i>		Y
<i>Eriogonum racemosum</i>	<i>Eriogonum racemosum</i>	<i>Eriogonum racemosum</i>	
		var. <i>racemosum</i>	Y
<i>Lotus plebius</i>	not observed	<i>Lotus utahensis</i>	Y
not observed	<i>Collins parviflora</i>	<i>Collins parviflora</i>	Y
not observed	not observed	<i>Arabis holboellii</i> var. <i>pinetorum</i>	Y
not observed	not observed	<i>Linum perenne</i>	Y
not observed	<i>Poa pratensis</i>	<i>Poa pratensis</i>	Y
<i>Sitanion hystrix</i>	not observed		N
[= <i>Elymus elymoides</i>]			

Plot Layout Modifications-1997

In 1996, Laura ran the plots backwards. She started at 2 meters from the 20m rebar. I have changed this so that the transects start at the 0m end. The 1997 data sheets list the corrected transect locations for this plot. The aluminum foil tags need to be replaced with brass tree tags on all trees and on the 0m and 20m rebar on this plot.

Line Intercept-1997

No significant changes occurred on the line intercepts this year.

Microplots-1997

Laura identified the grasses on the microplots as *Elymus elymoides* and *Agropyron cristatum*. I did not observe any of these species on the plot when I measured it, but *Elymus elymoides* is a late flowering grass, so it could appear later in the year. I did observe *Koeleria macrantha* which might be what she called *Agropyron cristatum*. *Agropyron cristatum* usually grows in disturbed or reseeded areas, not native grassland. *Stipa comata* and *Poa fendleriana* were also captured in the microplots. I am not confident on the identification of the *Elymus trachycaulus* that I identified on transect 3 and transect 4. It could be another species of *Elymus* because the spike had not fully matured.

Tree List-1997

No new trees were added in 1997. The trees on this plot were not measured because I had not started measuring the height of the trees when I did this plot. I never went back down there to measure their heights either. Next time the plot is surveyed the heights of the tree on this plot need to be measured.

PPS2

Pinus ponderosa; Southern plot 02, Goose Creek near MIA Camp

Baseline Azimuth: 70°

Transect Azimuth: 340°

Status

This plot was measured in 1996 and 1997. It has not been relocated since 1997.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Arctostaphylos uva-ursi</i>	not observed	does not occur in Zion	
		probably <i>A. patula</i>	N
not observed	not observed	<i>Chrysothamnus nauseosus</i>	
but a specimen was collected		var. <i>albicaulis</i>	Y

<i>Euphorbia brachycera</i>	not observed	<i>Euphorbia brachycera</i>	Y
<i>Physaria chambersii</i>	not observed	<i>Physaria chambersii</i> var. <i>chambersii</i>	Y
<i>Bouteloua gracilis</i>	not observed	<i>Bouteloua gracilis</i> ?	Y

Plot Layout Modifications-1997

No significant changes occurred with the layout of this plot this year. All aluminum foil tags on the 0m rebar, 20 m rebar and all trees were replaced with round aluminum tree tags this year.

Line Intercept-1997

No significant changes occurred on the line intercepts this year.

Microplots-1997

I observed nearly all of the species that Laura observed in 1996. Our microplots did not match up exactly with regards to the types of species present.

Tree List-1997

No significant changes occurred with regards to the tree on this plot.

PPW1

Pinus ponderosa; Western plot 01, Wildcat Canyon Trail

Baseline Azimuth: 153-157°
Transect Azimuth: 63-67°

Status

This plot was measured in 1996 and 1997. It could not be relocated in 2001. The Pocket Mesa prescribed burn likely burned all tree tags and some of the trees used to find the plot in the plot directions. It has been looked for twice.

This plot should be discarded and a new easier to find plot established in the area.

The above azimuths are likely to be with declination of 13-14°, but I am not sure of that assumption. The azimuths should be verified and noted whether declination was used or not.

Species Identification

1996	1997	2001 Verification	Voucher
<i>Poa fendleriana</i>	<i>Poa fendleriana</i>	<i>Poa fendleriana</i>	Y
not observed	<i>Microsteris gracilis</i>	<i>Microsteris gracilis</i>	Y
grass?	<i>Vulpia octoflora</i>	<i>Vulpia octoflora</i>	Y
<i>Erigeron divergens</i>	<i>Erigeron divergens</i>	<i>Erigeron divergens</i>	Y

Plot Layout Modifications-1997

No significant changes occurred in the plot layout this year. All aluminum foil tree tags and the tags on the 0m and 20m rebar need replaced with brass tree tags.

Line Intercept-1997

No significant changes occurred on the line intercepts this year.

Microplots-1997

A significant increase in the number of species present in the microplots occurred on this plot. It was an increase higher than most of the other plots. I could not verify if the *Erigeron* on the plot was actually *Erigeron divergens* as it was identified last year, so I label it as *Erigeron* spp. Last year Laura identified *Poa fendleriana*, *Elymus elymoides*, *Bouteloua gracilis* and an unknown grass as occurring in the microplots. Of the three identified grasses, I only identified *Poa fendleriana* as present in the plot. *Elymus elymoides* could occur in the plot, but it had just not flowered yet. I cannot confirm the presence of *Bouteloua gracilis* on this plot. I did not get it in any of the microplots. The unknown grass on transect 2 could be *Poa pratensis*. I also observed *Stipa comata* on the microplots.

Tree List-1997

No significant changes occurred with regards to the tree on this plot.

RITC01

Riparian; Taylor Creek plot 01 in Kolob Canyons

Baseline Azimuth: 71°

Transect Azimuth: 341°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997

2001 Verification

Voucher

None

RIZC06

Riparian; Zion Canyon plot near Bird Point 06

Baseline Azimuth: 270°

Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
None		

RIZC14

Riparian; Zion Canyon plot near Bird Point 14

Baseline Azimuth: 270°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
None		

RIZC24

Riparian; Zion Canyon plot near Bird Point 24

Baseline Azimuth: 270°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
None		

RIZC25

Riparian; Zion Canyon plot near Bird Point 25

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
<i>Celtis reticulata</i>	<i>Celtis reticulata</i>	Y

RIZC26

Riparian; Zion Canyon plot near Bird Point 26

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
<i>Physalis hederifolia</i>	<i>Physalis hederifolia</i>	Y
<i>Euphorbia fendleri</i>	<i>Euphorbia fendleri</i>	Y
<i>Fraxinus velutina</i>	<i>Fraxinus velutina</i>	Y

RIZC31

Riparian; Zion Canyon plot near Bird Point 31

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
None		

RIZC33

Riparian; Zion Canyon plot near Bird Point 33

Baseline Azimuth: 270°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
<i>Bromus inermis</i>	<i>Bromus inermis</i>	Y
<i>Agropyron cristatum</i>	<i>Agropyron cristatum</i>	Y
<i>Sporobolus cryptandrus</i>	<i>Sporobolus cryptandrus</i>	Y

RIZC38

Riparian; Zion Canyon plot near Bird Point 38

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
None		

RIZC39

Riparian; Zion Canyon plot near Bird Point 39

Baseline Azimuth: 90°
Transect Azimuth: 0°

Status

This plot was setup in 1997. Relocating this plot has not been attempted.

Species Identification

1997	2001 Verification	Voucher
<i>Agrostis stolonifera</i>	<i>Agrostis stolonifera</i>	Y
<i>Veronica peregrina</i>	<i>Veronica peregrina</i>	Y
<i>Equisetum hymale</i>	<i>Equisetum hymale</i>	Y
<i>Epilobium ciliatum</i>	<i>Epilobium ciliatum</i>	Y
<i>Elymus smithii</i>	<i>Elymus smithii</i>	Y

New Plots Established in the 1997 Field Season

- PJCH01 A plot near Crater Hill on the southwest corner of the park.
- PJKC01 A plot near the end of the road in the Kolob Canyon section of the park.
- PJSE2 A plot along the southeast boundary of the park.
- PJSE15 A plot along the southeast boundary of the park.
- RITC01 A plot below the Taylor Creek trailhead in the Kolob Canyon section of the park.
- RIZC06 A riparian plot in Zion Canyon
- RIZC14 A riparian plot in Zion Canyon
- RIZC24 A riparian plot in Zion Canyon
- RIZC25 A riparian plot in Zion Canyon
- RIZC26 A riparian plot in Zion Canyon
- RIZC31 A riparian plot in Zion Canyon
- RIZC33 A riparian plot in Zion Canyon
- RIZC38 A riparian plot in Zion Canyon
- RIZC39 A riparian plot in Zion Canyon
- RIZC46 A riparian plot in Zion Canyon

Codes used in the Systat Database for the Vegetation Mapping Datasheet

Leaf Phenology

E	Evergreen
C	Cold Deciduous
D	Drought Deciduous
MEC	Mixed Evergreen and Cold Deciduous
MED	Mixed Evergreen and Drought Deciduous
P	Perennial
A	Annual

Leaf Type

B	Broad Leaved
N	Needle leaved
M	Microphyllous
G	Graminoid
H	Broad Leaved Herbaceous
P	Pteridophyte
X	Xeromorphic

Physiognomic Class

FO	Forest
WO	Woodland
SW	Sparse Woodland
SH	Shrubland
SS	Sparse Shrubland
DS	Dwarf Shrubland
SD	Sparse Dwarf Shrubland
HE	Herbaceous
SV	Sparse Vascular/Non-Vascular Vegetation

Height Scale (in meters)

1	<.5
2	.5-1
3	1-2
4	2-5
5	5-10
6	10-15
7	15-20
8	20-35
9	35-50
10	>50

% Cover Scale

1	0-10
2	10-25
3	25-60
4	60-100

Topographic Position

IF	Interfluve
HS	High Slope
HL	High Level
MS	Midslope
BS	Backslope
SS	Step in Slope
LS	Low Slope
TS	Toe Slope
LL	Low Level
CW	Channel Wall
CB	Channel Bed
BF	Basin Floor

Surficial Geology

Igneous

GR	Granite
DI	Dioritic
GA	Gabbroic

Sedimentary

CB	Conglomerate and Breccia
SA	Sandstone
SI	Siltstone
SH	Shale
LD	Limestone and Dolomite
MA	Marl
GY	Gypsum

Metamorphic

GN	Gneiss
SC	Schist
SP	Slate and Phyllite
MA	Marble
SE	Serpentine

Glacial

UG	Undifferentiated Glacial
TI	Till
MO	Moraine
BT	Bedrock and Till
GF	Glacio-fluvial
DD	Deltaic Deposit
LF	Lacustrine and Fluvial
MD	Marine Deposit

Organic

PE	Peat
MU	Muck
MA	Marsh

Slope & Modified Depositional

TS	Talus and Scree
CO	Colluvial
SO	Solifluction
AF	Alluvial Fan
AL	Alluvium (Quaternary Alluvium or alluvium from streams, etc)

Aeolian Deposits

DU	Dunes
AS	Aeolian Sand Flats
LD	Loess Sands
CS	Cover Sands

Cowardin System

U	Upland
E	Estuarine
R	Riverine
P	Palustrine
L	Lacustrine

Hydrologic Regime

Tidal

IE	Irregularly Exposed
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RF	Regularly Flooded
IF	Irregularly Flooded

Non-Tidal

PF	Permanently Flooded
SF	Seasonally Flooded
ST	Seasonally/Temporarily Flooded
SA	Saturated
SS	Seasonally Saturated
IF	Intermittantly Flooded

U	Unknown
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Salinity Modifiers

S	Saltwater
B	Brackish
F	Freshwater

Soil Texture

CLL	Clay Loam
SCL	Sandy Clay
SAN	Sand
LSA	Loamy Sand
LOA	Loam
SAL	Sandy Loam
SIL	Silt Loam
SCL	Silty Clay Loam
SIL	Silt
SIC	Silty Clay
SAC	Sandy Clay
CLA	Clay
PEA	Peat
MUC	Muck

Soil Drainage

RD	Rapidly Drained
WD	Well Drained
MW	Moderatly Well Drained
SP	Somewhat Poorly Drained
PD	Poorly Drained
VP	Very Poorly Drained