

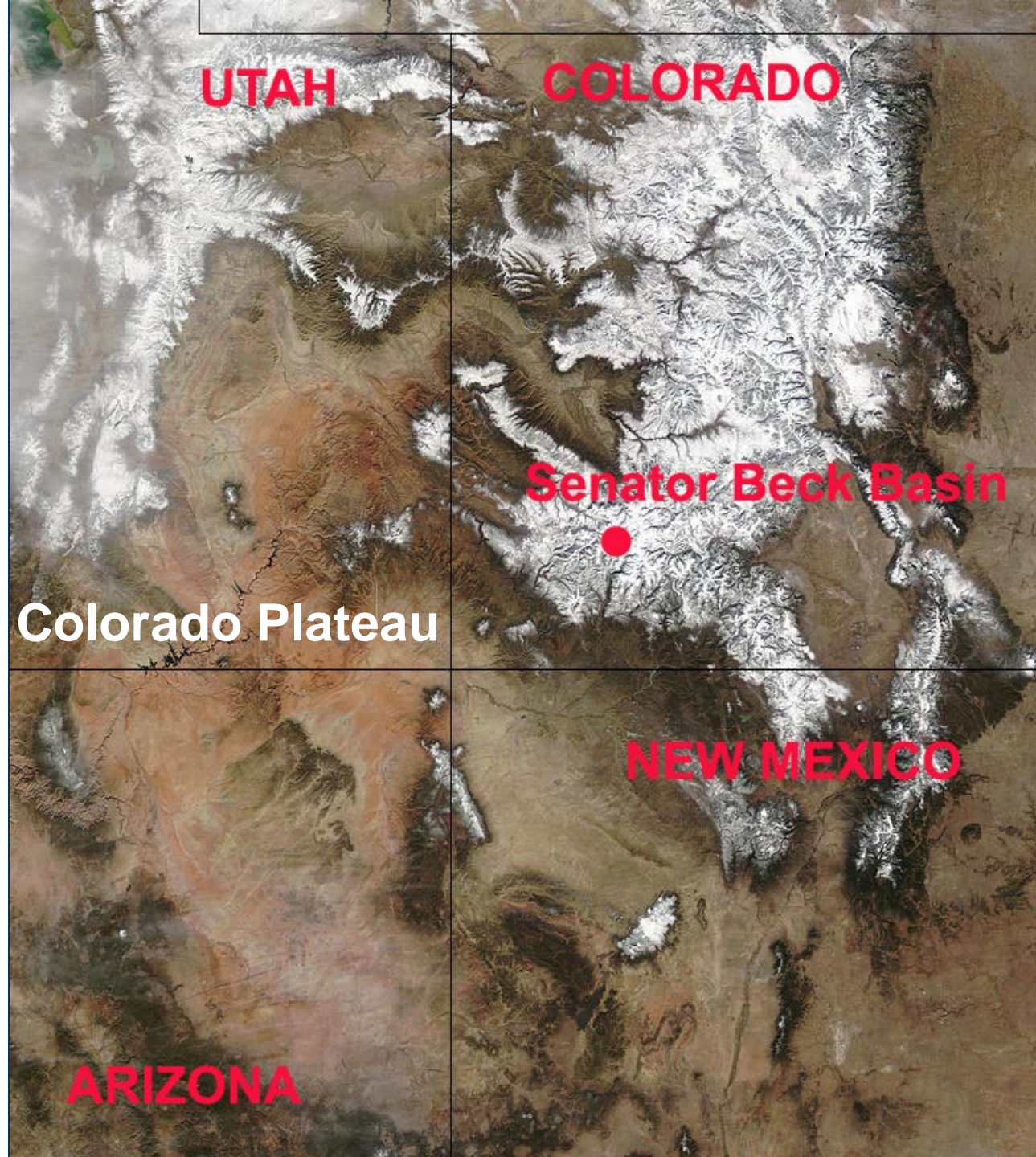
**Mountain System
and
Plant Community
Monitoring**

San Juan Mountains

Chris Landry

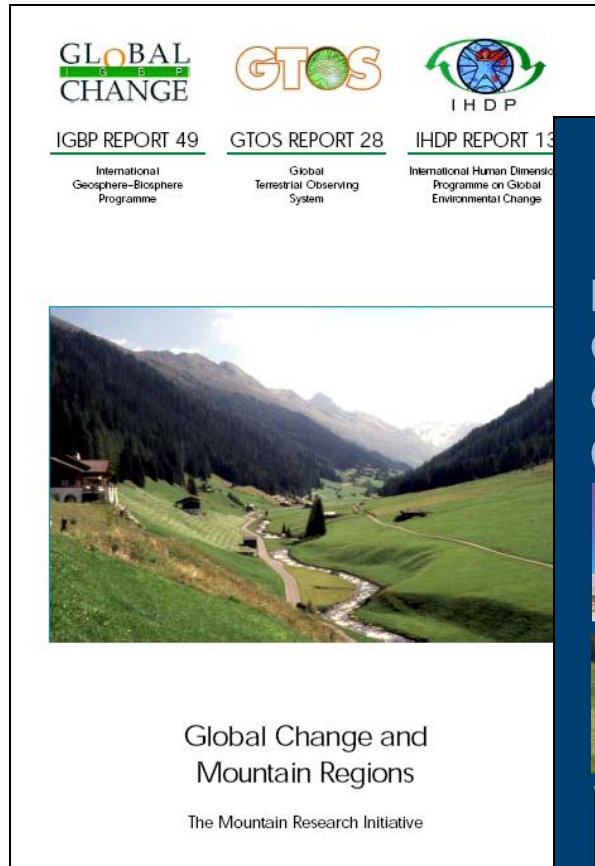
*Center for Snow and Avalanche
Studies
Silverton, Colorado*

www.snowstudies.org

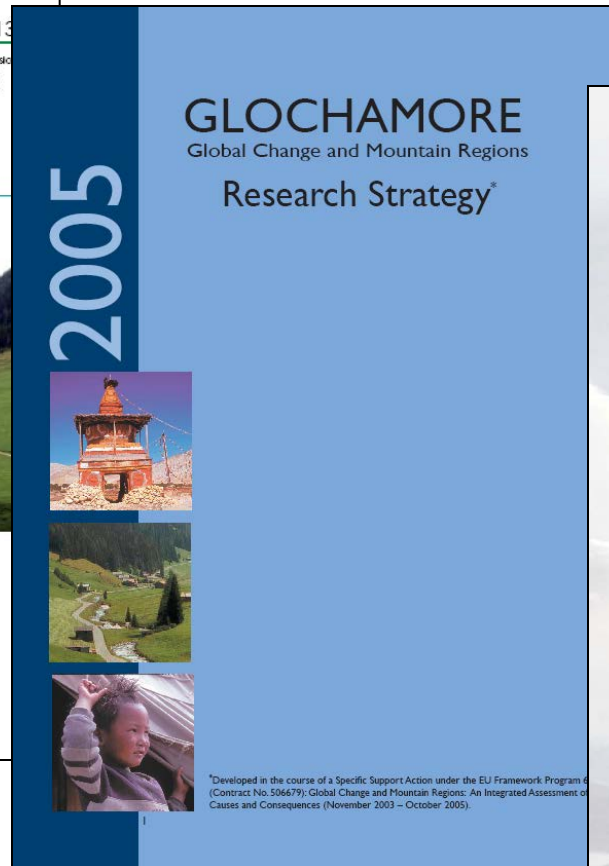


Mountain System Monitoring

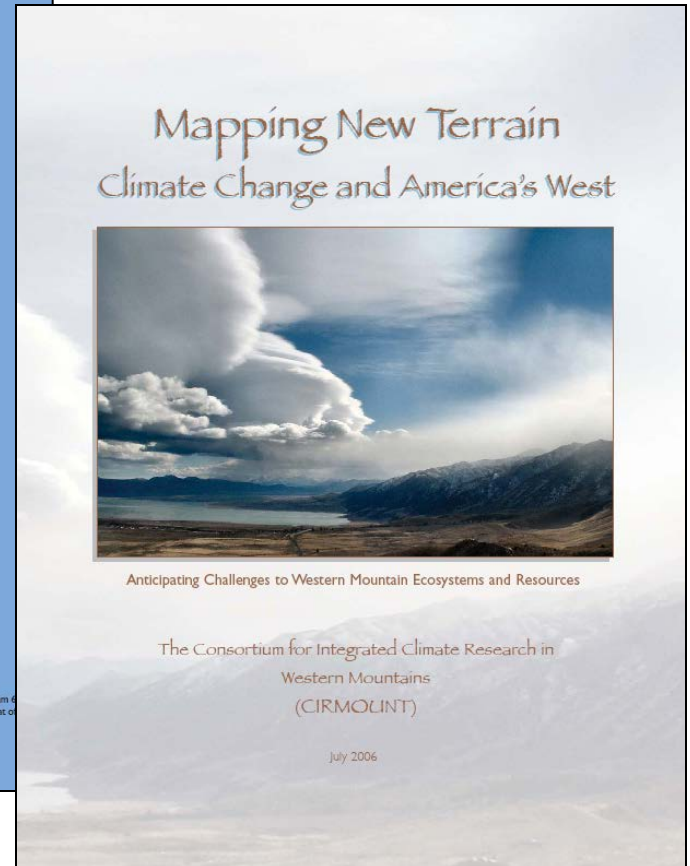
2001



2005



2006



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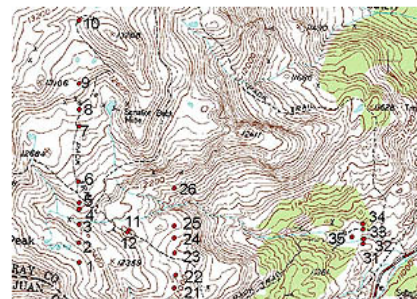


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SENATOR BECK BASELINE STUDY

In order to facilitate interdisciplinary snow system research, CSAS contracted with the Colorado Natural Heritage Program to perform a 'Baseline Study' of the plant communities in the SBBSA to be repeated every 5 years. The original study was conducted during the summer of 2004 and was repeated in 2009. The [complete 5-year repeat 2009 report](#) (pdf) and original [2004 Species List](#) (xls) are available for download.

Colorado Natural Heritage Program botanist Peggy Lyon (right) and National Park Service botanist Julie Crawford cataloged plant species inside a 0.1 m² Daubenmire frame on transect #11, located near the SBSP.



Altogether, twenty-three 100' transects were performed, at three general elevations - twelve in the alpine tundra, six at/near the krumholz line, and the remaining five in the subalpine. This map (USGS "Iron-ton, Colo" quadrangle) indicates the location of the southern (or eastern) end-point of each of the twenty-three 100' transects.

Survey monuments were placed at each end-point of each transect to facilitate repeat studies. Coordinates were also obtained by GPS for each southern (or eastern) end point. More photos and details can be found on our [web](#).

Internet Explorer interface showing the address bar with the URL http://www.snowstudies.org/SenBeck_PlantSurv_2009_Report_Final.pdf. The Norton Safe Web bar indicates the site is safe. The Google search bar is visible. The Favorites bar shows several links including USGS Real-Time Water Data, Center For Snow and Avala..., ORCA - Login, Climate science A fistful of d..., SBB snow-on LIDAR survey, SBB snow-off LIDAR survey, and Dust storms implicated in Co... The status bar at the bottom shows 'Save a Copy', 'Search', 'Select', '150%', and 'Search Web'.

Senator Beck Basin Long-term Vegetation Study 2009 Re-Survey

Final Report Presented to the
Center for Snow and Avalanche Studies, Silverton, Colorado

January 2010



Senator Beck Basin Study Area
Red Mountain Pass, CO

290 ha

Operated by
CSAS under
USFS Special
Use Permit with
Uncompahgre
National Forest

SBSP



SASP



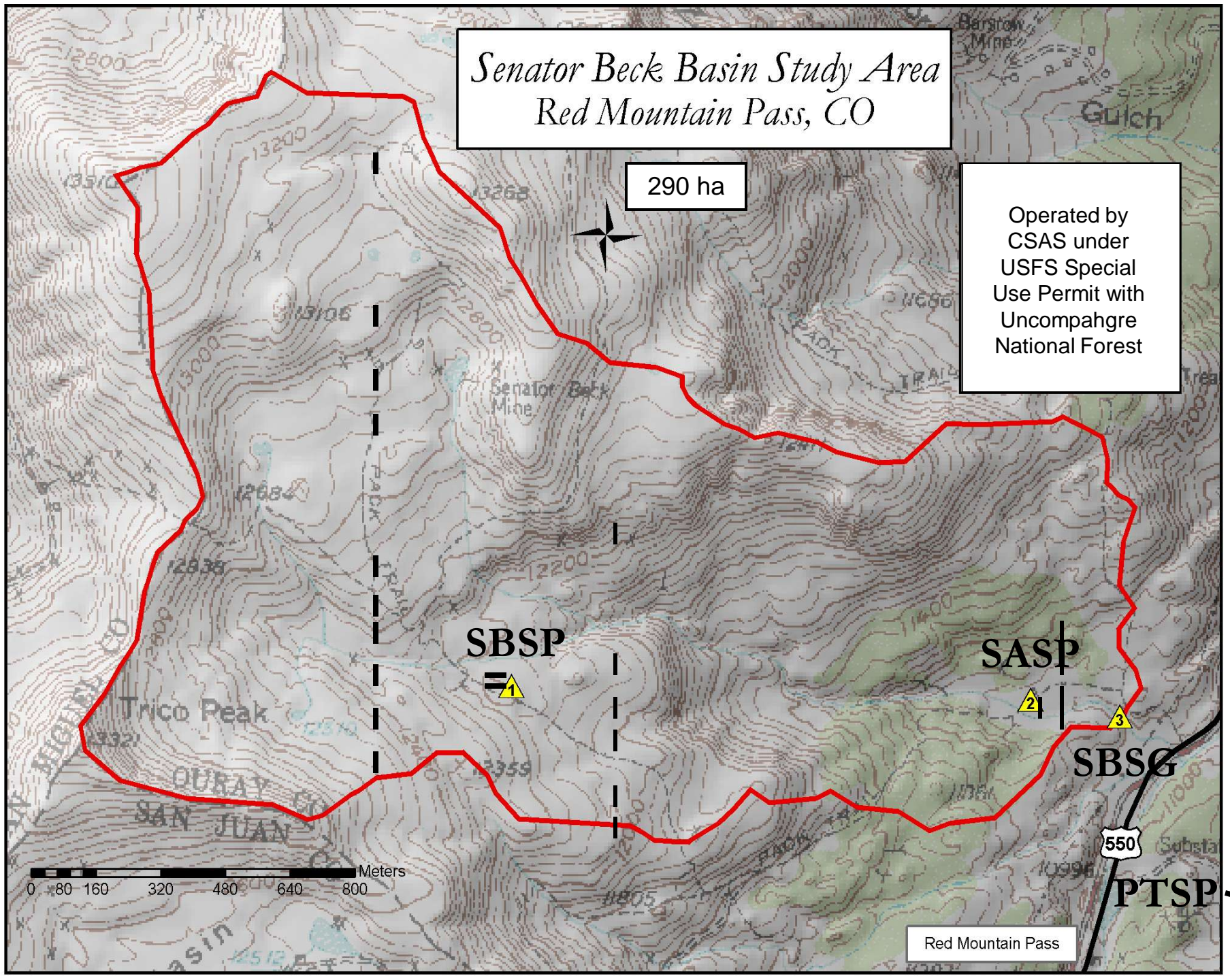
SBSG



PTSP



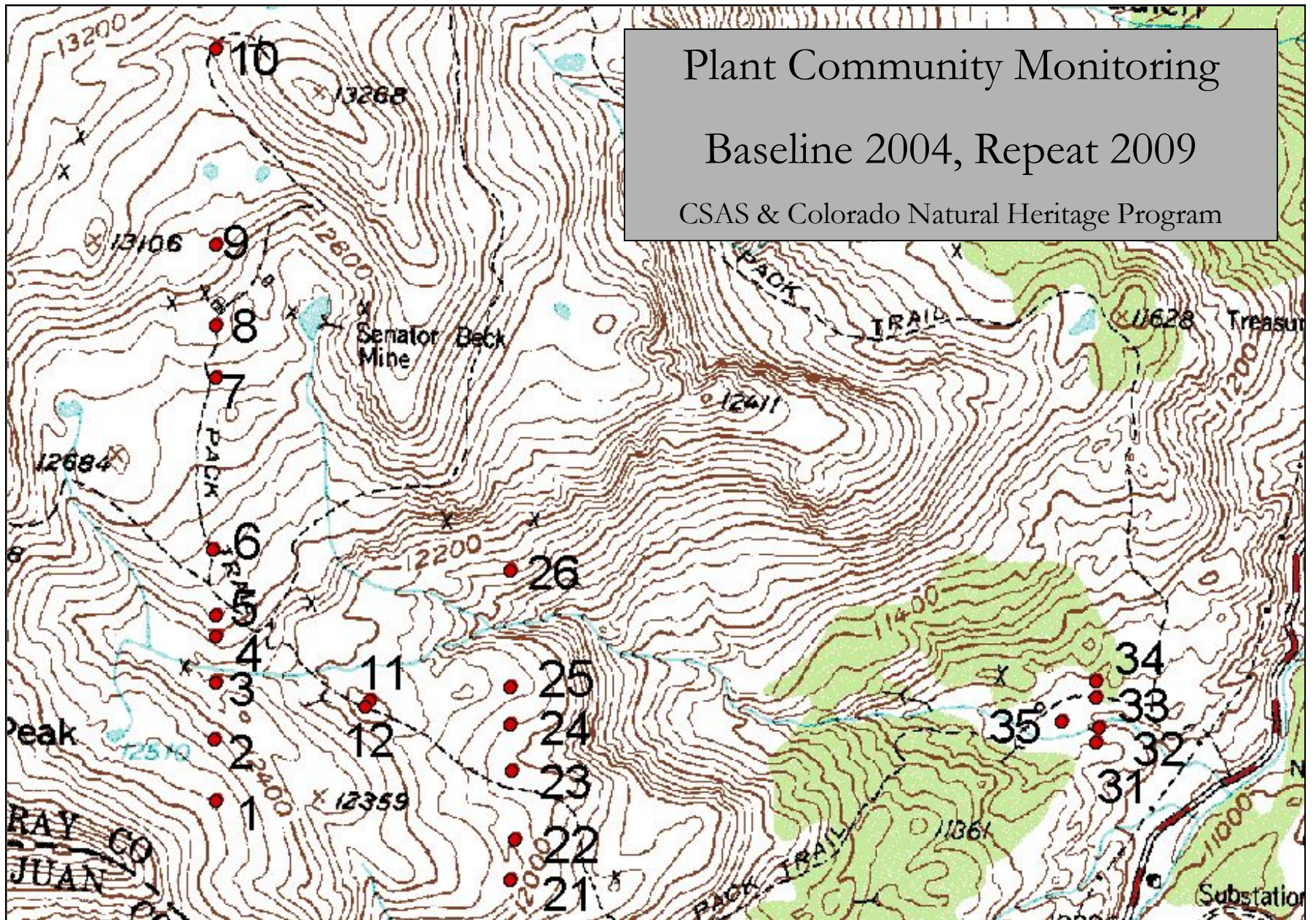
Red Mountain Pass



Plant Community Monitoring

Baseline 2004, Repeat 2009

CSAS & Colorado Natural Heritage Program





2004 Baseline Study Team

Peggy Lyon, Julia Hansen - CNHP

Julie Crawford - NPS

2009 Repeat Study Team

Peggy Lyon, Dawson White – CNHP

Sara Simonson – NREL, CSAS

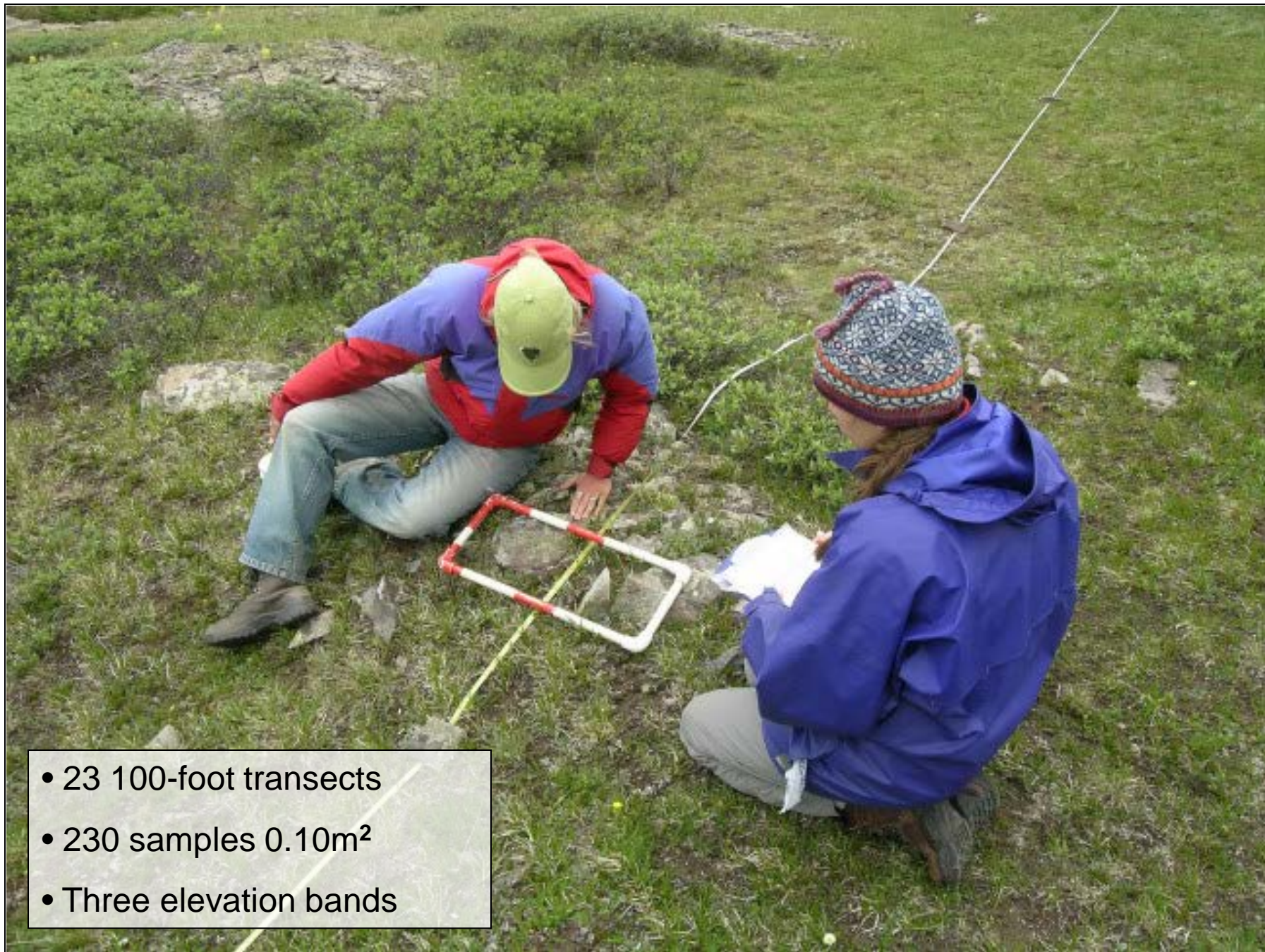
Julie Crawford - Consultant



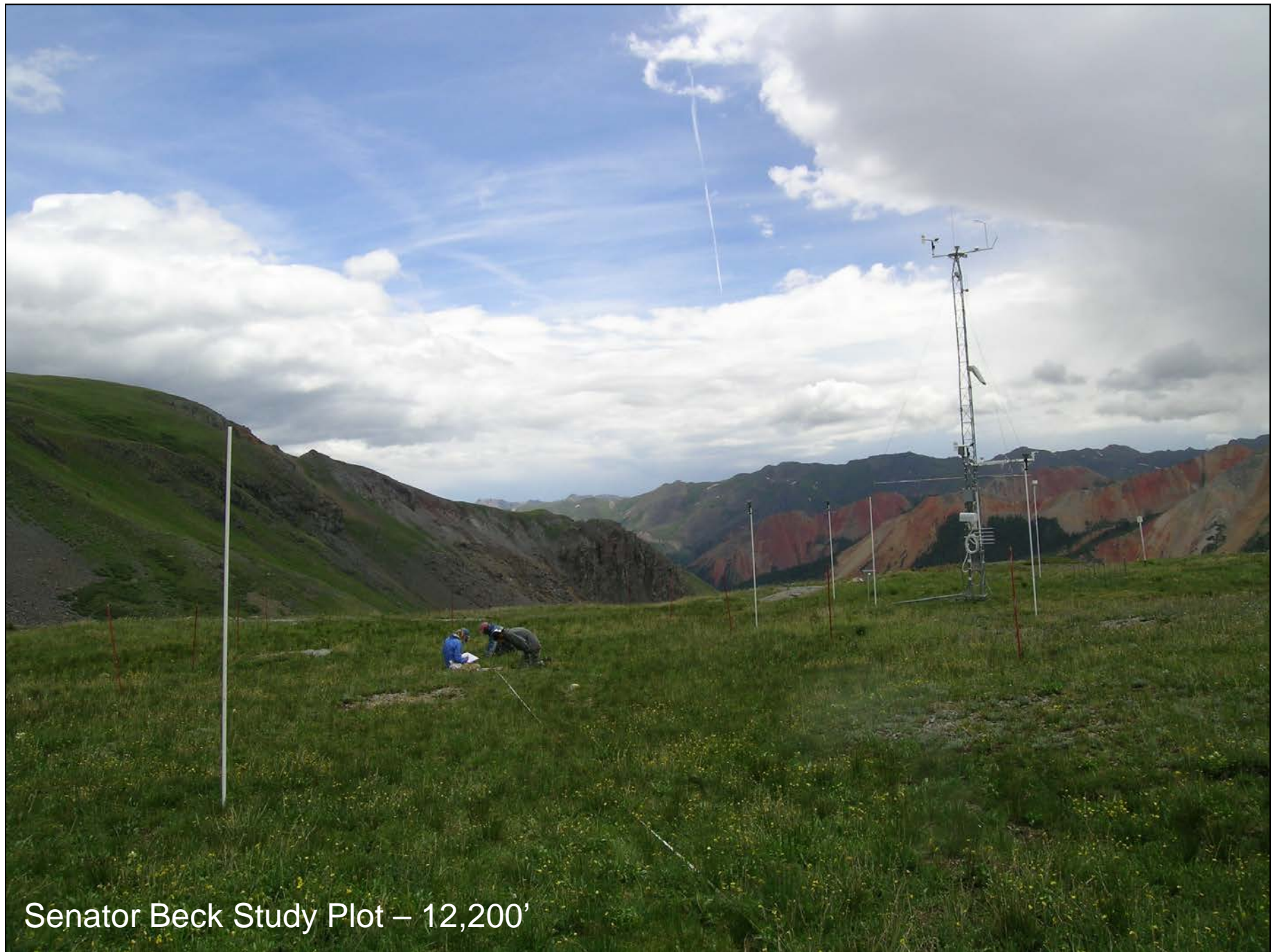
***Special thanks to
GMUG National Forest
for 2009 Repeat Study
funding assistance***



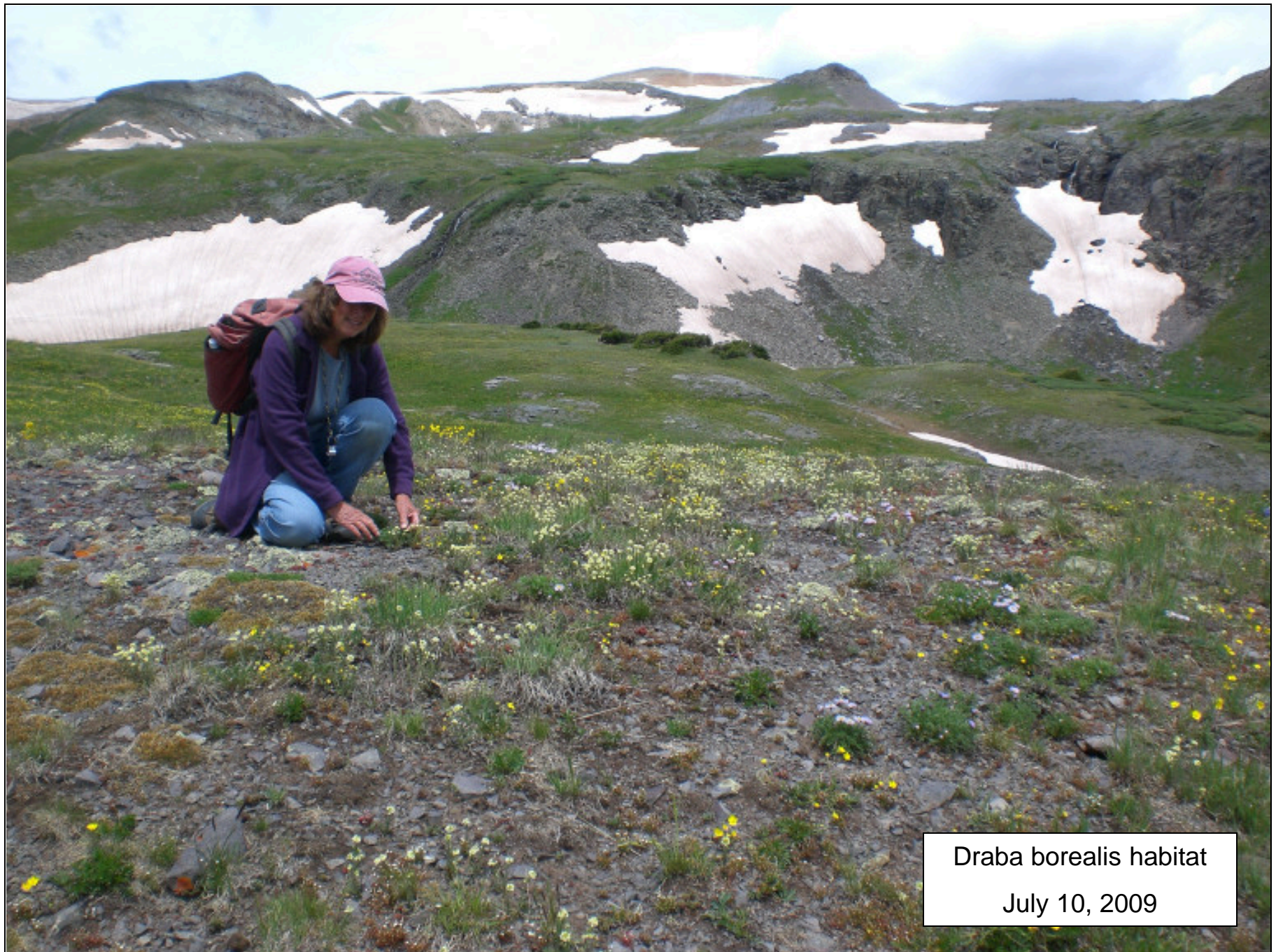




- 23 100-foot transects
- 230 samples 0.10m^2
- Three elevation bands



Senator Beck Study Plot – 12,200'



Draba borealis habitat

July 10, 2009

Plant Community	Status	Plant Species	Status
<i>Caltha leptosepala</i>	G4S4	<i>Besseyia ritteriana</i>	G3G4S3S4
<i>Acomastylis rossii</i> herbaceous vegetation	G4SU	<i>Draba crassa</i>	G3S3
<i>A. rossii</i> / <i>Bistorta bistortoides</i>	G4G5S4 S5	<i>Draba graminea</i>	G2S2
<i>A. rossii</i> / <i>Trifolium</i> sp.	G3S3S4	<i>Draba streptobrachia</i>	G3S3
<i>Ligusticum porteri</i> / <i>Vicia americana</i>	G3S3	<i>Erigeron melanocephalus</i>	G4S4
<i>Picea engelmannii</i> / <i>A. rossii</i> krummholz	G3?SU	<i>Erigeron pinnatisectus</i>	G4S4
<i>Salix arctica</i> / <i>A. rossii</i>	G4S4	<i>Minuartia macrantha</i>	G3S3
<i>Salix planifolia</i> / <i>Caltha leptosepala</i>	G4S4	<i>Packera crocata</i>	G4S3S4
		<i>Packera dimorphophylla</i>	G4S4
		<i>Podistera eastwoodiae</i>	G3S3
		<i>Potentilla subjuga</i>	G4S3?
		<i>Ranunculus macauleyi</i>	G4S3S4
		<i>Trifolium attenuatum</i>	G3G4S3S4

Table 1 (NatureServe 2009). Plant communities and species tracked by the Colorado Natural Heritage Program found within the Senator Beck Basin long-term vegetation transects during the 2009 survey. Conservation status is designated by a letter reflecting the appropriate geographic scale of the assessment (G = Global, N = National, S = Subnational), followed by a number from 1 to 5 (1 = critically imperiled, 2 = imperiled, 3 = vulnerable to extirpation or extinction, 4 = apparently secure, and 5 = demonstrably widespread, abundant, and secure).

Plant Species	Belt – Transect(s)	Elevation
<i>Calamagrostis canadensis</i>	Upper - 12	12,150' (3,703m)
<i>Carex microptera</i>	Upper - 11	12,320' (3,755m)
<i>Carex rossii</i>	Middle - 6	12,080' (3,682m)
<i>Descurainia incana</i>	Middle - 3	12,020' (3,664m)
<i>Dugaldia hoopsii</i>	Middle - 4	12,040' (3,670m)
<i>Geranium richardsonii</i>	Middle - 6	12,080' (3,682m)
<i>Ligusticum porteri</i>	Middle 2 & 4	12,070' (3,679m), 12,040' (3,670m)
<i>Luzula parviflora</i>	Upper - 7, 8, 10 Middle - 4	12,670' (3,676m), 12,730' (3,880m), 13,030' (3,972m), 12,040' (3,670m)
<i>Oxypolis fendleri</i>	Middle - 3 & 4	12,020' (3,664m), 12,040' (3,670m)
<i>Ranunculus inamoenus</i>	Middle - 4	12,040' (3,670m)
<i>Stellaria crassifolia</i>	Upper - 12 Middle - 3 & 6	12,150' (3,703m), 12,020' (3,664m), 12,080' (3,682m)
<i>Thalictrum fendleri</i>	Middle - 3	12,020' (3,664m)

Table 3. Species found in above treeline transects of the Senator Beck Basin long-term vegetation study area in 2004 and/or 2009 that are known primarily from subalpine environments; locations where they were recorded.

($p < 0.001$) in Repeated Measures ANOVA (Figure 6). In addition to the changes in species composition between the two readings, mean total vegetation cover increased greatly from 2004 to 2009 in all three belts (Figure 7). Repeated Measures Analysis of Variance verified these differences ($p < 0.0001$; Figure 8).

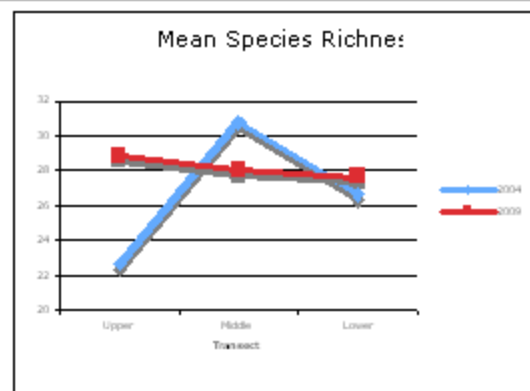


Figure 3. Mean species richness by transect in 2004 and 2009 in the Senator Beck Basin long-term vegetation transects.

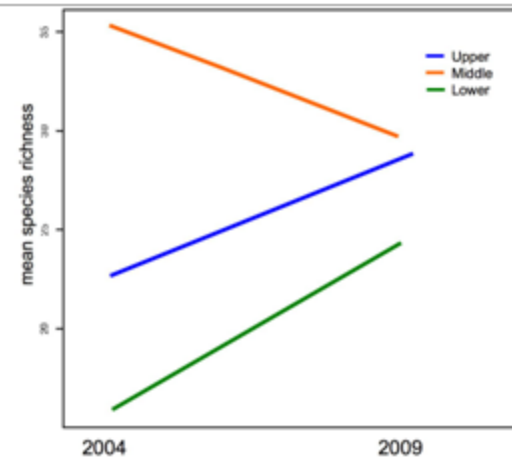


Figure 4. Repeated measures ANOVA showing mean species richness changes from 2004 to 2009 in the Senator Beck Basin long-term vegetation transects.



Figure 5. Mean Shannon Diversity Index by transect in 2004 and 2009 in the Senator Beck Basin long-term vegetation transects.

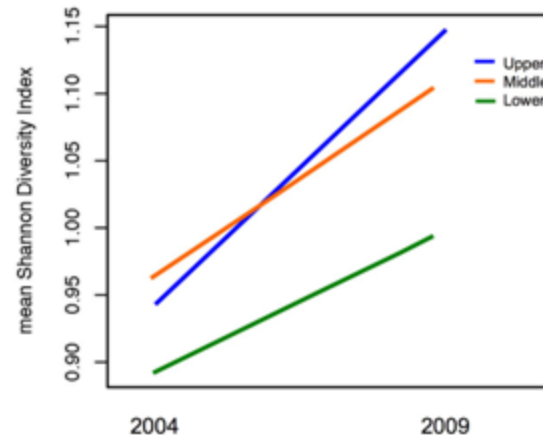


Figure 6. Repeated measures ANOVA showing mean Shannon Diversity Index changes from 2004 to 2009 in the Senator Beck Basin long-term vegetation transects.

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September 7, 2011

WY 2011 Total 1,400 mm

