

Buckboard Flat

Buckboard Flat snow course may well be the poster child for dramatic vegetative changes over the past 80 years. There is a huge compendium of research on the impact of vegetation on snow accumulation and ablation, particularly when comparing open meadows to conifer coverage. There is up to a 40% decline in SWE accumulation between the conifers and adjacent open areas.

Potential weather modification: none.



This photo is looking towards the north east along the main axis of the course.



This photo is looking in a more southerly direction opposite of the previous photo.

In these two photos of the Buckboard Flat Snow Course taken in 1936, the course is relatively open with young growing aspens nearby. Some conifers are apparent in the background interspersed in the aspen forest, as well as some brush species mixed in the foreground. The snow course is laid out along an old trail that is visible in the first photo.



Here is the Buckboard Flat Snow Course circa early 2000. Notice that the tree cover has increased dramatically and now the cover is a mix of aspens and at least 50% conifers.



In this photo, looking the other way of the previous photo, and after some trees have been removed, one can still see the remnants of the old trail in the early photograph. Notice again, the number and size of conifers along the course.



This photo is taken perpendicular to the course.



This is the end marker of the course.



This photo is looking perpendicular to the course.

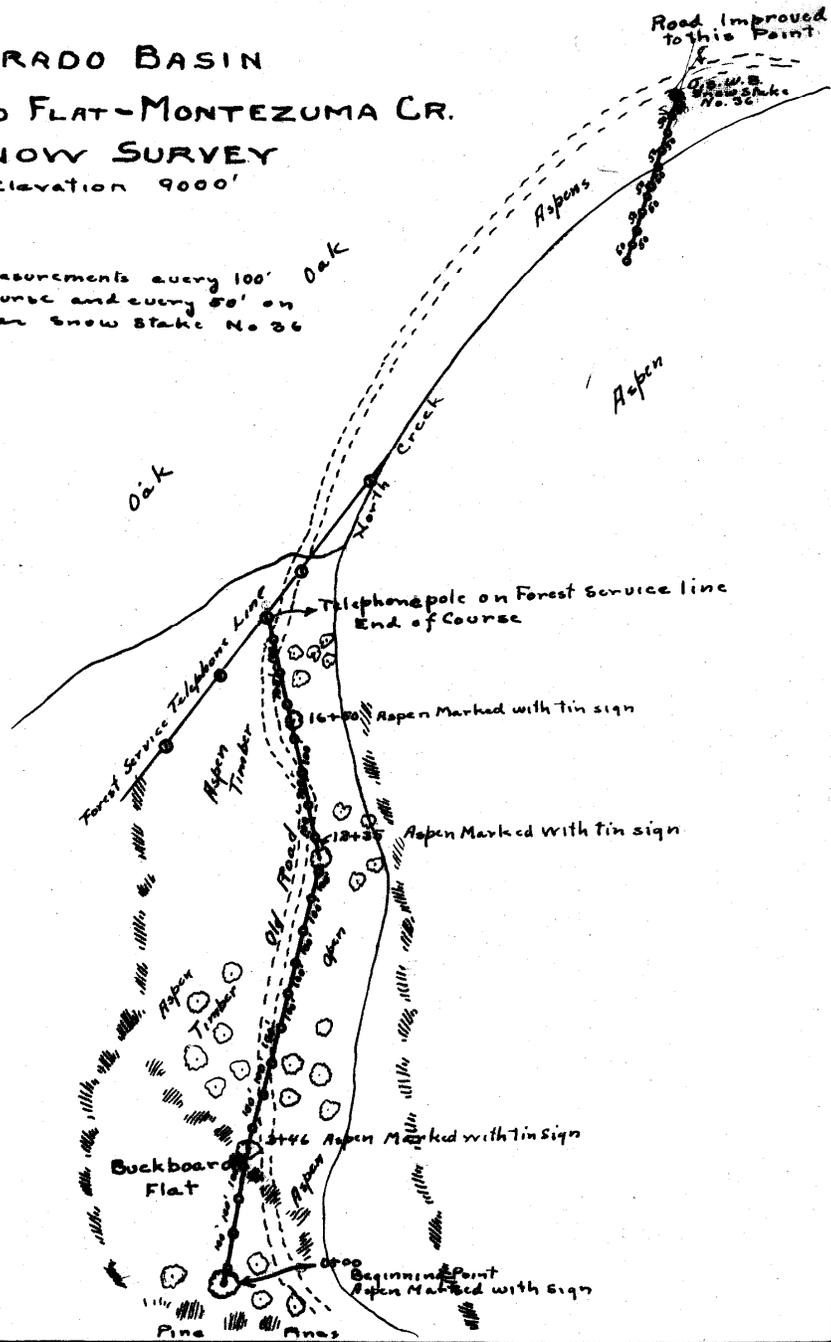


These last 4 photos taken in June 2007 are the cardinal coordinate photos looking from the center of the Buckboard Flat Snow Course along and across the course. The change in vegetation is amazing. The accumulation and ablation characteristics at this location will certainly have changed as well.

COLORADO BASIN
BUCKBOARD FLAT-MONTEZUMA CR.
SNOW SURVEY
 Elevation 9000'

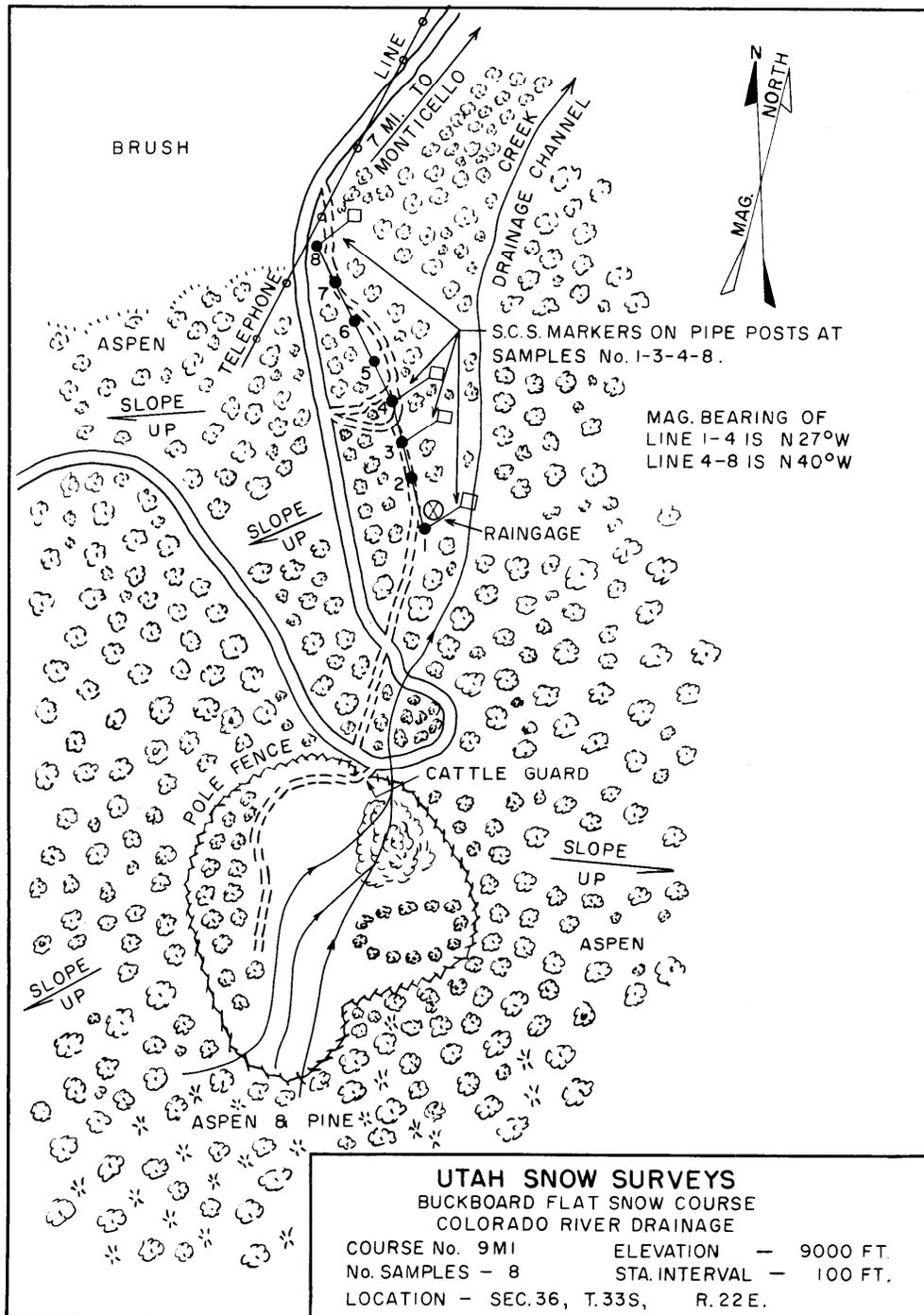
Note

Take Measurements every 100' on Upper Course and every 50' on course near Snow Stake No. 36



This is a scan of the original snow course map. Over time the snow course was shortened and when this happened, the original points continued to be measured, although they

were renumbered, thus points 1,2,3,4 and 5 may have originally been points 13,14,15,16 and 17. This map also shows the relative position of vegetation and other features with respect to the course. Distances are not measured and asterisks do not represent individual trees rather a general depiction of vegetation. The density of vegetation is also relative and not absolute.

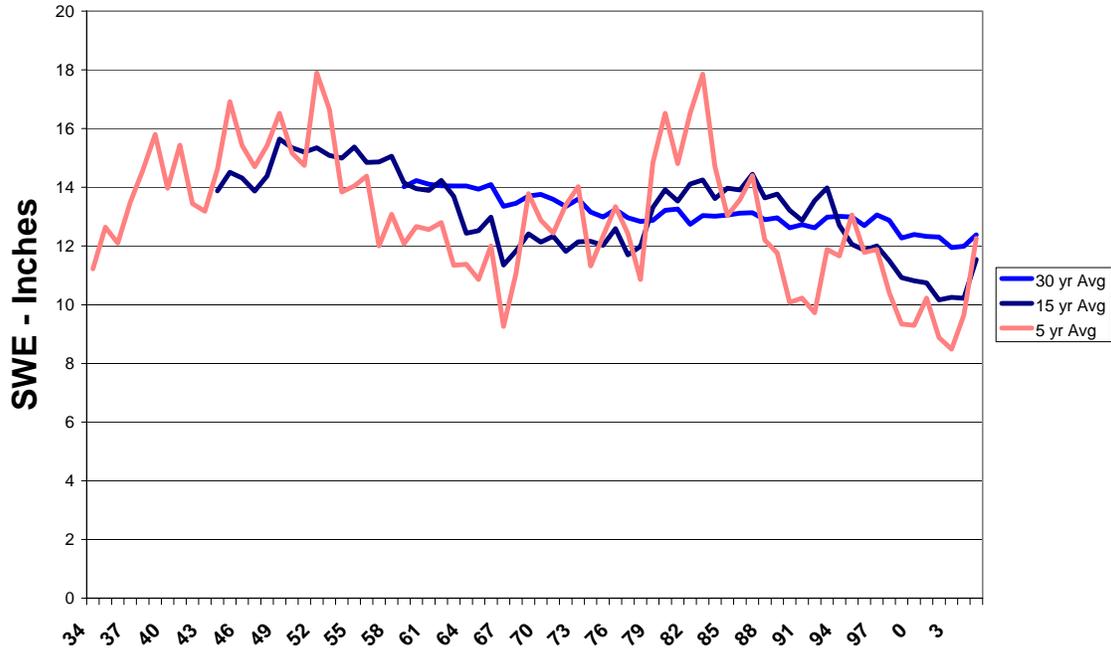


U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

7-L-19625-48

Map of Buckboard Flat showing current sample points.

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There has been a gradual decline in the observed April 1 swe accumulation from an average of about 14 inches to about 12 inches from the early 1960's to 2005. The steady decline gives support to the notion that the vegetation growth over a long period of time is associated with the decline. This is one of the few courses in the state that is not likely to have been impacted by weather modification. A 2 inch decline is only a 14% decrease in snowpack for this site and most research would indicate a much greater decline would be expected from such a dramatic change in vegetation. If this was just a conversion from an open meadow to aspen, a 20 to 25% decline would be expected. Where this has a significant conifer component, the decline would normally be even greater, perhaps as much as 30 to 35% decline. Without an increase due to weather modification one must pose the question: if the observed decline is only 14% and up to 30 or 35% was expected due to vegetation change, is this site accumulating more snow than in earlier time periods - possibly as much as a 10% to 20% increase? Then again maybe not, how can one definitively quantify various impacts, both positive and negative, at one geographic point across time? These questions are valid, just what is happening at this site? Unfortunately there is insufficient data to make a determination and answer these questions. We know that there is a large impact due to vegetative change and there may be many other unquantifiable positive and negative impacts on SWE accumulation as well.

Data from this course should not be used in long term comparisons of swe accumulation and ablation without data adjustment due to substantive changes in site vegetation and possibly other impacts.

R Julander
2007