A REVIEW OF CLIMATOLOGICAL DATA FOR GROUND SNOW LOADS IN ARIZONA

by

Scott Brent Freestone

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STATEMENT BY AUTHOR

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___________________________	________________
Achintya Haldar, Ph.D., P.E. Professor of Civil Engineering And Engineering Mechanics	Date

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ABSTRACT

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Snow loads on structures are determined in modern building codes by applying ground-to-roof conversion coefficients to ground snow loads. An essential part of structural design for the mountainous regions of Arizona is designing for loads due to snow. For accurate design for snow loading current ground snow loads in Arizona must be updated. Historical snow data obtained from climate monitoring stations throughout the state provide a basis for ground snow load predictions. Historical snow depth and snow water equivalent data from climate monitoring sources for over 500 sites across the state of Arizona have been compiled and modeled with lognormal distributions to determine ground snow loads to be used in structural design. Ground snow loads with a mean recurrence interval of fifty and thirty years (2% and 3.3% annual probability of exceedance, respectively) are presented.

CHAPTER ONE

INTRODUCTION

1.1 **CODE BACKGROUND**

When approaching the design of a new structure, one generally refers to a building code, such as the *International Building Code* (IBC) which is very common in urbanized areas in Arizona, or the *Uniform Building Code* (UBC) which is still enforced in some rural jurisdictions in Arizona. Building codes give an outline of the design process for the structure, from the applied loads to account for to the analysis procedure to employ. Second only to the utility required by the users of the structure, the loads imposed on the structure are often the starting point of the design. Individual loads will affect a structure independently and simultaneously in combinations. In most current building codes combinations of loads to consider are given for two methods of design, *Allowable Stress Design* (ASD, also referred to as *Allowable Strength Design* or *Working Stress Design*) and *Load and Resistance Factor Design* (LRFD). (ASCE 7-05)

ASD is characterized by comparing the stresses on structural members due to applied design loads to a predetermined allowable stress for the structural members. These allowable stresses are established based on safety factors applied to the material strength exhibited in standardized testing procedures and historical performance. These factors are applied to the material strength to provide a confidence against the uncertainty inherent in the material strength. These factors vary depending on the failure mechanism (e.g., bending moment, shear, axial compression, etc.)

The common load combinations used for structural design with ASD are:

$$\textit{Dead} \tag{1.1}$$

$$\textit{Dead} + \textit{Live} \tag{1.2}$$

$$\textit{Dead} + \textit{Live} + (\textit{Roof Live or Snow or Rain}) \tag{1.3}$$

$$\textit{Dead} + (\textit{Wind or } 0.7\textit{Seismic}) + \textit{Live} + (\textit{Roof Live or Snow or Rain}) \tag{1.4}$$

$$0.6\textit{Dead} + \textit{Wind} \tag{1.5}$$

$$0.6\textit{Dead} + 0.7\textit{Seismic} \tag{1.6}$$

LRFD is characterized by comparing the strength requirements of the structural components due to the application of factored loads to the allowable strength of the member. Each type of load (e.g., dead, roof live, roof snow, etc.) has a different factor representing uncertainty in the magnitude of the load and in the analysis from which the load effect is obtained from the load. (Steel, 2005) As in ASD, the strength of the member also has different resistance factors applied corresponding to each failure mechanism.

The common load combinations used in structural design with LRFD are:

$$1.4\textit{Dead} \tag{1.7}$$

$$1.2\textit{Dead} + 1.6\textit{Live} + 0.5(\textit{Roof Live or Snow or Rain}) \tag{1.8}$$

$$1.2\textit{Dead} + 1.6(\textit{Roof Live or Snow or Rain}) + (f_1\textit{Live or } 0.8\textit{Wind}) \tag{1.9}$$

$$1.2\textit{Dead} + 1.6\textit{Wind} + f_1\textit{Live} + 0.5(\textit{Roof Live or Snow or Rain}) \tag{1.10}$$

$$1.2\textit{Dead} \pm 1.0\textit{Seismic} + f_1\textit{Live} + f_2\textit{Snow} \tag{1.11}$$

$$0.9\textit{Dead} \pm (1.6\textit{Wind or } 1.0\textit{Seismic}) \tag{1.12}$$

where f_1 = 1.0 for floors in places of public assembly, for live loads in excess of 100 psf, and for parking garage live loads.
= 0.5 for other live loads.
f_2 = 0.7 for roof configurations (such as saw tooth) that do not

shed snow off the structure.
= 0.2 for other roof configurations.

Along with the affects of Dead, Live, Wind and Seismic loading, the affects of Snow on a structure can be a crucial aspect of the design. In both design approaches, ASD and LRFD, the design snow load is calculated from a basic ground snow load. The equation for determining the snow load to be used in the design of a building with a roof of a very low pitch (referred to as a flat roof in building codes) is as follows:

$$P_f = 0.7C_eC_tIp_g \qquad (1.13)$$

where P_f is the Flat Roof Snow Load (psf)
C_e is a dimensionless exposure factor
C_t is a dimensionless thermal factor
I is a dimensionless importance factor
p_g is the ground snow load (psf)

The determination of the roof snow load for sloped roofs has an additional step:

$$P_s = C_sP_f \qquad (1.14)$$

where C_s is a Roof Slope Factor
P_f is the Flat Roof Snow Load determined in equation 1.13

The Roof Slope Factor takes into account whether the roof is warm or cold, whether the surface of the roof is slippery and unobstructed or not, how much pitch the roof has and whether the roof is curved or not. (ASCE 7-05)

1.2 MOTIVATION

When considering structural design and engineering in Arizona, where the warm weather and dry climate are well known, the last thing typically thought of is the affects of snow on a structure. Much of the populated portions of the state rest at elevations lower than 4,500 feet (1,372 m) above mean sea level and rarely have a considerable accumulation of snow.

Figure 1.1
Looking West down the University of Arizona Mall
In Tucson during a Snow Storm on April 4, 1999

Even in most of the areas where it does snow, the load from the small amount of snow that is likely to accumulate would not exceed the live load consideration required in the load combinations previously mentioned. From these load combinations it can be surmised that if the roof snow load is equal to or less than the roof live load, there is no need to consider the snow load at all. (It is important to note that for large roof areas the live load may be reduced, but roof snow load may not. In these cases, the roof snow load may be negligible if it is less than the reduced roof live load, 12 psf in most cases.) (IBC, 2003) This is the case for most of the metropolitan areas in the state. There are however locations in the mountainous regions of the state, where this is not the case. Snow depths have been reported as high as 83 inches for Flagstaff, Arizona. (NCDC, 2006) This is a city with a population of about 57,000. Among other things, Flagstaff is the home of Northern Arizona University with approximately 19,000 students.

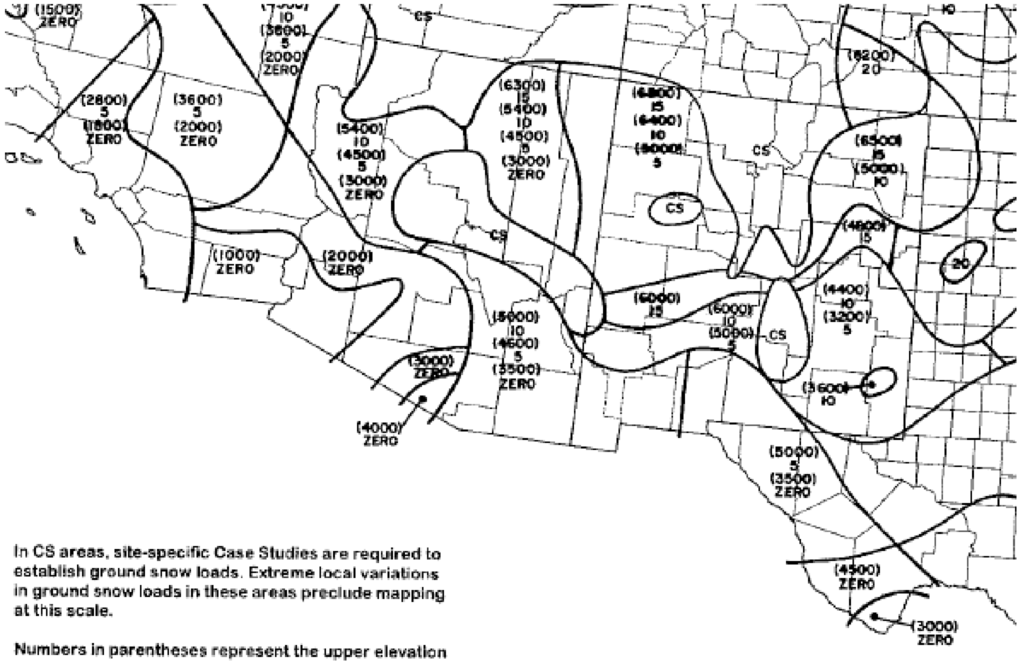
Figure 1.2
Apartments in Flagstaff after a Snow Storm

There are also rural areas in Arizona affected by snow loading. Although these areas are not the most urbanized regions of the state, there are some very significant structures in these areas that could fail due to the load of snow accumulation if it was not properly considered in the design. For instance, in Southern Arizona, an area where the climate is generally warm and snow loading is not given much thought in structural design, Mt. Graham is the home of the University of Arizona's Large Binocular Telescope (LBT) at an elevation of 10,480 feet (3,194 m) above mean sea level. The enclosure for the LBT is the height of a 12-story building rotating on a cylindrical base 38 feet tall. This is a very significant structure that houses "the world's most powerful optical telescope" (World's, 2003) where reported snow depths have been as much as 120 inches (Elliott, 1981).

Another rural location with significant construction is a telescope site in Happy Jack, Arizona. Happy Jack is a small town with a population between 600 and 700 in the southeast corner of Coconino County. Lowell Observatory in conjunction with The Discovery Channel is currently in the process of building a 4.2-meter telescope at an altitude of 7800 feet (2,377 m) above mean sea level in Happy Jack. Because Happy Jack is a small rural town there is no design snow load determined by a local jurisdiction for structures built in the area. In addition to these telescope sites, there are also mines with large structures at rural sites throughout Arizona, some of which are at high elevations where snow would contribute significantly to the loading on the structure.

Loading due to snow is the most critical design load for many structures in the mountainous regions of Arizona. At higher elevations snow will accumulate for most of the winter season, and although Arizona boasts of warmer and dryer climates than much of the United States, snow depths have been recorded as high as 126 inches (Elliott, 1981). The presence of significant amounts of snow during the winter months requires the use of accurate snow loads in the design of buildings and other structures.

Some guidance for snow load design in Arizona does currently exist. Most building codes currently used, such as the IBC and UBC reference snow load maps published by the American Society of Civil Engineers (ASCE) in the Standard for Minimum Design Loads for Buildings and Other Structures, ASCE 7. The maps in ASCE 7 indicate basic ground snow loads to be used in design, p_g used to determine the roof snow load in equation 1.13. These maps have contours separating regions of different climatological behavior. In each region grouped by contour lines the basic ground snow load is indicated based on the elevation. At elevations above those shown or locations where the snow load is unknown the designation “CS” is given to indicate that a “Case Study” of that specific area is required to determine the basic ground snow load to be used for design. Because of the characteristics of the rapidly varying terrain in the mountainous regions of Arizona, the snow load cannot always be accurately shown by general smoothed isolines. Hence, the “Case Study” areas are extensive for the higher elevation areas of the state. This makes it difficult to design for snow loads in these areas without performing an in-depth case study to determine the snow loads. (Tobiasson and Greatorex, 1996)



In CS areas, site-specific Case Studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.

Numbers in parentheses represent the upper elevation limits in feet for the ground snow load values presented below. Site-specific case studies are required to establish ground snow loads at elevations not covered.

To convert lb/sq ft to kN/m², multiply by 0.0479.

To convert feet to meters, multiply by 0.3048.

0 100 200 300 miles

FIGURE 7-1
GROUND SNOW LOADS, p_g FOR THE UNITED STATES (IB/SQ FT)

Figure 1.3
A Portion of the ASCE 7-05 Ground Snow Load Map

To provide more accurate local information regarding ground snow loads many states have published their own snow load design guides. (Arizona, 1981, Oregon, 1971, Washington, 1995) Arizona's state-specific guide, Snow Load Data for Arizona, provides another resource for determining ground snow loads. (Elliot, 1981) In this study ground snow loads with a magnitude predicted to occur once every 30 years are published as a guide to aid in structural design.

Although we have a few resources available to assist in determining snow loads for structural design, there still exists a need for additional information as well as further refinement of existing information. Much of the map in ASCE 7 indicates requirements for case studies to determine the ground snow load for specific areas. Snow Load Data for Arizona gives recommendations for snow loads based on a 30-year return period, which is not consistent with the requirements for most modern building codes. (ASCE 7-05) Furthermore, there has been much research in this area over the past three decades that could improve current snow load design methods. In Snow Load Data for Arizona it is suggested that a future publication would be advisable as more weather information and research becomes available (Elliott, 1981). This report explores the research in snow loading from the 1980's to current and its application in structural design in Arizona.

1.3 OBJECTIVES

There is a recognized need for guidance when considering the effects of snow loads on structures in the higher elevations of Arizona. Even though some locations in Arizona have experienced considerable amounts of snowfall, the current resources available do not provide a complete guide to designing structures in Arizona for snow loads. In this study, reliable snow loads are developed for use in the design of buildings and other structures in Arizona from historical climatological data. The National Water and Climate Center (NWCC), under the U.S. Department of Agriculture National Resources Conservation Service (formerly the U.S. Soils Conservation Service), has kept records for the amount of snow on the ground measured in *Snow Water Equivalents* (SWE) for 56 measuring stations in the mountainous regions of Arizona. The National Climate Data Center (NCDC) also has an extensive database of historical weather records that includes measurements for the daily snow depth at over 480 sites in Arizona.

Historical records for each of the sites with SWE data are statistically analyzed to determine an annual extreme SWE that has a mean recurrence interval of 50 years (or an annual 2% probability of being exceeded). (Haldar and Mahadevan, 2000) The SWE is then translated directly into a snow load to give a ground snow load that will occur on average once every 50 years, or a 50-year basic ground snow load. Likewise, the historical records for daily snow depth are analyzed to predict an annual extreme snow depth that has a mean recurrence interval of 50 years. An equation relating snow density to the depth is then applied to the 50-year ground snow depth to determine a 50-year ground snow load. Predicting 50-year ground snow loads in this report is consistent with current codes and building design practices. (ASCE 7-05)

The Happy Jack site mentioned previously is in a designated Case Study area in the ASCE 7-05 ground snow load maps and has a recommended ground snow load of 95 psf in Snow Load Data for Arizona. (Elliott, 1981) It will be interesting to compare this ground snow load value to that found with the updated modeling to see if the previous ground snow load is consistent with current practices suggested in the code.

CHAPTER TWO

LITERATURE REVIEW

2.1 OVERVIEW

Snow Load Data for Arizona (Elliott, 1981) provides useful snow load information for many specific sites in Arizona and is widely used today as a guide by design consultants across the state. The methods used in the development of ground snow loads have received considerable attention in the research community and have improved substantially during the past 3 decades. Since the publication of Snow Load Data for Arizona there has been much research done on the statistical modeling of snow loads. There have also been developments in the determination of ground snow loads from historical data with only depth of snow records. Furthermore, there now exists approximately 32 additional years or historical snow records with improvements on measuring and reporting the data.

2.2 SNOW LOAD DATA FOR ARIZONA

Snow Load Data for Arizona (Elliott, 1981) was prepared by a special Snow Load Committee of the Central Chapter of the Structural Engineers Association of Arizona in Cooperation with the Civil Engineering Department of Arizona State University. It was published in 1973 with a second printing in 1981. There were no revisions to the information in the second printing, only a one-page Foreword with a few notes responding to frequent questions that had been voiced as the structural design community of Arizona had begun implementing the findings of the report in their work.

Snow Load Data for Arizona presents basic ground snow loads to be used in design as well as information for the application of snow loads on structures with factors for wind exposure, sloped roofs, shape of roofs, etc. similar to those outlined in Section 1.1. The ground snow loads presented will be discussed here, but the application of loads on structures will be ignored since this is covered thoroughly in building codes and is beyond the scope of this study.

The introduction to Snow Load Data for Arizona states that it is intended to serve as a guide to structural designers. As a guide to designers there is no statistical information detailed in the report. There is however tables giving useful information including the 30-year basic ground snow load and the 30-year basic roof snow load for each of the sites studied. These tables also list the elevation for each site, the month and year of the maximum snow depth; maximum snow depth (inches), maximum measured, calculated, or estimated weight of snow on ground (psf) and the source of the data. Each site in the tables is divided into one of five "Snow Zones." The Snow Zones are geographical areas of Arizona that are separated by weather patterns and weather behavior, including snowfall.

The report states that the three major sources of snow data used were: 1) U.S. Soil Conservation Service (SCS) Snow Survey records, 2) U.S. Weather Bureau records and 3) "Actual Snow Loads in Arizona, a detailed study of the great storm of December 1967." (Elliott, 1968) The SCS records provided data for the depth and weight of snow on the ground. Actual Snow Loads in Arizona provided information for snow depth and estimated ground snow loads for a single storm in December 1967. "This storm was the heaviest short period snow fall in most areas of the state." (Elliott, 1968) The U.S. Weather Bureau records provided information only for the depth of snow. For the data with only snow depth, weights of snow were determined by comparing similar stations that had both depth and weight measurements.

Plots for maximum ground snow loads vs. elevation for each Snow Zone are included as figures in the report. In discussion of the development of the snow loads it is stated that the original intent was to draw regression curves for each of these plots and use the curve values for the basic ground snow loads. This approach was abandoned due to inaccurate loads resulting from the wide scatter of data. No regression curves were included in the final publication of the report, only the plots. These curves did however aid in determining the ground snow loads, but ultimately each site was considered and assigned a ground snow load individually. Elliott does not indicate the precise methods used to determine the ground snow loads published in this report. He does indicate that the snow density assumptions for the sites with only snow depth measurements are most likely "fraught with error…There is no way of judging accuracies of these weight estimates, but hopefully they are within 30%±." (Elliott, 1981)

Factors affecting the accuracy of determined snow loads based on depths are the variability in exposure of each of the sites (sun exposure decreases snow depth, but increases snow density) and the time during the season when the snow depth is measured (higher densities as snow melts later in the spring). Elliott suggests that reason and judgment were essential to develop the snow loads. If reason and judgment were required to determine snow loads based on the limited and varying data available, Elliott would be considered a qualified judge since his study was the source of much of the data used. He suggests that reason and judgment were not only used to develop the loads, but they are also required in application of the snow loads in structural design.

2.3 RELIABLE STATISTICAL MODELS FOR SNOW

For sufficient design of structures it is imperative to have accurate snow loads for design. Snowfall, however, is a naturally occurring phenomenon with some variability. As is well known in Arizona where water resources depend considerably on snowmelt, snowfall or snow depth does not measure the same each season. That is to say, the snowfall or snow depth varies from season to season, and from site to site. In order to accurately predict snow loading for structural design there must be a reliable statistical model for this natural phenomenon.

The American National Standard A58 (the predecessor to the current design load standard, ASCE 7) developed ground snow loads for structural design based on an analysis of annual extreme ground snow load data from National Weather Service climate monitoring stations. The ground snow load maps in the 1972 publication of the A58 Standard were based on 10 years of data at 140 monitoring stations (Ellingwood and Redfield, 1983). Subsequent publications have increased the data used in analysis, in both number of years of data and number of sites. With this expansion of data the design values changed, in some cases these changes were significant. In the case of the 1972 Edition of the A58 Standard ground snow loads with a mean recurrence interval of 50 years were determined using only 10 years of data. It is easy to see that the extrapolation from 10 years of actual data to predicting a value with a 50-year mean recurrence interval would be very sensitive to the statistical model used. The limited historical climatological data available from some of the climate monitoring stations makes it critical to find a reliable statistical model to predict the values to be used in analysis and design.

Some of the statistical distributions used for modeling of annual extreme snow loads in the era of the 1972 Edition of the A58 Standard were Tippett Type I and Frechét Type II extreme value distributions. These distributions were found to be inadequate in predicting the upper quantiles; the Type I distribution underestimated snow loads while the Type II distribution greatly overestimated the snow loads in the upper quantiles. Instead, the lognormal distribution was tried on the annual extreme snow water equivalent data for 50 sites across the United States and "fit very well" (Thom, 1966). The recommendation by Thom to use a lognormal distribution became the basis for the snow load maps in the 1972 Edition of the A58 Standard (Ellingwood and Redfield, 1984).

Ellingwood and Redfield (1983) further explored possible distributions used to model ground snow loads. Records for 76 "first-order" weather stations operated by the National Oceanic and Atmospheric Administration located in northeastern United States were examined. These sites are indicated as "first-order" stations because they provide data for the depth of snow as well as the water equivalent of snow (from which the weight of snow can be directly determined). The snow water equivalent (SWE) data was used to avoid the additional source of error inherent in the variability of the density conversion of snow depth to snow load. In order to determine an appropriate distribution model the comparison was made between models that were commonly used to describe the distribution of the annual extreme SWE. The distributions included in the comparison in the study were lognormal, log-Pearson Type III, Type I and Type II. Because the common tests for goodness-of-fit, the chi-square for lognormal distribution and Kolmogorov-Smirnov for Type I distributions (Haldar and Mahadevan, 2000), gave conflicting results for the best fitting distributions, the maximum probability plot correlation coefficient (MPPCC) criterion was used to determine the goodness of fit for each distribution (Ellingwood and Redfield, 1984).

The results of the study indicated that according to the MPPCC criterion, 30% of the sites had a distribution best fit by a lognormal distribution, 21% by a log-Pearson Type III, 24% by a Type I and 25% by a Type II distribution. Although the number of sites which showed the best fit for each distribution assumption did not vary greatly, through further investigation data sets were developed from a lognormal parent population using Monte Carlo techniques (Haldar and Mahadevan, 2000) and found strikingly similar results for percentages of data sets best fit by the respective distributions. The exercise was repeated with a Type I parent population and altogether different results were found. Finally, the study was concluded in agreeance with the aforementioned report completed 18 years previous (Thom, 1966) with a recommendation to use lognormal distribution for modeling annual extreme snow water equivalents.

2.4 DENSITIES FOR DEPTH-ONLY SNOW DATA

The density of snow is a random variable that must be given consideration in determining ground snow loads from historical snow depth data. Tobiasson and Greatorex (1996) developed a method for relating the density of snow to its depth. To develop this relationship data was taken from historical observations for 266 “first order” National Weather Services stations across the United States that had records for both snow depth and SWE. All sites for which less than ten years of data were recorded or sites that had more than ten years of recorded data but less than five in which snow was observed were discarded. For each of the 204 sites remaining that fit these criteria, the maximum snow depth was determined for each winter and the maximum SWE was determined for each winter. Consistent with the recommendations discussed in Chapter 2.3, the distributions for annual maximum snow depth and for annual maximum SWE were assumed to be lognormal. (Thom, 1966, Ellingwood and Redfield, 1984) Based on a lognormal distribution a depth of snow on the ground with a 2% annual probability of being exceeded (or 50-year mean recurrence interval) was determined for each site. Likewise, a ground snow load with a 2% annual probability of being exceeded was determined for each site. The 50-year snow depths were plotted against the 50-year ground snow loads and the best-fit equation was nonlinear:

$$p_g = 0.279 {h_g}^{1.36} \tag{2.1}$$

where: p_g is the ground snow load in psf
h_g is the depth of snow in inches. (Tobiasson and Greatorex, 1996)

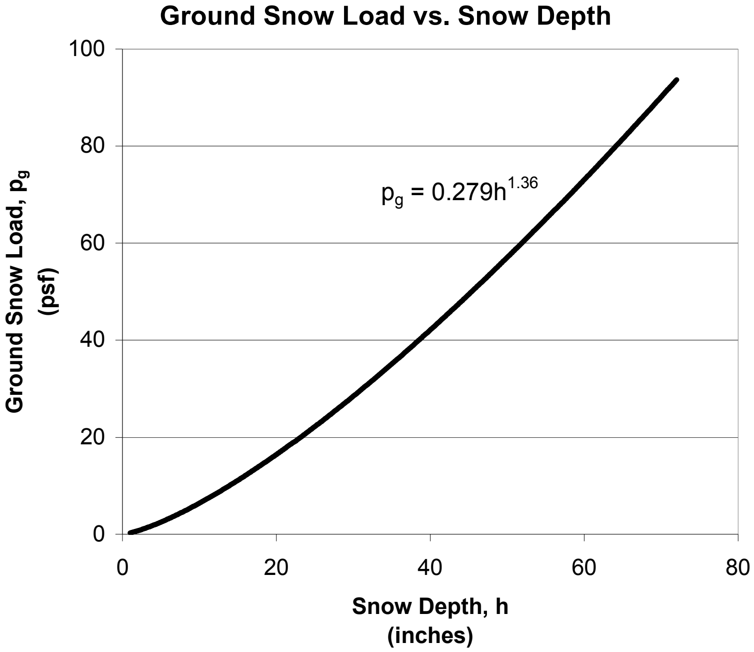


Figure 2.1
Ground Snow Load Relationship to Snow Depth

Figure 2.1 illustrates that the density of snow increases with its depth. For instance, a snow depth of 20 inches contains 15.8% water while a snow depth of 60 inches contains 23.3% water. This seems to be an accurate assumption for sites where the snow continues to pack throughout the winter and spring, compressing snow near the bottom of the snow pack. As will be shown later, this may not be the most accurate relationship for sites that have an annual extreme snow depth characterized by a periodic snow storm that melts away before the next snow storm occurs.

This equation relating snow depth to ground snow load has been used for the forty-eight contiguous states to determine the ground snow loads from historical snow depth data to develop the ground snow load maps in the ASCE 7. (O'Rourke, 2004)

CHAPTER THREE

DETERMINATION OF GROUND SNOW LOADS

3.1 INTRODUCTION

The methods used to determine the ground snow loads presented in this report include gathering data for historical snow depth or snow water equivalents for as many sites as possible within the state of Arizona, modeling them statistically and determining a 50-year snow depth or 50-year snow water equivalent. For the snow depth data, density conversion is required to obtain a ground snow load. For the snow water equivalent data, a unit conversion from inches of water to pounds per square foot is required to determine the applicable load:

$$p_g = SWE\left(\frac{62.4\,\frac{lbs}{cu.ft.}}{12\,\frac{in.}{ft.}}\right) \tag{3.1}$$

where p_g is the ground snow load (psf)
SWE is the Snow Water Equivalent (inches of water)

In order to reduce the task of analysis, it was decided to ignore data from certain sites that would obviously not have a ground snow load large enough to impact structural design. To be sure that the data would not yield a significant ground snow load a low threshold was set for those data sets to be ignored. All sites with an annual maximum observed snow depth of 6 inches or less were set aside and not included in the statistical analysis. These sites are shown with a ground snow load equal to zero in Table 3.4, Summary of Ground Snow Loads, presented later in this chapter.

3.2 DATA COLLECTION

Data was taken from 2 main sources: the National Climate Data Center and the National Weather and Climate Center. These sources were used because they provided data that was publicly available and provided a large number of sites across the state. Other sources likely exist with additional historical snow depth and/or snow water equivalent data. The United States Forest Service was contacted for further historical snow data from the national forests but no response was received within time to include in this report. There are sites in Snow Data for Arizona for which current data could not be obtained. Although there is possibly more data available, the sources aforementioned seem to provide a good representation of Arizona and were utilized in this study.

Each site is assigned to a Climate Division, as illustrated in Figure 3.1, by the NCDC. Climate Divisions are intended to be geographic divisions of homogeneous weather. The Climate Divisions are a further development of the "Snow Zones" mentioned in Snow Load Data for Arizona. (Elliot, 1981) It appears that the boundaries for the climate divisions fall on county borders, which are not necessarily precise divisions for change in climate behavior. This method was likely chosen for convenient bookkeeping and reporting instead of homogenous climate. It should be noted that the NCDC is currently in the midst of a review of the Climate Divisions across the United States. They are likely to be revised to more accurately represent areas of similar climate. Figure 3.2 is a diagram of all the sites from which data was collected distinguished by Climate Division. Included for reference are the locations of Flagstaff, Phoenix and Tucson.

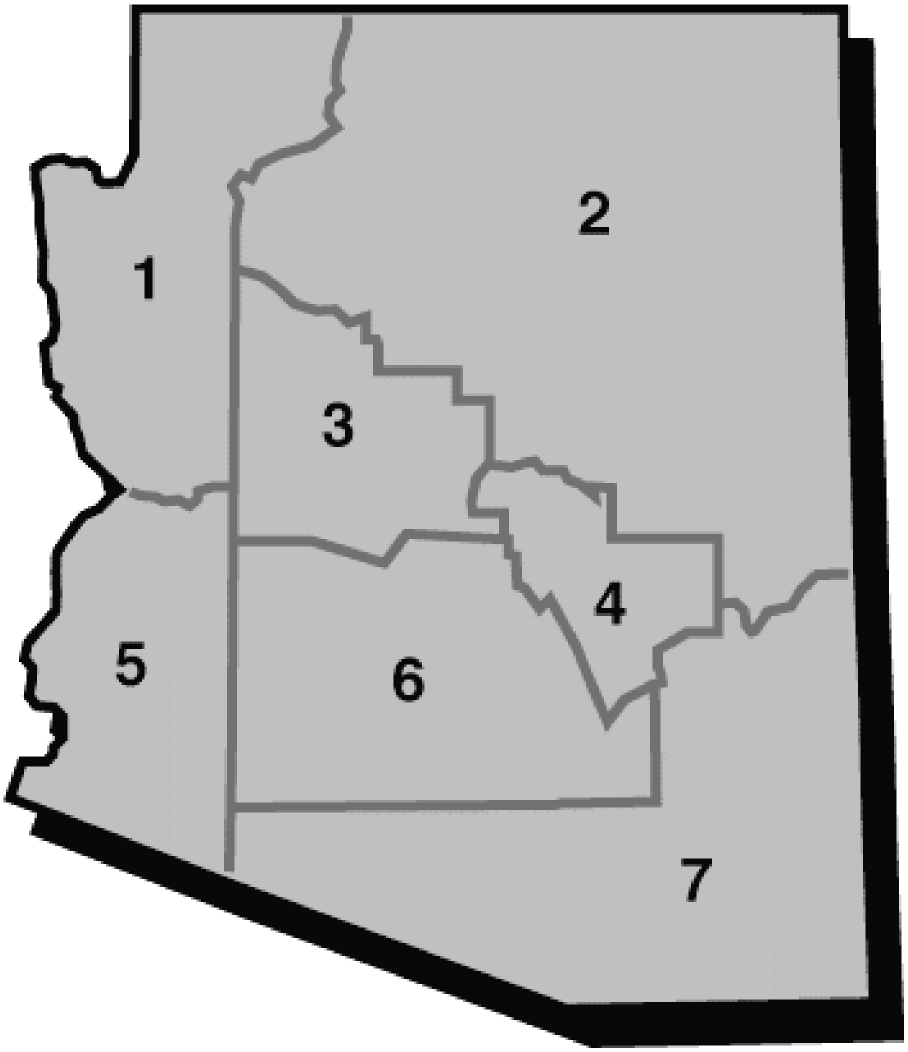


Figure 3.1
Climate Divisions As Defined by NCDC

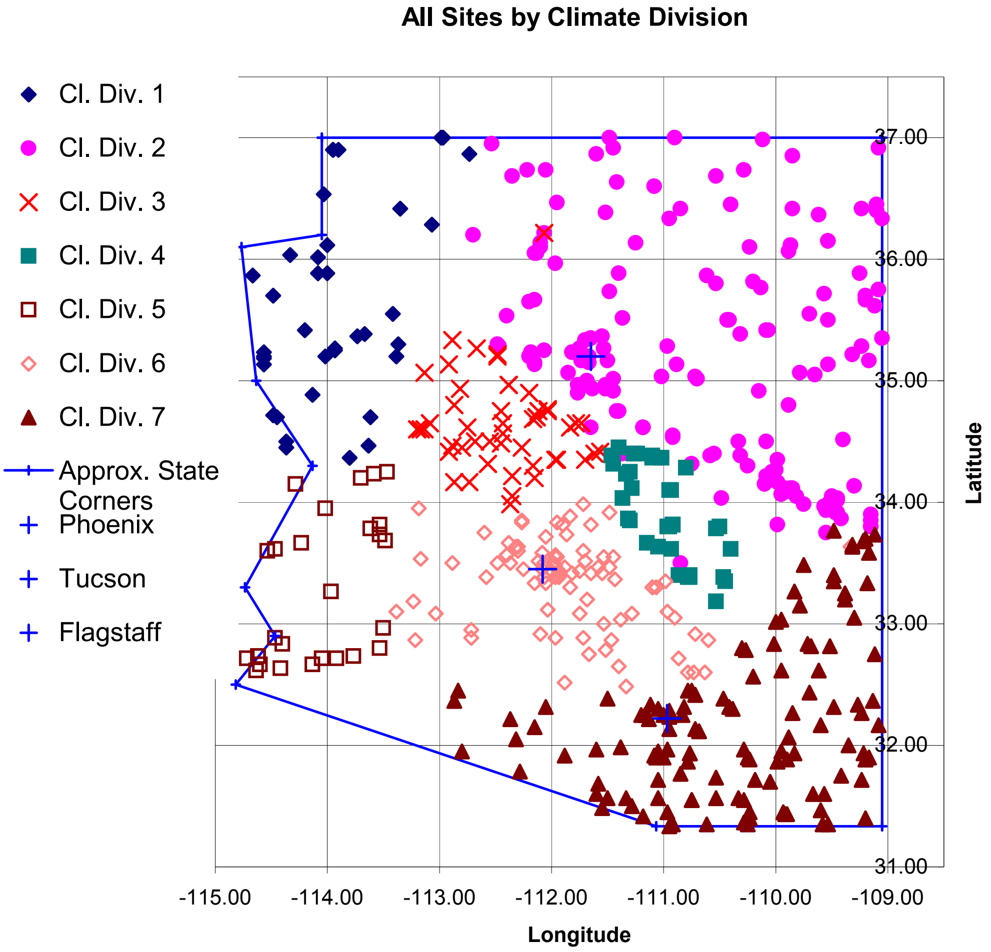


Figure 3.2
Data Stations by Climate Divisions

Figure 3.3 shows all the sites distinguished by the source of the data. In some instances sites from different sources are at the same location. Because some sources had data for different time periods recorded each site was treated individually regardless of its proximity to other sites. Data was manipulated individually to enable statistical modeling for each site independently with independent results.

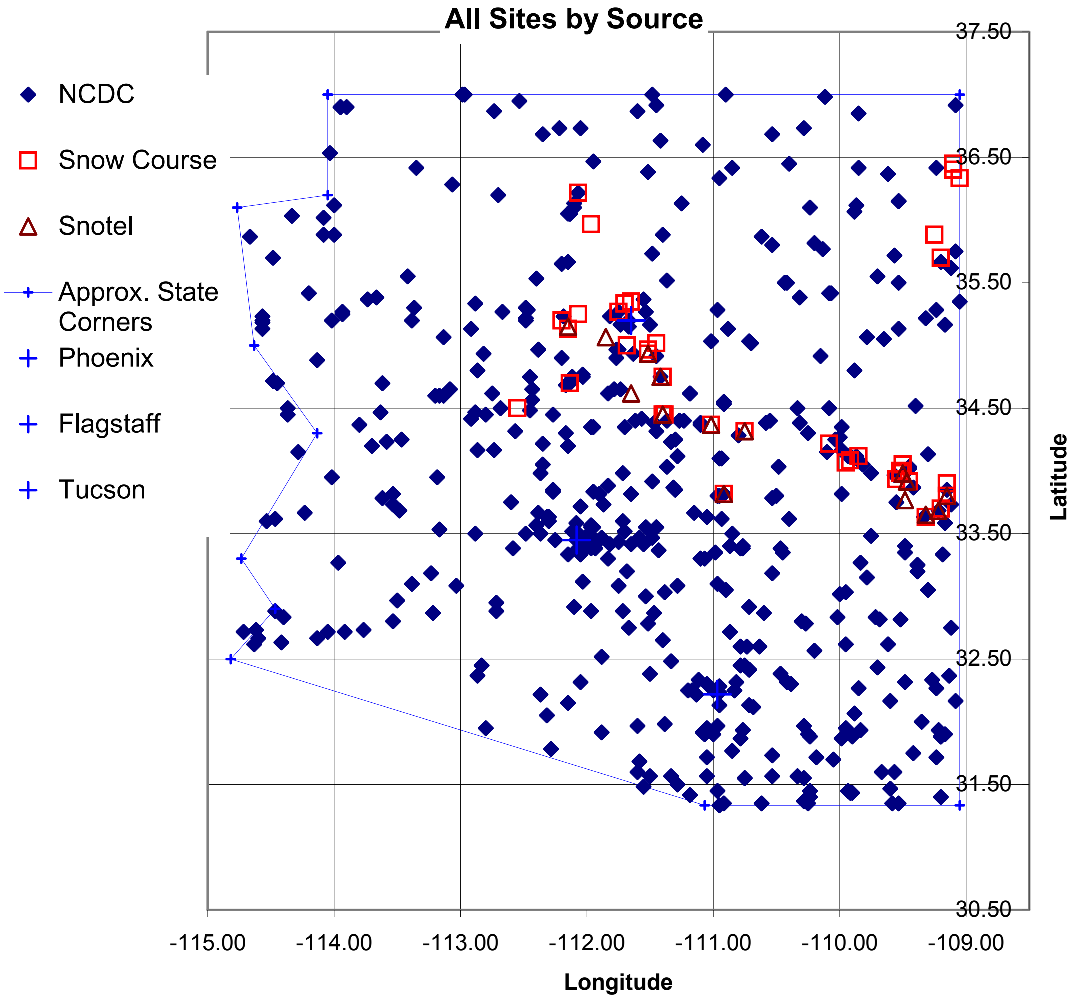


Figure 3.3
Data Stations by Sources

3.2.1 NATIONAL CLIMATE DATA CENTER

The National Climate Data Center (NCDC) is a part of the United States Department of Commerce. It is specifically operated as part of the National Environmental Satellite, Data, and Information Service of the National Oceanic and Atmospheric Administration. The purpose of NCDC is to manage the Nation's global climatological data for monitoring, assessment, and prediction of changes in the global climate. (NCDC, 2006)

The NCDC maintains a database of information from a cooperative network of climate observers. Many different climate-monitoring organizations contribute data to the database. Information for this report was accessed from the NCDC database through the Office of the State of Arizona Climatologist. Andrew W. Ellis, Director of the Office of Climatology and State Climatologist for Arizona was contacted by email and in turn filed a request with the NCDC for the data of interest. In less than one day a response was received indicating that the data was available via an Internet .ftp site. The data remained available for seven days, after which it was deleted from the .ftp site. The data was provided for download as a zipped file containing ASCII files. There was over 150 megabytes of information in ASCII format, including historical daily snow depths for 483 individual sites in Arizona. The number of years that data was recorded varied greatly by site from 1 year to 173 years (the number of years of data is included in Table 3.4, Summary of Ground Snow Loads). In addition to the snow depth data there was miscellaneous information that was discarded (i.e. to reduce the data down before it could be manipulated for statistical modeling).

3.2.2 NATIONAL WEATHER AND CLIMATE CENTER

The National Weather and Climate Center (NWCC) is part of the National Resource Conservation Service operated under the United States Department of

Agriculture. Their purpose is to promote national resource conservation by leading the development and transfer of climate information. (NWCC, 2006)

The Snow Survey program is maintained primarily to provide mountain snow pack and streamflow forecasting information. Two types of sites are maintained by the NWCC for monitoring snow water equivalents (SWE), Snow Course sites and Snotel sites.

Snow Course sites are generally meadow areas that are well protected from wind. Measurements are taken manually around the beginning and end of each month during the winter and spring. Data from these sites included the depth of snow, the SWE and the date the measurement was taken. The number of years that data was recorded varied from 6 to 68 years.

Snotel (for SNOwpack TELemetry) sites are automated sites that transmit data via VHF radio signals to a central computer in Portland, Oregon. The SWE is measured daily by a pressure sensitive pillow. Snotel sites are generally located in high mountain watersheds. The information available from these sites included the daily SWE and the date and times of measurement. The number of years recorded for each site varied from 6 years to 23 years.

3.3 STATISTICAL METHODS

Consistent with the recommendations of the previously mentioned studies (see Section 2.3) and the current design load standards, a lognormal distribution was assumed for the annual extreme snow depth for NCDC sites and annual extreme SWE for the

NWCC sites. In order to verify the goodness-of-fit for the lognormal distribution a chi-square goodness-of-fit test was performed on a data set from a typical NCDC site. The McNary 2N site has records available for 73 years in which the minimum annual extreme snow depth recorded was 8 inches and the maximum annual extreme snow depth was 42 inches. The results of the test are shown in Table 3.1. Occurrences are years in which the annual extreme snow depth is within the interval indicated.

Table 3.1
Chi-square Test Results for McNary 2N

McNary 2N			
Snow Depth	Observed Occurences	Theoretical Occurences	$(O-T)^2/T$
<10	4	4.0	0.00
10 to 15	15	16.8	0.18
15 to 19	19	16.6	0.34
19 to 25	16	18.5	0.34
20 to 29	7	7.2	0.01
30 to 39	10	7.6	0.79
>39	2	2.3	0.05
Sum =	73	73.0	1.72

With 4 degrees of freedom (7 intervals - 1- 2 distribution parameters = 4 degrees of freedom) the resulting chi-square value is less than 9.488 corresponding to a 5% significance level, hence the lognormal distribution is acceptable at the 5% significance level. (Haldar and Mahadevan, 2000) This test was not performed on all the sites, but having a 5% significance level indicates that 5 samples out of 100 are not modeled accurately with a lognormal distribution. A 5% significance level is adequate for purposes of modeling annual extreme snow data.

After the individual data for each site was collected and reduced to annual extremes for each of the years that data was available, the mean and standard deviation for all the years of record were found for each site. From this information the Coefficient of Variation (COV) was calculated and the lognormal distribution parameters, λ and ζ, were determined.

$$Mean = \mu_X = \frac{1}{n}\sum_{i=1}^{n} x_i \tag{3.2}$$

$$Standard\ Deviation = \sigma_X = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \mu_X)^2} \tag{3.3}$$

$$COV = \delta_X = \frac{\sigma_X}{\mu_X} \tag{3.4}$$

$$\lambda_X = \ln \mu_X - \frac{1}{2}\zeta_X^2 \tag{3.5}$$

$$\zeta_X^2 = \ln\left[1 + \delta_X^2\right] \tag{3.6}$$

For many of the sites, particularly those with a large number of years without snow observed, the COV was very large and artificially inflated the 50-year mean recurrence interval ground snow load value. After considering the wide variability in the COV's for some of the Arizona sites and reviewing the means and standard deviations for the 76 sites used in the Ellingwood and Redfield report (1984) (in which lognormal was designated as the best-fitting distribution), the decision was made to impose a maximum limit for the COV. If the calculated COV was greater than 1.0 the value used to determine ζ^2 was limited to 1.0. All sites that had a calculated COV equal to or less than 1.0 were not modified. After these modifications of the COV, the results appeared more realistic and consistent than with the inflated COV's.

The snow depth values and SWE values with a 2% probability of being exceeded annually (50-year mean recurrence interval) can be determined using the lognormal parameters.

$$P(x \le b) = \frac{1}{\sqrt{2\pi}} \int_{0}^{\left(\frac{\ln b - \lambda_X}{\zeta_X}\right)} \exp\left(-\frac{1}{2}s^2\right) ds \tag{3.7}$$

where x is annual maximum snow depth or annual maximum
snow water equivalent
b is the 50-year snow depth or 50-year snow water equivalent

$$S = \frac{\ln X - \lambda_X}{\zeta_X} \tag{3.8}$$

Alternatively:

$$P(x \le b) = \Phi\left[\frac{\ln b - \lambda_X}{\zeta_X}\right] \tag{3.9}$$

where $\Phi[\_]$ is the cumulative distribution function (CDF) of the
standard normal distribution and is available in most
texts (Haldar, 2000)

The task is to determine the value of *b*, or the value of *x* corresponding to a CDF of 0.98. A CDF = 0.98 implies a value for *x* with a 2% annual probability of being exceeded (1-0.98 = 2%). A value for $\left[\dfrac{\ln b - \lambda_X}{\zeta_X}\right]$ that corresponds to value of $\Phi\left[\dfrac{\ln b - \lambda_X}{\zeta_X}\right] = 1 - 0.02 = 0.98$ can be found from a table commonly found in a textbook. Referencing the table in Appendix 1 of Probability, Reliability and Statistical Methods in Engineering Design (Haldar and Mahadevan, 2000) one can find that for $\Phi\left[\dfrac{\ln b - \lambda_X}{\zeta_X}\right] = 0.98$, the corresponding value of $\left[\dfrac{\ln b - \lambda_X}{\zeta_X}\right] = 2.0548$. Solving for *b* yields:

$$b = \exp[2.0548 * \zeta_X + \lambda_X] \tag{3.10}$$

This process can be repeated to determine the 30-year snow depth and snow water equivalent. For a 30-year mean recurrence interval a corresponding value for *x* with a $\dfrac{1}{30} = 3.3\%$ annual probability of being exceeded is sought. The corresponding value of $\left[\dfrac{\ln b - \lambda_X}{\zeta_X}\right] = 1.8339$. Similar to equation 3.10 we solve for *b*:

$$b = \exp[1.8339 * \zeta_X + \lambda_X] \tag{3.11}$$

These same steps can be applied for any mean recurrence interval of interest. The appropriate values for the CDF, Φ, must be selected, then a table referenced for the corresponding value of $\left[\frac{\ln b-\lambda_X}{\zeta_X}\right]$.

With these values the 50-year and 30-year ground snow loads were established for each site. For the sites with SWE data equation 3.1 is used to find the ground snow load. For the sites with only snow depth data the density of the snow must be determined in order to find a 50-year or 30-year ground snow load.

3.4 DENSITY OF SNOW

The density of snow is a difficult quantity to measure. Not only can it vary greatly from site to site, but it can also vary at a given site throughout the duration of the snow season. Furthermore, at a given site and time the density of snow in a snow pack can vary within the snow pack from the bottom of the snow pack to the top. A few reasons for this variation in density are; the packing of the snow, the wetness of the snow when it falls and the thawing and refreezing action of the snow through the season. Early in the season, when the temperatures are colder, the snow falls and remains frozen on the ground. As it accumulates the weight of the snow piling on top compresses the snow near the bottom to a higher density. Conversely, prolonged or repeated exposure to the sun can cause the snow near the top to melt down into the snow pack where it refreezes. Although the density through the depth of the snow varies, an average density of the snow pack is considered sufficient for analysis. This average density increases as the density increases at the bottom or the top of the snow pack.

Table 3.2 illustrates the variations in snow density at two NWCC sites. It includes the measured snow depth and measured SWE at the Snowslide Canyon and Happy Jack sites for a snowstorm during March 2006.

Table 3.2
SWE/Snow Depth Records during Storm

Snowslide Canyon

Date	Snow Water Equivalent	Snow Depth	Change in Snow Water Equivalent	Change in Snow Depth	% Water of Snow
3/9	2.8	5.5			51%
3/10	3.3	5.7	0.5	0.2	58%
3/11	4.6	20.4	1.3	14.7	23%
3/12	6.0	34.3	1.4	13.9	17%
3/13	6.7	34.8	0.7	0.5	19%
3/14	6.6	29.4	-0.1	-5.4	22%
3/15	7.0	24.5	0.4	-4.9	29%
3/16	6.9	22.1	-0.1	-2.4	31%

Happy Jack

Date	Snow Water Equivalent	Snow Depth	Change in Snow Water Equivalent	Change in Snow Depth	% Water of Snow
3/9	0.0	0.7			0%
3/10	0.0	0.3	0.0	-0.4	0%
3/11	0.5	3.3	0.5	3.0	15%
3/12	1.8	14.2	1.3	10.9	13%
3/13	2.3	15.0	0.5	0.8	15%
3/14	2.3	13.3	0.0	-1.7	17%
3/15	2.3	10.7	0.0	-2.6	21%
3/16	2.2	9.5	-0.1	-1.2	23%

During the week of the storm, the depth of snow drops off very quickly after the storm passes, but the SWE remains almost constant for a few days. The 5.5 inches of snow with a 51% water at the beginning of the week before the storm at Snowslide Canyon had obviously been on the ground for some time and had already experienced significant melting. Just as new snow falling can change the density of a deep snow pack by packing it even further, the new drier snow fell and the average density decreased drastically for the Snowslide Canyon site. This same general behavior is evident at the Happy Jack site as well; on March 12 the density (or % water) decreased as the dry and light snow fell, then it melted and decreased in depth, but the weight remained consistent.

Table 3.3 compares the ground snow load measured by the SWE data and the ground snow load calculated using equation 2.1.

Table 3.3
Load Comparison by Method

Snowslide Canyon					
Date	Snow Water Equivalent	Snow Depth	Ground Snow Load From Snow Water Equivalent	Ground Snow Load From Snow Depth (Eq. 2.1)	% Difference
3/9	2.8	5.5	14.6	2.8	81%
3/10	3.3	5.7	17.2	3.0	83%
3/11	4.6	20.4	23.9	16.9	30%
3/12	6.0	34.3	31.2	34.2	-10%
3/13	6.7	34.8	34.8	34.8	0%
3/14	6.6	29.4	34.3	27.7	19%
3/15	7.0	24.5	36.4	21.6	41%
3/16	6.9	22.1	35.9	18.8	48%

Happy Jack					
Date	Snow Water Equivalent	Snow Depth	Ground Snow Load From Snow Water Equivalent	Ground Snow Load From Snow Depth (Eq. 2.1)	% Difference
3/9	0.0	0.7	0.0	0.2	NC
3/10	0.0	0.3	0.0	0.1	NC
3/11	0.5	3.3	2.6	1.4	46%
3/12	1.8	14.2	9.4	10.3	-10%
3/13	2.3	15.0	12.0	11.1	7%
3/14	2.3	13.3	12.0	9.4	21%
3/15	2.3	10.7	12.0	7.0	41%
3/16	2.2	9.5	11.4	6.0	48%

Equation 2.1 does not give accurate results in predicting the ground snow load at these 2 sites. It does, however, predict the snow load exactly for one day of record at the Snowslide Canyon site, March 13. It would be expected that equation 2.1 would be relatively accurate; however the prediction of the daily snow load is not the intent of the study done by Tobiasson and Greatorex (1996) in the development of equation 2.1. This relationship was developed from comparing *annual* maximum snow depth to *annual* maximum SWE. This does not imply that it can be accurate for predicting snow density on any given site on any given day. It must be remember that equation 2.1 is intended to predict *annual* maximum ground snow load from *annual* maximum snow depth.

With a few exceptions, the predictions for ground snow loads shown in Table 3.3 by equation 2.1 appear to be low. This could be due to the fact that the annual extreme values for snow depth and SWE used in the development did not occur in the spring, when snow is known to have a higher density. (Fridley et al., 1994) This equation was also developed by fitting data from 204 sites across the United States to a single curve. The report does not indicate where the data for each site fell relative to the curve. There could have been areas of the U.S. that had more scatter relative to other areas. There are many possible causes for the inaccuracies in the predictions of ground snow loads, but it is impossible to come to a certain conclusion for such an isolated snowstorm incident as shown in the case study.

Although equation 2.1 cannot be expected to predict the ground snow load from snow depth for two sites in Arizona from an isolated spring snowstorm, noting the inaccuracies does cause questions to arise as to the applicability for this equation for

Arizona. To further investigate the application and suitability of this equation specifically for Arizona, a study similar to that of Tobiasson and Greatorex (1996) has been conducted.

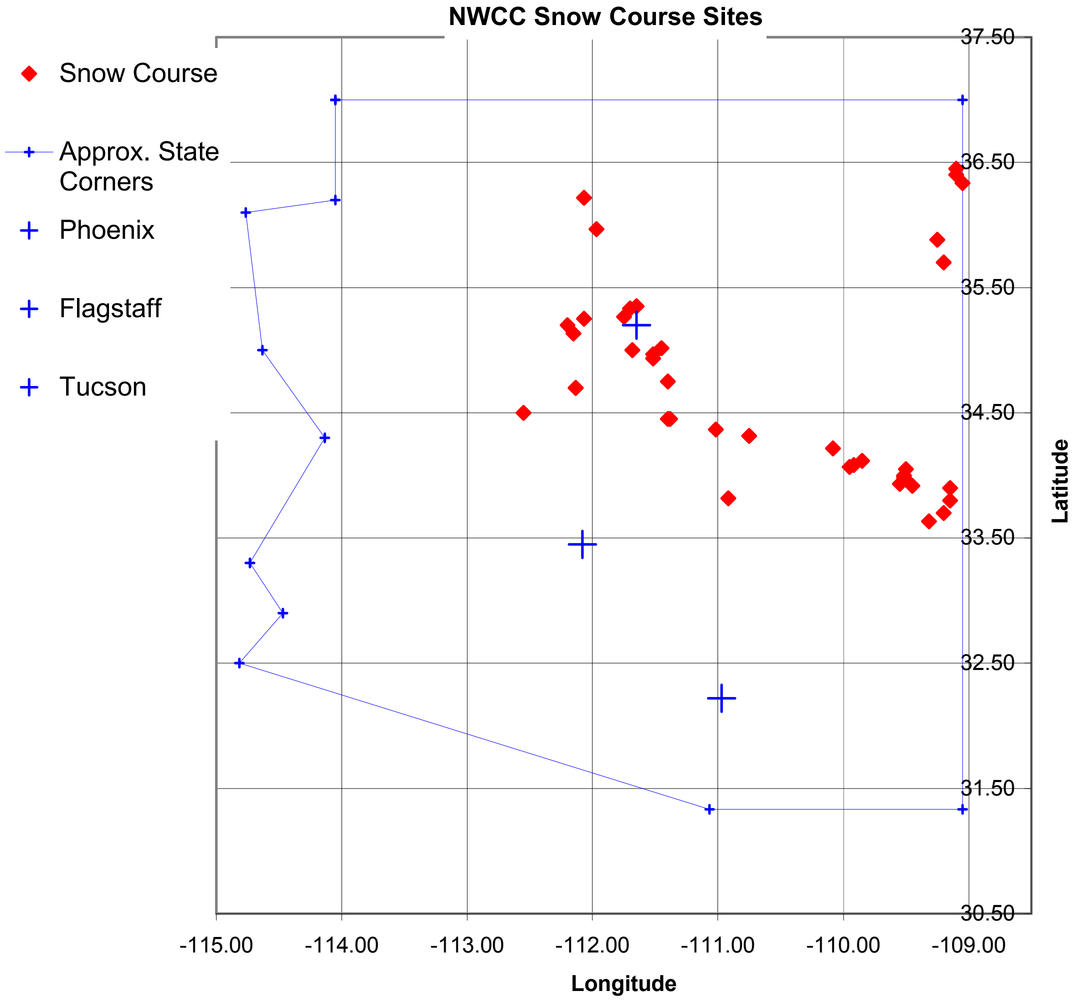


Figure 3.4
Location of NWCC Snow Course Sites

Historical records for 41 Snow Course sites compiled for this report contain both snow depth and SWE data. Figure 3.4 shows the location of each of these sites. Comparing Figure 3.4 to Figure 3.6 its can be shown that there is a reasonable representation of those sites with ground snow loads of 12 psf or greater. For each of these sites the annual maximum snow depth and annual maximum SWE were modeled to determine a 50-year snow depth and a 50-year SWE. A lognormal distribution was assumed and the procedure presented in Chapter 3.3 was followed. The 50-year ground snow load was plotted against the 50-year snow depth to determine a density relationship. Similar to that shown in Figure 2.1, the best-fit curve was nonlinear, see Figure 3.5.

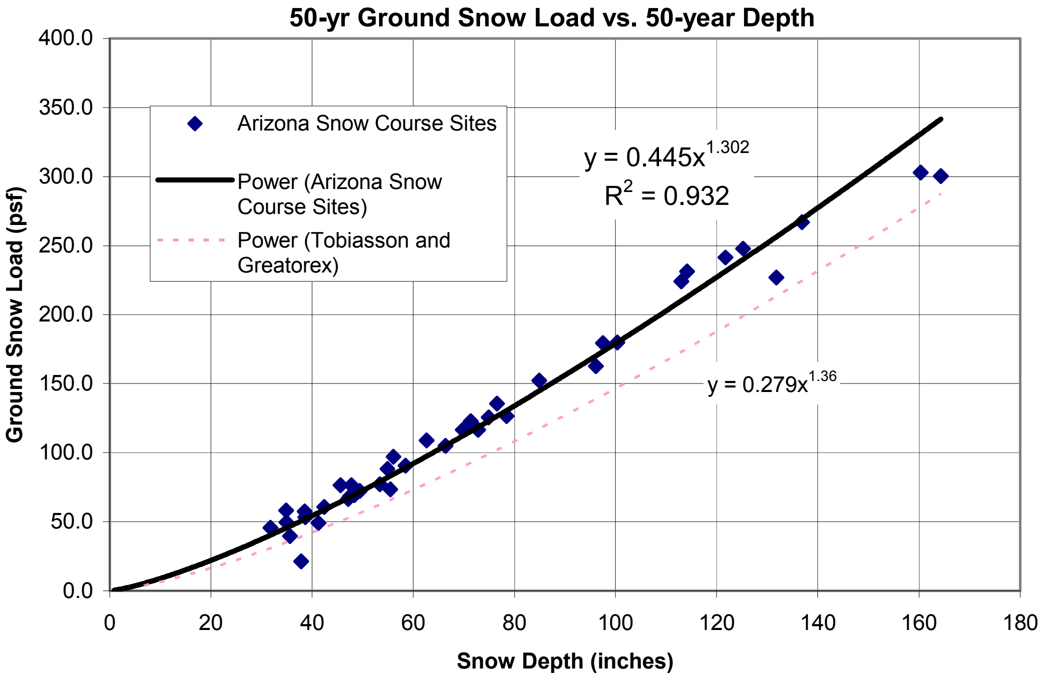


Figure 3.5
Density Relationship for Arizona Snow Course Sites

The curve determined from Arizona sites predicts a higher load for a given depth than that determined from equation 2.1 for the entire U.S. The reasons for this may be the same as those discussed previously. The refinement of this density relationship to represent Arizona exclusively yields the equation:

$$p_g = 0.445 h_g^{1.302} \qquad (3.12)$$

where p_g is the ground snow load in psf (multiply by 0.048 to get kN/m^2)
h_g is the depth of snow in inches

Equation 3.12 shows only the curve that fit the scatter best, with no adjustment to increase the confidence level for the predicted ground snow load. From the Coefficient of Determination R^2 value of 0.932 in Figure 3.5 it can be shown that the relationship shown in equation 3.12 is an accurate predictor accounting for 93% of the total variation in ground snow loads. (Haldar and Mahadevan, 2000) Because this curve fit the data scatter best and represents the approximate mean, if we further assume that the median is close to the mean, it can be expected that it will provide a conservative prediction approximately half of the time.

Because equation 3.12 fits the data available for Arizona better than equation 2.1, it is used in this study for determining ground snow loads from snow depth; nevertheless, determining the density of snow is a complex task with numerous random variables and has been the source of many inaccuracies for decades. (Elliott, 1981)

3.5 GROUND SNOW LOADS

As expected, many sites at lower elevations throughout the state have 50-year Ground Snow Loads equal to zero. All sites in Climate Division 5 had a calculated ground snow load equal to zero. Figure 3.6 shows the location of all sites with a 50-year Ground Snow Load of 12 pounds per square foot (psf) or greater.

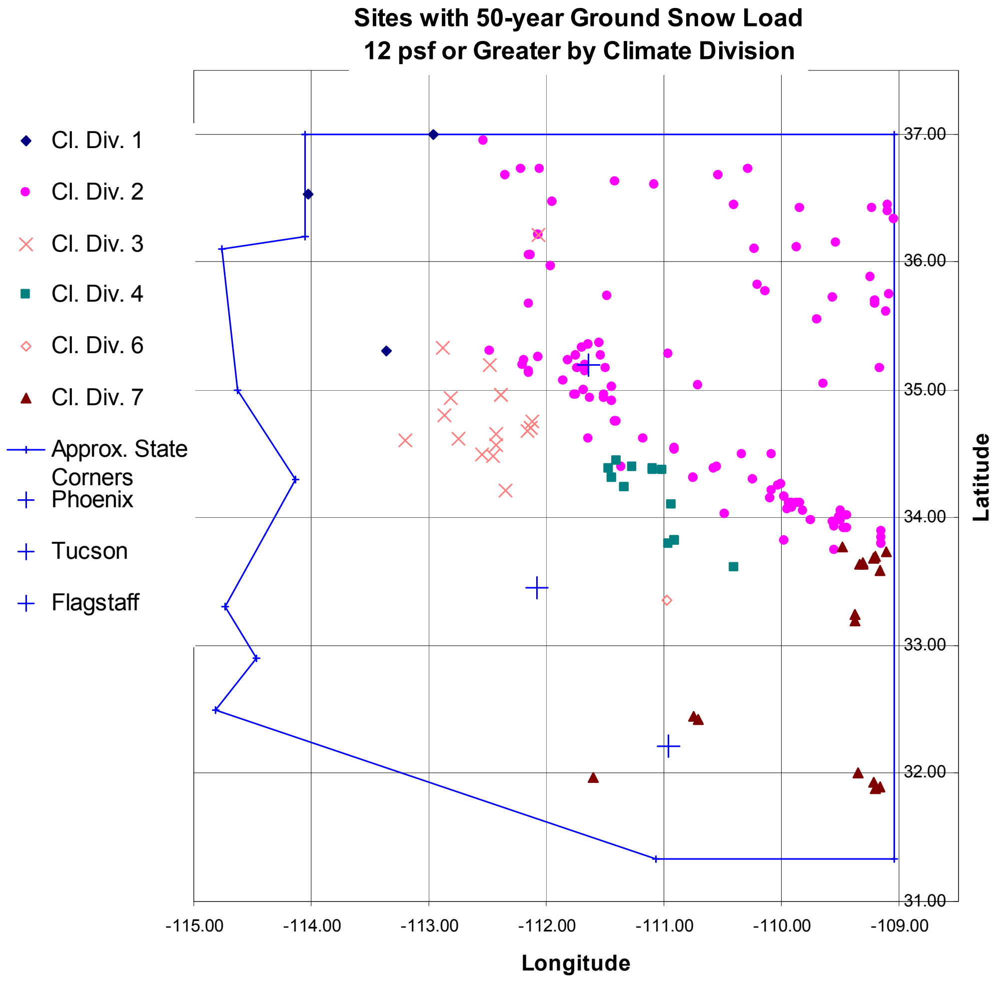


Figure 3.6
Data Stations with 50-year Ground Snow Loads Equal to 12 psf or Greater

The majority (63.6%) of the sites that are represented by having 50-year ground snow loads greater than 11 psf fall in Climate Division 2. Climate Divisions 1 (1.7%), 3 (10.2%), 4 (9.7%), 6 (0.6%) and 7 (11.4%) make up the remaining representation of sites with ground snow loads equal to 12 psf or greater.

All of the ground snow loads determined in this study are presented in Table 3.4. Some locations had records for more than one site (town, city, etc. is meant by *location*). During statistical modeling each site was kept independent and modeled individually. For the purposes of summarizing the data, only one site was listed for each location, with a few exceptions. For locations with more than one site at elevations differing by more than 300 feet (91 meters) and having a significantly different snow load calculated for each, both sites are shown in the table. For locations where one or more site records are not included in the table, three criteria were used to determine which site record and ground snow load value would be shown. 1) If a site had more than 15 years of data included in determining the ground snow load it was given precedence. 2) Those sites that had the ground snow loads determined by SWE data were considered to have more reliable records than site with only snow depth data (due to the error inherent in converting snow depth to ground snow load discussed in Section 3.4). 3) If considering the two preceding items could not determine which site was more accurate, the Coefficient of Variation values were compared, the site that had more consistent annual maxima (a lower COV) was given priority. These rules were not hard and fast rules, each location with multiple sites was considered individually and if, after the application of the

3 listed criteria the preferred site could still not be obtained, the record with a more conservative ground snow load was chosen.

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf)**	**30-yr Ground Snow Load (psf)**	Data Source
*	BEAVER DAM	MOHAVE	1	-113.95	36.90	1875 (572)	--	--	--	--	1	**0**	**0**	NCDC
	BEAVER DAM	MOHAVE	1	-113.95	36.90	1875 (572)	--	--	--	--	43	**0**	**0**	NCDC
	BULLHEAD CITY	MOHAVE	1	-114.57	35.13	540 (165)	--	--	--	--	29	**0**	**0**	NCDC
*	CHLORIDE	MOHAVE	1	-114.20	35.42	4021 (1226)	--	--	--	--	1	**0**	**0**	NCDC
	COLORADO CITY	MOHAVE	1	-112.97	37.00	5009 (1527)	13	--	1979	2	43	**10**	**8**	NCDC
*	COLORADO CITY	MOHAVE	1	-112.98	37.00	5012 (1528)	8	--	1951	4	13	**8**	**6**	NCDC
*	DAVIS DAM	MOHAVE	1	-114.57	35.18	531 (162)	--	--	--	--	11	**0**	**0**	NCDC
	DAVIS DAM # 2	MOHAVE	1	-114.57	35.20	659 (201)	--	--	--	--	20	**0**	**0**	NCDC
*	DIAMOND BAR RANCH		1	-114.00	35.88	3601 (1098)	--	--	--	--	5	**0**	**0**	NCDC
*	DIAMOND M RANCH	MOHAVE	1	-113.37	35.30	5479 (1670)	15	--	2001	1	7	**19**	**15**	NCDC
*	HACKBERRY		1	-113.73	35.37	3582 (1092)	--	--	--	--	5	**0**	**0**	NCDC
*	KATHERINE RANGER STN	MOHAVE	1	-114.57	35.23	670 (204)	--	--	--	--	2	**0**	**0**	NCDC
	KINGMAN AAF	MOHAVE	1	-113.93	35.27	3385 (1032)	7	--	1922	3	67	**2**	**1**	NCDC
*	KINGMAN AIRPORT	MOHAVE	1	-113.93	35.25	3419 (1042)	--	--	--	--	3	**0**	**0**	NCDC
	KINGMAN NO 2	MOHAVE	1	-114.02	35.20	3538 (1079)	--	--	--	--	27	**0**	**0**	NCDC
	LAKE HAVASU	MOHAVE	1	-114.37	34.45	482 (147)	--	--	--	--	25	**0**	**0**	NCDC
	LAKE HAVASU CITY	MOHAVE	1	-114.37	34.50	468 (143)	--	--	--	--	15	**0**	**0**	NCDC
*	LITTLEFIELD 1 NE	MOHAVE	1	-113.90	36.90	1904 (581)	--	--	--	--	12	**0**	**0**	NCDC
*	LITTLEFIELD 25 SSW	MOHAVE	1	-114.03	36.53	4002 (1220)	12	--	1949	1	5	**9**	**7**	NCDC
*	LOOKOUT RANCH		1	-113.38	35.20	5002 (1525)	--	--	--	--	7	**0**	**0**	NCDC
*	MEADVIEW 1SE	MOHAVE	1	-114.08	36.02	3199 (975)	--	--	--	--	10	**0**	**0**	NCDC
	MOUNT TRUMBULL	MOHAVE	1	-113.35	36.42	5603 (1708)	40	--	1945	12	57	**8**	**6**	NCDC
	PEACH SPRINGS	MOHAVE	1	-113.42	35.55	4969 (1515)	27	--	1967	12	56	**4**	**3**	NCDC
*	PIERCE FERRY		1	-114.00	36.12	1371 (418)	--	--	--	--	5	**0**	**0**	NCDC
	PIERCE FERRY 17 SSW	MOHAVE	1	-114.08	35.88	3857 (1176)	11	--	1979	2	22	**6**	**4**	NCDC
	PIPE SPRINGS NATL MON	MOHAVE	1	-112.73	36.87	4919 (1500)	18	--	1973	1	43	**5**	**4**	NCDC
*	SIGNAL	MOHAVE	1	-113.63	34.47	1522 (464)	--	--	--	--	1	**0**	**0**	NCDC
*	SIGNAL 13 SW		1	-113.80	34.37	2512 (766)	--	--	--	--	9	**0**	**0**	NCDC
	TEMPLE BAR	MOHAVE	1	-114.33	36.03	1280 (390)	--	--	--	--	19	**0**	**0**	NCDC
*	TOPOCK	MOHAVE	1	-114.48	34.72	449 (137)	--	--	--	--	3	**0**	**0**	NCDC
*	TOPOCK 2 SSE		1	-114.45	34.70	502 (153)	--	--	--	--	13	**0**	**0**	NCDC
	TRUXTON CANYON	MOHAVE	1	-113.67	35.38	3819 (1164)	12	--	1932	12	54	**4**	**3**	NCDC
	TUWEEP	MOHAVE	1	-113.07	36.28	4774 (1455)	15	--	1967	12	45	**7**	**5**	NCDC
*	WHITE HILLS 5 WSW	MOHAVE	1	-114.48	35.70	2430 (741)	--	--	--	--	4	**0**	**0**	NCDC
	WIKIEUP	MOHAVE	1	-113.62	34.70	2009 (613)	--	--	--	--	54	**0**	**0**	NCDC
	WILLOW BEACH	MOHAVE	1	-114.67	35.87	740 (226)	--	--	--	--	39	**0**	**0**	NCDC
	YUCCA 1 NNE	MOHAVE	1	-114.13	34.88	1950 (594)	--	--	--	--	53	**0**	**0**	NCDC
	ALPINE	APACHE	2	-109.15	33.85	8048 (2454)	60	--	1967	12	97	**38**	**31**	NCDC
	ARBABS FOREST	APACHE	2	-109.20	35.70	7680 (2341)	--	6	98	2	21	**41**	**36**	S. Course
*	ASH FORK 5 N	COCONINO	2	-112.47	35.28	5325 (1623)	8	--	1978	3	8	**6**	**6**	NCDC
	ASH FORK 6 N	COCONINO	2	-112.48	35.30	5304 (1617)	38	--	1967	12	71	**12**	**9**	NCDC
	Baldy	Apache	2	-109.50	33.98	9125 (2782)	--	17.6	83	4	23	**115**	**103**	Snotel
	BALDY #1 - SNOW COURSE AND AERI	APACHE	2	-109.52	33.98	9125 (2782)	--	18.3	79	3	50	**110**	**99**	S. Course
	BALDY #2	APACHE	2	-109.55	33.93	9750 (2973)	--	41.8	79	3	36	**238**	**214**	S. Course
	BEAR PAW	COCONINO	2	-111.65	35.35	10100 (3079)	--	51	93	E/ST	37	**271**	**244**	S. Course
	BEAVER SPRING	APACHE	2	-109.05	36.33	9220 (2811)	--	16.8	93	3	20	**103**	**96**	S. Course
*	BELLEMONT NWFO	COCONINO	2	-111.82	35.23	7150 (2180)	20	--	2005	1	7	**26**	**22**	NCDC
	BETATAKIN	NAVAJO	2	-110.53	36.68	7284 (2221)	38	--	1967	12	67	**26**	**23**	NCDC
*	BIG LAKE		2	-109.42	33.87	9004 (2745)	--	--	--	--	2	**0**	**0**	NCDC
*	BITA HOCHEE TRADING POST	NAVAJO	2	-110.08	35.42	5904 (1800)	--	--	--	--	8	**0**	**0**	NCDC
*	BLACK MOUNTAIN MISSION	APACHE	2	-109.87	36.12	6353 (1937)	12	--	1961	12	9	**10**	**8**	NCDC
	BLUE RIDGE RANGER STN	COCONINO	2	-111.18	34.62	6878 (2097)	38	--	1997	1	39	**39**	**31**	NCDC
	BRIGHT ANGEL RS	COCONINO	2	-112.07	36.22	8398 (2560)	89	--	1993	2	81	**164**	**138**	NCDC
*	BUCK SPRING	APACHE	2	-109.85	34.12	7400 (2256)	--	5.4	98	2	8	**35**	**30**	S. Course
*	BUFFALO RANCH		2	-111.95	36.47	5662 (1726)	21	--	1960	12	4	**32**	**25**	NCDC
	BURRUS RANCH	COCONINO	2	-111.53	35.27	6802 (2074)	70	--	1949	2	25	**67**	**54**	NCDC
	CAMERON 1 NNE	COCONINO	2	-111.40	35.88	4163 (1269)	18	--	1967	12	31	**2**	**1**	NCDC
*	CAMP GERONIMO	GILA	2	-111.37	34.40	5514 (1681)	15	--	1978	2	2	**28**	**22**	NCDC
	CANYON DE CHELLY	APACHE	2	-109.53	36.15	5608 (1710)	8	--	1974	1	36	**2**	**2**	NCDC
*	CEDAR RIDGE TRADING POST	COCONINO	2	-111.52	36.38	5923 (1806)	--	--	--	--	6	**0**	**0**	NCDC
	CHALENDER	COCONINO	2	-112.07	35.25	7100 (2165)	--	12	73	3	59	**63**	**55**	S. Course
	CHEESE SPRINGS	APACHE	2	-109.50	34.05	8700 (2652)	--	12.4	73	3	37	**72**	**66**	S. Course
	CHEVELON RS	COCONINO	2	-110.92	34.55	7004 (2135)	52	--	1967	12	45	**43**	**35**	NCDC
	CHINLE	APACHE	2	-109.53	36.15	5544 (1690)	14	--	1967	12	57	**9**	**7**	NCDC
	CIBECUE	NAVAJO	2	-110.48	34.03	4979 (1518)	18	--	1937	1	52	**14**	**11**	NCDC
	CLAY SPRINGS	NAVAJO	2	-110.32	34.38	6318 (1926)	--	--	--	--	16	**0**	**0**	NCDC
	COPPER MINE TRADING POST	COCONINO	2	-111.42	36.63	6383 (1946)	23	--	1960	12	38	**13**	**10**	NCDC
	Coronado Trail	Apache	2	-109.15	33.80	8400 (2561)	--	13.8	93	3	23	**75**	**66**	Snotel
	CORONADO TRAIL	APACHE	2	-109.15	33.80	8350 (2546)	--	12.5	49	2	68	**65**	**57**	S. Course

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf)**	**30-yr Ground Snow Load (psf)**	Data Source
	FORT APACHE	APACHE	2	-109.52	34.00	9160 (2793)	--	17.6	93	3	55	**107**	**96**	S. Course
	FORT DEFIANCE		2	-109.08	35.75	6904 (2105)	14	--	1903	2	19	**13**	**10**	NCDC
	FORT VALLEY	COCONINO	2	-111.75	35.27	7345 (2239)	57	--	1949	1	97	**73**	**60**	NCDC
	FORT VALLEY	COCONINO	2	-111.75	35.27	7350 (2241)	--	11.6	49	2	59	**60**	**52**	S. Course
	FREDONIA	COCONINO	2	-112.53	36.95	4681 (1427)	18	--	1973	1	41	**11**	**9**	NCDC
	Fry	Coconino	2	-111.85	35.07	7200 (2195)	--	15	93	3	23	**95**	**86**	Snotel
	GANADO	APACHE	2	-109.57	35.72	6338 (1932)	24	--	1967	12	77	**12**	**10**	NCDC
	GRAND CANYON	COCONINO	2	-111.97	35.97	7500 (2287)	--	10.6	73	3	59	**52**	**45**	S. Course
	GRAND CANYON AIRWAYS	COCONINO	2	-112.13	36.05	6973 (2126)	40	--	1949	1	20	**38**	**31**	NCDC
	GRAND CANYON HDQS		2	-112.13	36.05	6891 (2101)	38	--	1949	1	54	**38**	**32**	NCDC
	GRAND CANYON N P 2	COCONINO	2	-112.15	36.05	6783 (2068)	28	--	1979	2	30	**25**	**22**	NCDC
	GRAND CANYON NATL PARK	COCONINO	2	-112.13	36.05	6953 (2120)	29	--	1967	12	21	**30**	**27**	NCDC
*	GRAY MOUNTAIN TRADING POST		2	-111.48	35.73	4914 (1498)	15	--	1962	1	7	**14**	**11**	NCDC
	GREER	APACHE	2	-109.45	34.02	8273 (2522)	54	--	1967	12	81	**61**	**50**	NCDC
*	GREER LAKES	APACHE	2	-109.45	34.03	8505 (2593)	--	--	--	--	1	**0**	**0**	NCDC
	HAPPY JACK	COCONINO	2	-111.40	34.75	7630 (2326)	--	20.1	73	3	55	**90**	**79**	S. Course
*	Happy Jack	Coconino	2	-111.42	34.75	7630 (2326)	--	11.6	05	3	6	**78**	**69**	Snotel
	HAPPY JACK RS	COCONINO	2	-111.42	34.75	7478 (2280)	58	--	1997	1	37	**76**	**63**	NCDC
	HAWLEY LAKE	APACHE	2	-109.75	33.98	8178 (2493)	91	--	1967	12	22	**146**	**132**	NCDC
	HEBER	COCONINO	2	-110.75	34.32	7640 (2329)	--	16.2	73	3	50	**77**	**68**	S. Course
	Heber	Coconino	2	-110.75	34.32	7640 (2329)	--	11.6	98	3	23	**75**	**68**	Snotel
*	HEBER		2	-110.58	34.38	6504 (1983)	30	--	1922	2	14	**45**	**36**	NCDC
	HEBER (BLACK MESA) RANGER STA	NAVAJO	2	-110.55	34.40	6588 (2009)	48	--	1967	12	56	**35**	**29**	NCDC
	HOLBROOK	NAVAJO	2	-110.15	34.92	5084 (1550)	19	--	1967	12	111	**5**	**4**	NCDC
*	HOUCK 2 W		2	-109.23	35.28	5812 (1772)	--	--	--	--	1	**0**	**0**	NCDC
*	HOUSE ROCK		2	-112.05	36.73	5382 (1641)	15	--	1948	12	7	**11**	**8**	NCDC
*	INDIAN WELLS TRADING POST	NAVAJO	2	-110.07	35.42	5904 (1800)	--	--	--	--	1	**0**	**0**	NCDC
	INNER CANYON USGS	COCONINO	2	-112.10	36.10	2571 (784)	--	--	--	--	21	**0**	**0**	NCDC
	JACOB LAKE	COCONINO	2	-112.22	36.73	7823 (2385)	60	--	1973	4	32	**77**	**64**	NCDC
	JEDDITO		2	-110.13	35.77	6704 (2044)	16	--	1937	1	25	**14**	**11**	NCDC
	JUNIPINE	COCONINO	2	-111.75	34.97	5134 (1565)	44	--	1937	1	47	**39**	**31**	NCDC
*	KAIBITO		2	-111.08	36.60	6002 (1830)	14	--	1960	12	11	**16**	**13**	NCDC
	KAYENTA	NAVAJO	2	-110.28	36.73	5704 (1739)	24	--	1915	12	64	**11**	**9**	NCDC
*	KAYENTA 21 SSW	NAVAJO	2	-110.40	36.45	6524 (1989)	12	--	1974	1	4	**18**	**15**	NCDC
	KEAMS CANYON	NAVAJO	2	-110.20	35.82	6203 (1891)	12	--	1906	11	69	**10**	**8**	NCDC
*	KLAGETOH		2	-109.53	35.50	6402 (1952)	7	--	1952	11	9	**5**	**4**	NCDC
	KLAGETOH 12 WNW	APACHE	2	-109.70	35.55	6498 (1981)	36	--	1967	12	35	**16**	**12**	NCDC
	LAKE MARY	COCONINO	2	-111.45	35.02	6930 (2113)	--	7.8	79	2	31	**52**	**46**	S. Course
	LAKESIDE RANGER STN	NAVAJO	2	-109.98	34.17	6704 (2044)	52	--	1967	12	44	**52**	**43**	NCDC
	LEES FERRY	COCONINO	2	-111.60	36.87	3209 (978)	8	--	1967	12	84	**1**	**0**	NCDC
	LEUPP	COCONINO	2	-110.97	35.28	4704 (1434)	55	--	1918	12	50	**12**	**9**	NCDC
	LUKACHUKAI	APACHE	2	-109.23	36.42	6518 (1987)	20	--	1961	12	59	**11**	**9**	NCDC
*	LUPTON		2	-109.05	35.35	6212 (1894)	--	--	--	--	3	**0**	**0**	NCDC
	MANY FARMS SCHOOL	APACHE	2	-109.62	36.37	5314 (1620)	13	--	1961	12	25	**3**	**3**	NCDC
	MAVERICK	APACHE	2	-109.55	33.75	7803 (2379)	42	--	1961	12	20	**61**	**53**	NCDC
	Maverick Fork	Apache	2	-109.47	33.92	9200 (2805)	--	23.6	93	3	23	**139**	**125**	Snotel
	MAVERICK FORK SNOW COURSE & A	APACHE	2	-109.45	33.92	9150 (2790)	--	23.5	93	E/ST	50	**144**	**128**	S. Course
	MC NARY 2 N	NAVAJO	2	-109.87	34.12	7338 (2237)	42	--	1967	12	73	**45**	**40**	NCDC
	MCNARY (DISC.)	NAVAJO	2	-109.92	34.08	7200 (2195)	--	11.6	73	3	51	**61**	**54**	S. Course
*	METEOR CRATER	COCONINO	2	-111.02	35.03	5662 (1726)	--	--	--	--	6	**0**	**0**	NCDC
	MILK RANCH (DISC.)	NAVAJO	2	-109.95	34.07	7000 (2134)	--	8	73	3	49	**43**	**38**	S. Course
	MONUMENT VALLEY	NAVAJO	2	-110.12	36.98	5563 (1696)	8	--	1989	2	26	**2**	**2**	NCDC
	MORMON LAKE RNGR STN	COCONINO	2	-111.45	34.92	7183 (2190)	20	--	1963	1	30	**11**	**9**	NCDC
	Mormon Mountain	Coconino	2	-111.52	34.93	7500 (2287)	--	17	93	3	23	**105**	**93**	Snotel
	MORMON MOUNTAIN - SNOW COURS	COCONINO	2	-111.52	34.93	7500 (2287)	--	24.1	73	3	50	**110**	**97**	S. Course
	MORMON MOUNTAIN SUMMIT #2	COCONINO	2	-111.52	34.97	8470 (2582)	--	33.6	93	2	31	**202**	**181**	S. Course
	MUND'S PARK	COCONINO	2	-111.63	34.93	6468 (1972)	22	--	1990	2	20	**29**	**26**	NCDC
	NAVAJO	APACHE	2	-109.53	35.13	5583 (1702)	--	--	--	--	16	**0**	**0**	NCDC
	NEWMAN PARK	COCONINO	2	-111.68	35.00	6750 (2058)	--	14.4	73	3	43	**63**	**55**	S. Course
	NUTRIOSO	APACHE	2	-109.15	33.90	8500 (2591)	--	9.3	49	2	68	**43**	**38**	S. Course
	OAK CREEK CANYON	COCONINO	2	-111.77	34.97	5074 (1547)	19	--	1999	4	24	**19**	**15**	NCDC
*	ORAIBI	NAVAJO	2	-110.62	35.87	5934 (1809)	--	--	--	--	13	**0**	**0**	NCDC
	PAGE	COCONINO	2	-111.45	36.92	4269 (1302)	9	--	1967	12	47	**5**	**4**	NCDC
	PAINTED DESERT N P	APACHE	2	-109.78	35.07	5758 (1756)	11	--	1976	11	33	**8**	**6**	NCDC
	PETRIFIED FOREST N P	NAVAJO	2	-109.88	34.80	5444 (1660)	14	--	1967	12	75	**7**	**6**	NCDC
	PHANTOM RANCH	COCONINO	2	-112.10	36.13	2529 (771)	8	--	1971	1	40	**0**	**0**	NCDC
	PINEDALE	NAVAJO	2	-110.25	34.30	6504 (1983)	42	--	1937	1	57	**46**	**37**	NCDC
	PINETOP	NAVAJO	2	-109.93	34.12	6958 (2121)	31	--	1987	2	18	**27**	**24**	NCDC
	PINETOP 2E	NAVAJO	2	-109.92	34.12	7198 (2195)	54	--	1967	12	63	**46**	**39**	NCDC

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf)**	**30-yr Ground Snow Load (psf)**	Data Source
	SANDERS	APACHE	2	-109.32	35.22	5852 (1784)	14	--	1967	12	49	**8**	**6**	NCDC
	SANDERS 11 ESE	APACHE	2	-109.17	35.17	6248 (1905)	20	--	1967	12	26	**14**	**11**	NCDC
*	SEBA DALKAI SCHOOL	NAVAJO	2	-110.43	35.50	5904 (1800)	--	--	--	--	10	**0**	**0**	NCDC
	SEDONA	COCONINO	2	-111.77	34.90	4219 (1286)	16	--	1949	1	62	**3**	**3**	NCDC
*	SHONGOPOVI		2	-110.53	35.80	6123 (1867)	--	--	--	--	2	**0**	**0**	NCDC
	SHOW LOW	NAVAJO	2	-110.00	34.27	6412 (1955)	20	--	1905	4	39	**22**	**18**	NCDC
	SHOW LOW CITY	NAVAJO	2	-110.03	34.25	6438 (1963)	41	--	1967	12	40	**21**	**17**	NCDC
	SILVER CREEK RANCH	NAVAJO	2	-109.98	34.35	6153 (1876)	14	--	1952	11	20	**7**	**5**	NCDC
	SNOW BOWL #1 ALT.	COCONINO	2	-111.70	35.33	9920 (3024)	--	40.2	93	3	22	**204**	**182**	S. Course
	SNOW BOWL #2	COCONINO	2	-111.70	35.33	11200 (3415)	--	51.6	93	3	41	**272**	**246**	S. Course
	SNOWFLAKE	NAVAJO	2	-110.08	34.50	5641 (1720)	30	--	1967	12	106	**11**	**8**	NCDC
	SNOWFLAKE 15 W	NAVAJO	2	-110.33	34.50	6078 (1853)	24	--	1967	12	34	**17**	**13**	NCDC
*	Snowslide Canyon	Coconino	2	-111.65	34.62	9730 (2966)	--	41	05	4	8	**246**	**222**	Snotel
	SNOWSLIDE CANYON	COCONINO	2	-111.65	35.35	9750 (2973)	--	47.5	93	E/ST	37	**218**	**194**	S. Course
	SPRINGERVILLE	APACHE	2	-109.30	34.13	7035 (2145)	14	--	1961	11	95	**8**	**6**	NCDC
	ST MICHAELS 6 WNW	APACHE	2	-109.20	35.67	7642 (2330)	14	--	1913	2	22	**13**	**11**	NCDC
	SUNRISE MOUNTAIN	APACHE	2	-109.57	33.97	9368 (2856)	85	--	1973	4	16	**173**	**135**	NCDC
	SUNSET CRATER NATL MONUMENT	COCONINO	2	-111.55	35.37	6978 (2128)	31	--	1973	3	37	**31**	**27**	NCDC
	SUPAI	COCONINO	2	-112.70	36.20	3203 (977)	--	--	--	--	44	**0**	**0**	NCDC
	TEEC NOS POS	APACHE	2	-109.08	36.92	5289 (1612)	10	--	1974	1	44	**4**	**3**	NCDC
*	TEES TO		2	-110.42	35.50	5803 (1769)	7	--	1959	12	8	**1**	**1**	NCDC
*	TIMBER RANGER STN	COCONINO	2	-111.18	34.62	6812 (2077)	--	--	--	--	3	**0**	**0**	NCDC
*	TONALEA		2	-110.95	36.33	5514 (1681)	--	--	--	--	2	**0**	**0**	NCDC
	TSAILE CANYON #1	APACHE	2	-109.10	36.40	8160 (2488)	--	11.2	95	3	21	**73**	**67**	S. Course
	TSAILE CANYON #3	APACHE	2	-109.10	36.45	8920 (2720)	--	15.4	93	2	20	**93**	**87**	S. Course
	TUBA CITY	COCONINO	2	-111.25	36.13	4987 (1520)	20	--	1967	12	98	**5**	**4**	NCDC
*	VALLE	COCONINO	2	-112.20	35.65	5891 (1796)	--	--	--	--	2	**0**	**0**	NCDC
*	VALLE AIRPORT		2	-112.15	35.67	6002 (1830)	10	--	1949	1	12	**11**	**9**	NCDC
	WAHWEAP	COCONINO	2	-111.48	37.00	3729 (1137)	8	--	1967	12	45	**1**	**1**	NCDC
	WALLACE RANGER STN		2	-110.92	34.53	7012 (2138)	30	--	1949	1	41	**33**	**27**	NCDC
	WALNUT CANYON NATL MONUMENT	COCONINO	2	-111.50	35.17	6683 (2038)	54	--	1967	12	57	**36**	**30**	NCDC
	WHITE HORSE LAKE JCT	COCONINO	2	-112.15	35.13	7180 (2189)	--	16.6	73	3	33	**79**	**69**	S. Course
	Whitehorse Lake	Coconino	2	-112.15	35.15	7180 (2189)	--	13.5	93	3	23	**83**	**74**	Snotel
	WHITERIVER 1 SW	NAVAJO	2	-109.98	33.82	5119 (1561)	21	--	1960	1	101	**12**	**9**	NCDC
	WILLIAMS	COCONINO	2	-112.18	35.23	6748 (2057)	52	--	1949	1	106	**44**	**36**	NCDC
*	WILLIAMS 24 NNW	COCONINO	2	-112.40	35.53	5753 (1754)	--	--	--	--	4	**0**	**0**	NCDC
	WILLIAMS CREEK FISH HATCHERY	APACHE	2	-109.82	34.05	6963 (2123)	38	--	1967	12	15	**46**	**38**	NCDC
	WILLIAMS SKI RUN	COCONINO	2	-112.20	35.20	7720 (2354)	--	24.6	73	4	39	**136**	**122**	S. Course
	WINDOW ROCK 4 SW	APACHE	2	-109.12	35.62	6918 (2109)	18	--	1967	12	62	**13**	**10**	NCDC
*	WINSLOW	NAVAJO	2	-110.70	35.02	4868 (1484)	--	--	--	--	2	**0**	**0**	NCDC
	WINSLOW MUNICIPAL AP	NAVAJO	2	-110.72	35.03	4885 (1489)	29	--	1967	12	89	**10**	**8**	NCDC
	WUPATKI NM	COCONINO	2	-111.37	35.52	4907 (1496)	32	--	1967	12	63	**7**	**5**	NCDC
*	ANVIL ROCK		3	-113.13	35.07	5261 (1604)	--	--	--	--	2	**0**	**0**	NCDC
*	ASH FORK 12 WNW	YAVAPAI	3	-112.67	35.27	5739 (1750)	9	--	1988	1	8	**8**	**7**	NCDC
	ASH FORK 3	YAVAPAI	3	-112.48	35.20	5074 (1547)	12	--	1990	1	17	**8**	**7**	NCDC
*	ASH FORK CAMPGROUND	YAVAPAI	3	-112.48	35.22	5150 (1570)	--	--	--	--	1	**0**	**0**	NCDC
*	BAGDAD		3	-113.20	34.60	3201 (976)	17	--	1927	2	9	**13**	**10**	NCDC
	BAGDAD	YAVAPAI	3	-113.17	34.60	3954 (1206)	10	--	1932	12	73	**1**	**1**	NCDC
*	BAGDAD 2	YAVAPAI	3	-113.13	34.60	4116 (1255)	--	--	--	--	9	**0**	**0**	NCDC
	BAGDAD 8 NE	YAVAPAI	3	-113.08	34.65	4241 (1293)	15	--	1967	12	26	**6**	**5**	NCDC
	BEAVER CREEK	YAVAPAI	3	-111.78	34.65	3524 (1074)	6	--	1965	4	50	**1**	**1**	NCDC
	BRIGHT ANGEL	COCONINO	3	-112.07	36.22	8400 (2561)	--	27.9	93	3	59	**154**	**135**	S. Course
	BUMBLE BEE	YAVAPAI	3	-112.15	34.20	2502 (763)	11	--	1967	12	28	**1**	**1**	NCDC
	CAMP WOOD	YAVAPAI	3	-112.87	34.80	5713 (1742)	36	--	1967	12	31	**18**	**14**	NCDC
	CASTLE HOT SPRINGS	YAVAPAI	3	-112.37	33.98	1990 (607)	--	--	--	--	48	**0**	**0**	NCDC
*	CASTLE HOT SPRINGS 4 N		3	-112.35	34.05	2801 (854)	--	--	--	--	10	**0**	**0**	NCDC
	CEDAR GLADE		3	-112.38	34.97	4651 (1418)	28	--	1930	1	40	**18**	**14**	NCDC
	CHILDS	YAVAPAI	3	-111.70	34.35	2649 (808)	10	--	1937	1	91	**0**	**0**	NCDC
	CHINO VALLEY	YAVAPAI	3	-112.45	34.75	4749 (1448)	22	--	1967	12	65	**6**	**4**	NCDC
*	CONGRESS	YAVAPAI	3	-112.87	34.17	3021 (921)	--	--	--	--	11	**0**	**0**	NCDC
	COPPER BASIN DIVIDE	YAVAPAI	3	-112.55	34.50	6720 (2049)	--	11.3	68	12	35	**57**	**49**	S. Course
	CORDES	YAVAPAI	3	-112.17	34.30	3770 (1149)	15	--	1967	12	74	**2**	**1**	NCDC
	CROWN KING	YAVAPAI	3	-112.35	34.22	5918 (1804)	54	--	1967	12	82	**55**	**43**	NCDC
*	DRAKE RANGER STN		3	-112.38	34.97	4651 (1418)	12	--	1961	12	9	**13**	**10**	NCDC
*	DUGAS 2 SE	YAVAPAI	3	-111.95	34.35	4041 (1232)	--	--	--	--	13	**0**	**0**	NCDC
	FOSSIL SPRINGS	YAVAPAI	3	-111.57	34.42	4271 (1302)	--	--	--	--	20	**0**	**0**	NCDC
	GADDES CANYON	YAVAPAI	3	-112.13	34.70	7600 (2317)	--	20.8	73	3	36	**107**	**93**	S. Course
	GROOM CREEK	YAVAPAI	3	-112.45	34.48	6104 (1861)	36	--	1949	1	32	**35**	**29**	NCDC
*	HILLSIDE		3	-112.92	34.42	3851 (1174)	10	--	1949	1	8	**3**	**2**	NCDC

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf)**	**30-yr Ground Snow Load (psf)**	Data Source
	SELIGMAN	YAVAPAI	3	-112.88	35.33	5249 (1600)	16	--	1906	1	101	**9**	**7**	NCDC
	SELIGMAN 13 SSW	YAVAPAI	3	-112.92	35.13	5242 (1598)	--	--	--	--	20	**0**	**0**	NCDC
*	SKULL VALLEY	YAVAPAI	3	-112.68	34.50	4251 (1296)	--	--	--	--	9	**0**	**0**	NCDC
	STANTON	YAVAPAI	3	-112.73	34.17	3480 (1061)	10	--	1967	12	25	**2**	**2**	NCDC
	SYCAMORE RANGER STN	YAVAPAI	3	-111.97	34.35	4002 (1220)	8	--	1937	1	41	**2**	**2**	NCDC
	TONTO SPRINGS RANGER STN 4 W	YAVAPAI	3	-112.75	34.62	4802 (1464)	24	--	1915	12	42	**13**	**10**	NCDC
	TUZIGOOT	YAVAPAI	3	-112.03	34.77	3469 (1058)	--	--	--	--	29	**0**	**0**	NCDC
	TUZIGOOT NATL MONUMENT	YAVAPAI	3	-112.03	34.75	3382 (1031)	26	--	1967	12	31	**4**	**3**	NCDC
	WALNUT CREEK	YAVAPAI	3	-112.82	34.93	5089 (1551)	55	--	1948	2	91	**14**	**11**	NCDC
	WALNUT GROVE	YAVAPAI	3	-112.57	34.32	3763 (1147)	14	--	1913	2	112	**1**	**1**	NCDC
	YAEGER CANYON	YAVAPAI	3	-112.17	34.68	6002 (1830)	30	--	1933	1	32	**31**	**25**	NCDC
	YAVA 6 ESE	YAVAPAI	3	-112.80	34.45	3782 (1153)	--	--	--	--	28	**0**	**0**	NCDC
	BAKER BUTTE	GILA	4	-111.40	34.45	7300 (2226)	--	23.9	73	3	34	**119**	**105**	S. Course
	Baker Butte	Gila	4	-111.40	34.45	7300 (2226)	--	14.7	83	3	23	**90**	**81**	Snotel
	BAKER BUTTE NO. 2	GILA	4	-11.38	34.45	7700 (2348)	--	30.8	73	3	34	**197**	**175**	S. Course
	BAR T BAR RANCH	GILA	4	-111.37	34.03	3103 (946)	--	--	--	--	25	**0**	**0**	NCDC
	GISELA	GILA	4	-111.28	34.12	2899 (884)	19	--	1967	12	94	**1**	**1**	NCDC
	GLOBE	GILA	4	-110.77	33.38	3649 (1113)	12	--	1985	2	25	**2**	**1**	NCDC
*	GLOBE #2	GILA	4	-110.77	33.40	3749 (1143)	--	--	--	--	12	**0**	**0**	NCDC
	GLOBE RANGER STN	GILA	4	-110.78	33.38	3552 (1083)	11	--	1967	12	76	**1**	**1**	NCDC
*	GRAPEVINE		4	-111.05	33.63	2221 (677)	--	--	--	--	4	**0**	**0**	NCDC
*	HILLTOP		4	-110.40	33.62	5704 (1739)	12	--	1945	3	6	**15**	**13**	NCDC
	INTAKE		4	-110.93	33.62	2221 (677)	--	--	--	--	47	**0**	**0**	NCDC
	MIAMI	GILA	4	-110.87	33.40	3559 (1085)	--	--	--	--	92	**0**	**0**	NCDC
*	MILLERS RIM TRAIL RANCH		4	-111.23	34.40	5631 (1717)	--	--	--	--	1	**0**	**0**	NCDC
	NATURAL BRIDGE	GILA	4	-111.45	34.32	4612 (1406)	36	--	1967	12	82	**25**	**19**	NCDC
*	O W RANCH		4	-110.80	34.28	7203 (2196)	--	--	--	--	1	**0**	**0**	NCDC
*	PARKER CREEK MNTC YRD	GILA	4	-110.95	33.80	5504 (1678)	--	--	--	--	1	**0**	**0**	NCDC
	PAYSON	GILA	4	-111.33	34.23	4912 (1498)	48	--	1967	12	58	**28**	**21**	NCDC
	PAYSON 12 NNE	GILA	4	-111.27	34.40	5504 (1678)	42	--	1967	12	25	**35**	**30**	NCDC
	PAYSON RANGER STN	GILA	4	-111.33	34.23	4851 (1479)	24	--	1937	1	72	**14**	**11**	NCDC
*	PAYSON RANGER STN 2	GILA	4	-111.30	34.25	5002 (1525)	--	--	--	--	3	**0**	**0**	NCDC
*	PINE	GILA	4	-111.47	34.38	5452 (1662)	14	--	1974	1	2	**23**	**20**	NCDC
	PLEASANT VALLEY R S	GILA	4	-110.95	34.10	5049 (1539)	27	--	1967	12	42	**5**	**4**	NCDC
	PROMONTORY BUTTE	GILA	4	-111.02	34.37	7930 (2418)	--	35.4	80	4	17	**216**	**194**	S. Course
	PUNKIN CENTER	GILA	4	-111.30	33.85	2325 (709)	--	--	--	--	33	**0**	**0**	NCDC
	RENO R S	GILA	4	-111.32	33.87	2420 (738)	9	--	1967	12	59	**0**	**0**	NCDC
*	RIM TRAIL RANCH	GILA	4	-111.27	34.40	5631 (1717)	--	--	--	--	2	**0**	**0**	NCDC
	ROOSEVELT 1 WNW	GILA	4	-111.15	33.67	2204 (672)	--	--	--	--	101	**0**	**0**	NCDC
	SALT RIVER	GILA	4	-110.50	33.80	3611 (1101)	12	--	1942	1	19	**2**	**2**	NCDC
	SAN CARLOS	GILA	4	-110.45	33.35	2640 (805)	--	--	--	--	33	**0**	**0**	NCDC
*	SAN CARLOS AIRPORT	GILA	4	-110.47	33.38	2889 (881)	--	--	--	--	4	**0**	**0**	NCDC
	SAN CARLOS RESERVOIR	GILA	4	-110.53	33.18	2532 (772)	--	--	--	--	62	**0**	**0**	NCDC
*	SENECA 3 NW		4	-110.53	33.78	4924 (1501)	--	--	--	--	2	**0**	**0**	NCDC
	SIERRA ANCHA	GILA	4	-110.97	33.80	5099 (1555)	30	--	1967	12	50	**20**	**16**	NCDC
	TONTO CREEK FISH HAT 2	GILA	4	-111.10	34.38	6388 (1948)	27	--	1997	1	31	**15**	**12**	NCDC
	TONTO CREEK FISH HATCHERY	GILA	4	-111.10	34.37	6282 (1915)	58	--	1967	12	28	**39**	**31**	NCDC
	WORKMAN CREEK	GILA	4	-110.92	33.82	6900 (2104)	--	20.1	73	3	42	**102**	**90**	S. Course
	Workman Creek	Gila	4	-110.92	33.82	6900 (2104)	--	16.1	83	3	23	**94**	**85**	Snotel
*	WORKMAN CREEK 1	GILA	4	-110.92	33.82	6973 (2126)	--	--	--	--	1	**0**	**0**	NCDC
*	WORKMAN CREEK 2	GILA	4	-110.92	33.82	6973 (2126)	25	--	1942	1	2	**55**	**43**	NCDC
	YOUNG	GILA	4	-110.93	34.10	5051 (1540)	31	--	1953	3	60	**15**	**12**	NCDC
*	ALAMO 8 SW		5	-113.70	34.20	951 (290)	--	--	--	--	4	**0**	**0**	NCDC
	ALAMO DAM	LA PAZ	5	-113.58	34.23	1290 (393)	--	--	--	--	31	**0**	**0**	NCDC
*	ALAMO DAM 6 ESE	YUMA	5	-113.47	34.25	1480 (451)	--	--	--	--	13	**0**	**0**	NCDC
*	ALAMO RANGER STN		5	-110.85	33.50	3040 (927)	--	--	--	--	4	**0**	**0**	NCDC
	BOUSE	LA PAZ	5	-114.02	33.95	925 (282)	--	--	--	--	55	**0**	**0**	NCDC
	DATELAND	YUMA	5	-113.53	32.80	449 (137)	--	--	--	--	17	**0**	**0**	NCDC
	DATELAND WHITEWING RANCH	YUMA	5	-113.50	32.97	520 (159)	--	--	--	--	34	**0**	**0**	NCDC
	EHRENBERG	YUMA	5	-114.53	33.60	322 (98)	--	--	--	--	30	**0**	**0**	NCDC
	EHRENBERG 2 E	LA PAZ	5	-114.47	33.62	465 (142)	--	--	--	--	29	**0**	**0**	NCDC
*	IMPERIAL DAM		5	-114.47	32.88	171 (52)	--	--	--	--	2	**0**	**0**	NCDC
	KOFA MINE	YUMA	5	-113.97	33.27	1774 (541)	--	--	--	--	54	**0**	**0**	NCDC
	MOHAWK		5	-113.77	32.73	541 (165)	--	--	--	--	52	**0**	**0**	NCDC
	PARKER	LA PAZ	5	-114.28	34.15	420 (128)	--	--	--	--	113	**0**	**0**	NCDC
	QUARTZSITE	LA PAZ	5	-114.23	33.67	875 (267)	--	--	--	--	37	**0**	**0**	NCDC
	SALOME 1 ESE	YUMA	5	-113.62	33.78	1902 (580)	--	--	--	--	17	**0**	**0**	NCDC
*	SALOME 17 SE	LA PAZ	5	-113.48	33.68	1599 (487)	--	--	--	--	12	**0**	**0**	NCDC
	SALOME 6 SE		5	-113.53	33.73	1703 (519)	--	--	--	--	50	**0**	**0**	NCDC

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf)**	**30-yr Ground Snow Load (psf)**	Data Source
	AGUILA	MARICOPA	6	-113.18	33.95	2164 (660)	--	--	--	--	78	**0**	**0**	NCDC
	ALHAMBRA	MARICOPA	6	-112.12	33.52	1142 (348)	--	--	--	--	29	**0**	**0**	NCDC
	APACHE JUNCTION	PINAL	6	-111.55	33.42	1722 (525)	--	--	--	--	15	**0**	**0**	NCDC
*	APACHE JUNCTION 4 NNW	PINAL	6	-111.58	33.47	1890 (576)	--	--	--	--	5	**0**	**0**	NCDC
	APACHE JUNCTION 5 NE	PINAL	6	-111.48	33.47	2069 (631)	--	--	--	--	19	**0**	**0**	NCDC
*	ARIZONA CITY	PINAL	6	-111.67	32.75	1505 (459)	--	--	--	--	4	**0**	**0**	NCDC
*	ARIZONA FALLS 1 WNW	MARICOPA	6	-111.98	33.50	1250 (381)	--	--	--	--	6	**0**	**0**	NCDC
	ARIZONA FALLS 1 WNW	MARICOPA	6	-111.97	33.48	1250 (381)	--	--	--	--	16	**0**	**0**	NCDC
	ASHURST HAYDEN DAM	PINAL	6	-111.28	33.08	1549 (472)	--	--	--	--	50	**0**	**0**	NCDC
	BARTLETT DAM	MARICOPA	6	-111.65	33.82	1650 (503)	--	--	--	--	67	**0**	**0**	NCDC
	BEARDSLEY	MARICOPA	6	-112.38	33.67	1270 (387)	--	--	--	--	29	**0**	**0**	NCDC
	BUCKEYE	MARICOPA	6	-112.58	33.38	890 (271)	--	--	--	--	110	**0**	**0**	NCDC
	CAREFREE	MARICOPA	6	-111.90	33.82	2529 (771)	--	--	--	--	38	**0**	**0**	NCDC
	CASA GRANDE	PINAL	6	-111.72	32.88	1403 (428)	--	--	--	--	105	**0**	**0**	NCDC
	CASA GRANDE NATL MONUMENT	PINAL	6	-111.53	33.00	1419 (433)	--	--	--	--	85	**0**	**0**	NCDC
*	CAVE CREEK		6	-111.95	33.83	2122 (647)	--	--	--	--	13	**0**	**0**	NCDC
*	CAVE CREEK 3 ESE	MARICOPA	6	-111.90	33.82	2529 (771)	--	--	--	--	2	**0**	**0**	NCDC
	CAVE CREEK DAM	MARICOPA	6	-112.05	33.72	1670 (509)	--	--	--	--	21	**0**	**0**	NCDC
	CHANDLER	MARICOPA	6	-111.83	33.30	1220 (372)	--	--	--	--	33	**0**	**0**	NCDC
	CHANDLER HEIGHTS	MARICOPA	6	-111.68	33.20	1425 (434)	--	--	--	--	58	**0**	**0**	NCDC
	DEER VALLEY	MARICOPA	6	-112.08	33.58	1257 (383)	--	--	--	--	36	**0**	**0**	NCDC
*	EAST MESA	MARICOPA	6	-111.65	33.42	1518 (463)	--	--	--	--	4	**0**	**0**	NCDC
*	EL MIRAGE		6	-112.32	33.63	1142 (348)	--	--	--	--	1	**0**	**0**	NCDC
	ELOY 4 NE	PINAL	6	-111.52	32.78	1545 (471)	--	--	--	--	55	**0**	**0**	NCDC
	FALCON FIELD	MARICOPA	6	-111.75	33.43	1322 (403)	--	--	--	--	29	**0**	**0**	NCDC
	FLORENCE	PINAL	6	-111.38	33.03	1400 (427)	--	--	--	--	100	**0**	**0**	NCDC
	FOUNTAIN HILLS	MARICOPA	6	-111.72	33.60	1580 (482)	--	--	--	--	27	**0**	**0**	NCDC
	GILA BEND	MARICOPA	6	-112.72	32.95	735 (224)	--	--	--	--	111	**0**	**0**	NCDC
	GILA BEND AIRPORT		6	-112.72	32.88	853 (260)	--	--	--	--	23	**0**	**0**	NCDC
	GOULDS RANCH	MARICOPA	6	-112.07	33.38	1201 (366)	--	--	--	--	46	**0**	**0**	NCDC
	GRANITE REEF DAM	MARICOPA	6	-111.70	33.52	1322 (403)	--	--	--	--	173	**0**	**0**	NCDC
	GRIGGS 3 W	MARICOPA	6	-112.48	33.50	1160 (354)	--	--	--	--	41	**0**	**0**	NCDC
	HARQUAHALA PLAINS		6	-113.17	33.53	1220 (372)	--	--	--	--	28	**0**	**0**	NCDC
	HORSESHOE DAM	MARICOPA	6	-111.72	33.98	2019 (616)	--	--	--	--	58	**0**	**0**	NCDC
	KEARNY	PINAL	6	-110.90	33.05	1830 (558)	--	--	--	--	22	**0**	**0**	NCDC
	KELVIN	PINAL	6	-110.97	33.10	1850 (564)	--	--	--	--	37	**0**	**0**	NCDC
*	LAKE PLEASANT	MARICOPA	6	-112.27	33.85	1601 (488)	--	--	--	--	10	**0**	**0**	NCDC
	LAKE PLEASANT	MARICOPA	6	-112.27	33.83	1536 (468)	--	--	--	--	19	**0**	**0**	NCDC
	LAVEEN 3 SSE	MARICOPA	6	-112.15	33.33	1135 (346)	--	--	--	--	58	**0**	**0**	NCDC
	LITCHFIELD PARK	MARICOPA	6	-112.37	33.50	1030 (314)	--	--	--	--	86	**0**	**0**	NCDC
	MARICOPA 4 N	PINAL	6	-112.03	33.12	1160 (354)	--	--	--	--	46	**0**	**0**	NCDC
	MARICOPA 9 SSW		6	-112.10	32.92	1401 (427)	--	--	--	--	58	**0**	**0**	NCDC
	MARINETTE	MARICOPA	6	-112.30	33.63	1152 (351)	--	--	--	--	48	**0**	**0**	NCDC
	MESA	MARICOPA	6	-111.82	33.42	1235 (376)	--	--	--	--	108	**0**	**0**	NCDC
*	MONTEZUMA	MARICOPA	6	-113.38	33.10	741 (226)	--	--	--	--	5	**0**	**0**	NCDC
	MORMON FLAT	MARICOPA	6	-111.45	33.55	1705 (520)	--	--	--	--	83	**0**	**0**	NCDC
	MUMMY MOUNTAIN	MARICOPA	6	-111.97	33.55	1421 (433)	--	--	--	--	16	**0**	**0**	NCDC
	ORACLE		6	-110.78	32.60	4602 (1403)	16	--	1937	1	54	**7**	**6**	NCDC
	ORACLE 2 SE	PINAL	6	-110.73	32.60	4509 (1375)	12	--	1967	12	56	**2**	**2**	NCDC
*	PAINTED ROCK DAM	MARICOPA	6	-113.03	33.08	568 (173)	--	--	--	--	6	**0**	**0**	NCDC
*	PARADISE VALLEY NO 2	MARICOPA	6	-111.97	33.57	1381 (421)	--	--	--	--	4	**0**	**0**	NCDC
*	PARADISE VALLEY NO 2	MARICOPA	6	-111.95	33.55	1421 (433)	--	--	--	--	5	**0**	**0**	NCDC
	PHOENIX CITY	MARICOPA	6	-112.08	33.45	1098 (335)	--	--	--	--	48	**0**	**0**	NCDC
	PHOENIX INDIAN SCHOOL	MARICOPA	6	-112.07	33.50	1122 (342)	--	--	--	--	30	**0**	**0**	NCDC
	PHOENIX SKY HARBOR INTL AP	MARICOPA	6	-112.00	33.43	1107 (337)	--	--	--	--	59	**0**	**0**	NCDC
*	PHOENIX SOUTH MOUNTAIN	MARICOPA	6	-112.05	33.33	2645 (807)	--	--	--	--	9	**0**	**0**	NCDC
	PICACHO 8 SE	PINAL	6	-111.40	32.65	1830 (558)	--	--	--	--	19	**0**	**0**	NCDC
	PICACHO RESERVOIR	PINAL	6	-111.47	32.87	1512 (461)	--	--	--	--	28	**0**	**0**	NCDC
	PINAL RANCH	PINAL	6	-110.98	33.35	4523 (1379)	25	--	1967	12	78	**16**	**12**	NCDC
*	PINNACLE PEAK	MARICOPA	6	-111.87	33.73	2564 (782)	--	--	--	--	4	**0**	**0**	NCDC
	RED ROCK 6 SSW	PINAL	6	-111.33	32.48	1879 (573)	--	--	--	--	53	**0**	**0**	NCDC
	SACATON	PINAL	6	-111.75	33.08	1285 (392)	--	--	--	--	96	**0**	**0**	NCDC
	SAN MANUEL	PINAL	6	-110.63	32.60	3459 (1055)	9	--	1958	11	52	**1**	**1**	NCDC
	SCOTTSDALE	MARICOPA	6	-111.88	33.47	1201 (366)	--	--	--	--	18	**0**	**0**	NCDC
	SENTINEL		6	-113.22	32.87	689 (210)	--	--	--	--	31	**0**	**0**	NCDC
*	SLATE MOUNTAIN	PINAL	6	-111.88	32.52	1932 (589)	--	--	--	--	4	**0**	**0**	NCDC
	SOUTH PHOENIX	MARICOPA	6	-112.07	33.38	1155 (352)	--	--	--	--	45	**0**	**0**	NCDC
*	STANFIELD		6	-111.97	32.88	1312 (400)	--	--	--	--	2	**0**	**0**	NCDC
	STEWART MOUNTAIN	MARICOPA	6	-111.53	33.55	1422 (433)	--	--	--	--	58	**0**	**0**	NCDC

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf)**	**30-yr Ground Snow Load (psf)**	Data Source
	TONOPAH 5N	MARICOPA	6	-112.88	33.50	1150 (351)	--	--	--	--	31	**0**	**0**	NCDC
*	TONTO HILLS	MARICOPA	6	-111.83	33.88	3680 (1122)	--	--	--	--	2	**0**	**0**	NCDC
*	VALLEY CITRUS FARM	MARICOPA	6	-111.97	33.38	1181 (360)	--	--	--	--	5	**0**	**0**	NCDC
*	WADDELL 3 SSE		6	-112.40	33.57	1099 (335)	--	--	--	--	2	**0**	**0**	NCDC
	WILLOW SPRINGS RANCH	PINAL	6	-110.87	32.72	3690 (1125)	--	--	--	--	30	**0**	**0**	NCDC
	WINKELMAN 6 S	PINAL	6	-110.72	32.92	2080 (634)	--	--	--	--	38	**0**	**0**	NCDC
*	WINKLEMAN 12 SE	PINAL	6	-110.60	32.87	2589 (789)	--	--	--	--	11	**0**	**0**	NCDC
	WITTMANN 4SW	MARICOPA	6	-112.60	33.75	1670 (509)	--	--	--	--	47	**0**	**0**	NCDC
	YOUNGTOWN	MARICOPA	6	-112.30	33.60	1135 (346)	--	--	--	--	42	**0**	**0**	NCDC
	AJO	PIMA	7	-112.87	32.37	1799 (549)	--	--	--	--	92	**0**	**0**	NCDC
	AJO WELL	PIMA	7	-112.83	32.45	1430 (436)	--	--	--	--	28	**0**	**0**	NCDC
*	ALPINE 18 SW	GREENLEE	7	-109.33	33.63	9158 (2792)	84	--	1987	3	4	**209**	**171**	NCDC
	ALPINE 8 SSE	GREENLEE	7	-109.12	33.73	6728 (2051)	19	--	1999	4	17	**20**	**17**	NCDC
	AMADO	SANTA CRUZ	7	-111.05	31.72	3050 (930)	--	--	--	--	28	**0**	**0**	NCDC
	ANVIL RANCH	PIMA	7	-111.38	31.98	2749 (838)	--	--	--	--	58	**0**	**0**	NCDC
	APACHE 6 WNW	COCHISE	7	-109.23	31.72	5382 (1641)	--	--	--	--	17	**0**	**0**	NCDC
	APACHE POWDER COMPANY	COCHISE	7	-110.25	31.90	3688 (1124)	--	--	--	--	68	**0**	**0**	NCDC
*	ARAVAIPA RANGER STN		7	-110.27	32.78	3670 (1119)	--	--	--	--	2	**0**	**0**	NCDC
	ARIVACA	PIMA	7	-111.33	31.57	3619 (1103)	--	--	--	--	51	**0**	**0**	NCDC
*	ARIZONA SONORA DESERT MUSEUM	PIMA	7	-111.17	32.25	2821 (860)	--	--	--	--	12	**0**	**0**	NCDC
*	ARSENIC TUBS		7	-109.83	33.27	4704 (1434)	7	--	1948	2	3	**6**	**4**	NCDC
*	BEACH RANCH	PIMA	7	-110.77	31.93	3762 (1147)	--	--	--	--	9	**0**	**0**	NCDC
*	BEAR VALLEY		7	-111.18	31.42	4031 (1229)	--	--	--	--	12	**0**	**0**	NCDC
	BEAVER HEAD	GREENLEE	7	-109.20	33.70	8000 (2439)	--	12.5	68	1	68	**60**	**52**	S. Course
*	Beaverhead	Greenlee	7	-109.22	33.68	7990 (2436)	--	8.3	98	3	11	**57**	**51**	Snotel
	BEAVERHEAD LODGE	GREENLEE	7	-109.22	33.68	8092 (2467)	44	--	1962	1	20	**66**	**55**	NCDC
	BENSON	COCHISE	7	-110.28	31.97	3585 (1093)	17	--	1919	3	74	**1**	**1**	NCDC
*	BENSON 23 NNW	COCHISE	7	-110.38	32.30	3142 (958)	--	--	--	--	5	**0**	**0**	NCDC
	BENSON 6 SE	COCHISE	7	-110.23	31.88	3689 (1125)	--	--	--	--	16	**0**	**0**	NCDC
	BISBEE	COCHISE	7	-109.92	31.43	5306 (1618)	20	--	1949	1	68	**5**	**4**	NCDC
	BISBEE 1 WNW	COCHISE	7	-109.93	31.45	5559 (1695)	7	--	1988	1	17	**4**	**3**	NCDC
	BISBEE 2	COCHISE	7	-109.90	31.43	5049 (1539)	6	--	1980	2	28	**1**	**1**	NCDC
	BLACK RIVER PUMPS	GRAHAM	7	-109.75	33.48	6063 (1849)	15	--	1997	1	56	**5**	**4**	NCDC
	BLUE	GREENLEE	7	-109.17	33.58	5419 (1652)	42	--	1967	12	58	**16**	**13**	NCDC
*	BONITA CREEK		7	-109.78	33.15	4802 (1464)	10	--	1949	1	6	**7**	**5**	NCDC
	BOSLEY RANCH	GRAHAM	7	-110.20	32.57	4802 (1464)	--	--	--	--	25	**0**	**0**	NCDC
	BOWIE	COCHISE	7	-109.48	32.32	3759 (1146)	10	--	1978	1	104	**1**	**1**	NCDC
*	BOWIE JUNCTION R15 ON W5		7	-109.70	32.43	4723 (1440)	--	--	--	--	1	**0**	**0**	NCDC
	CANELO 1 NW	SANTA CRUZ	7	-110.53	31.57	5009 (1527)	11	--	1978	12	93	**2**	**2**	NCDC
	CASCABEL	COCHISE	7	-110.42	32.32	3144 (959)	--	--	--	--	37	**0**	**0**	NCDC
	CHIRICAHUA NATL MONUMENT	COCHISE	7	-109.35	32.00	5299 (1615)	28	--	1967	12	69	**9**	**7**	NCDC
	CLIFTON	GREENLEE	7	-109.30	33.05	3519 (1073)	15	--	1949	1	112	**0**	**0**	NCDC
	COCHISE 4 SSE	COCHISE	7	-109.88	32.07	4179 (1274)	10	--	1912	2	33	**1**	**1**	NCDC
	COCHISE STRONGHOLD		7	-109.95	31.95	4749 (1448)	8	--	1928	2	20	**3**	**3**	NCDC
	CORONADO N M HDQTRS	COCHISE	7	-110.25	31.35	5241 (1598)	16	--	1988	1	46	**4**	**3**	NCDC
*	CORONADO NATL MONUMENT		7	-110.28	31.37	5553 (1693)	15	--	1958	3	5	**8**	**6**	NCDC
	CORTARO 3 SW	PIMA	7	-111.12	32.33	2269 (692)	--	--	--	--	29	**0**	**0**	NCDC
*	COVERED WELLS 1 E	PIMA	7	-112.15	32.15	2620 (799)	--	--	--	--	8	**0**	**0**	NCDC
	DOS CABEZAS 1 SE	COCHISE	7	-109.60	32.17	5104 (1556)	12	--	1967	12	32	**6**	**5**	NCDC
	DOUGLAS	COCHISE	7	-109.53	31.35	4039 (1231)	--	--	--	--	37	**0**	**0**	NCDC
	DOUGLAS BISBEE-DOUGLAS INTL A	COCHISE	7	-109.60	31.47	4104 (1251)	--	--	--	--	58	**0**	**0**	NCDC
	DOUGLAS SMELTER		7	-109.58	31.35	3972 (1211)	--	--	--	--	71	**0**	**0**	NCDC
	DUNCAN	GREENLEE	7	-109.12	32.75	3659 (1116)	15	--	1949	1	72	**0**	**0**	NCDC
	EAGLE CREEK	GREENLEE	7	-109.48	33.40	5104 (1556)	35	--	1967	12	46	**4**	**3**	NCDC
	EAGLE CREEK 2	GREENLEE	7	-109.48	33.35	4869 (1484)	--	--	--	--	17	**0**	**0**	NCDC
	ELGIN 5 N	SANTA CRUZ	7	-110.53	31.73	4904 (1495)	13	--	1916	1	59	**3**	**2**	NCDC
	FAIRBANK 1 S	COCHISE	7	-110.18	31.72	3851 (1174)	10	--	1939	2	65	**1**	**1**	NCDC
*	FLYING H RANCH		7	-110.23	31.40	5081 (1549)	--	--	--	--	11	**0**	**0**	NCDC
	FORT HUACHUCA	COCHISE	7	-110.33	31.57	4664 (1422)	13	--	1916	1	51	**5**	**4**	NCDC
*	FORT THOMAS	GRAHAM	7	-109.95	33.03	2679 (817)	--	--	--	--	9	**0**	**0**	NCDC
	FORT THOMAS 2 SW	GRAHAM	7	-110.00	33.02	2799 (853)	--	--	--	--	40	**0**	**0**	NCDC
	FRITZ RANCH	GREENLEE	7	-109.18	33.33	4323 (1318)	--	--	--	--	33	**0**	**0**	NCDC
	FT GRANT	GRAHAM	7	-109.95	32.62	4849 (1478)	40	--	1935	3	67	**3**	**2**	NCDC
	GRANVILLE	GREENLEE	7	-109.38	33.20	6802 (2074)	38	--	1968	12	21	**12**	**9**	NCDC
	GREEN VALLEY	PIMA	7	-111.00	31.90	2899 (884)	--	--	--	--	18	**0**	**0**	NCDC
*	GREY PEAK	GREENLEE	7	-109.38	33.25	6398 (1951)	30	--	1950	2	5	**42**	**33**	NCDC
*	GREYS PEAK MNTC YD	GREENLEE	7	-109.38	33.25	6658 (2030)	15	--	1979	2	7	**17**	**15**	NCDC
	Hannagan Meadows	Greenlee	7	-109.32	33.65	9020 (2750)	--	27.1	83	4	23	**167**	**150**	Snotel
	HANNAGAN MEADOWS	GREENLEE	7	-109.32	33.63	9090 (2771)	--	27	93	2	36	**159**	**141**	S. Course

Appendix A is an expanded table with a more complete presentation of the statistical data, including distribution parameters, for all of the sites. With the distribution parameters for each site the ground snow loads for any mean recurrence interval can be calculated by the methods presented in Section 3.3.

Although there is some inherent error in the calculation of ground snow load from depth, there are a few sites that give confidence to the methods used. For the Happy Jack location there are 3 sites; Snow Course, SnoTel and NCDC each have a representation. (Results for all 3 sites are shown only in Appendix A) The SnoTel site has only 6 years of records available and discounted as less reliable. The 50-year ground snow load value of the Snow Course (SWE) site and that of the NCDC (snow depth) site are very similar. The NCDC site has a 50-year ground snow load of 95 psf predicted from the snow depth with equation 3.12, while the Snow Course site has a 50-year ground snow load of 90 psf calculated directly from SWE. The prediction in this case is off by only 6%. McNary is another location with multiple sites that has an accurate prediction of the 50-year ground snow load based on snow depth. The Snow Course site has a value of 61 psf calculated directly from SWE data, while the NCDC site has a predicted value of 58 psf based on snow depth. This is an error of only 5%.

On the other hand, Fort Valley has a predicted value for its NCDC site of 92 psf and a calculated value for its Snow Course site of only 60 psf, a 53% error. This is evidence that equation 3.12 represents only the best-fit regression curve for the snow depth vs. ground snow load data, as shown in Figure 3.5. Although this curve fits the relationship best, there is still error in the approximation. As stated in Section 3.4 it can be expected that the prediction will be conservative and unconservative for approximately half of the predictions.

3.6 OBSERVATIONS

In an attempt to find other relationships with the ground snow loads a plot was created for latitude vs. 50-year ground snow loads.

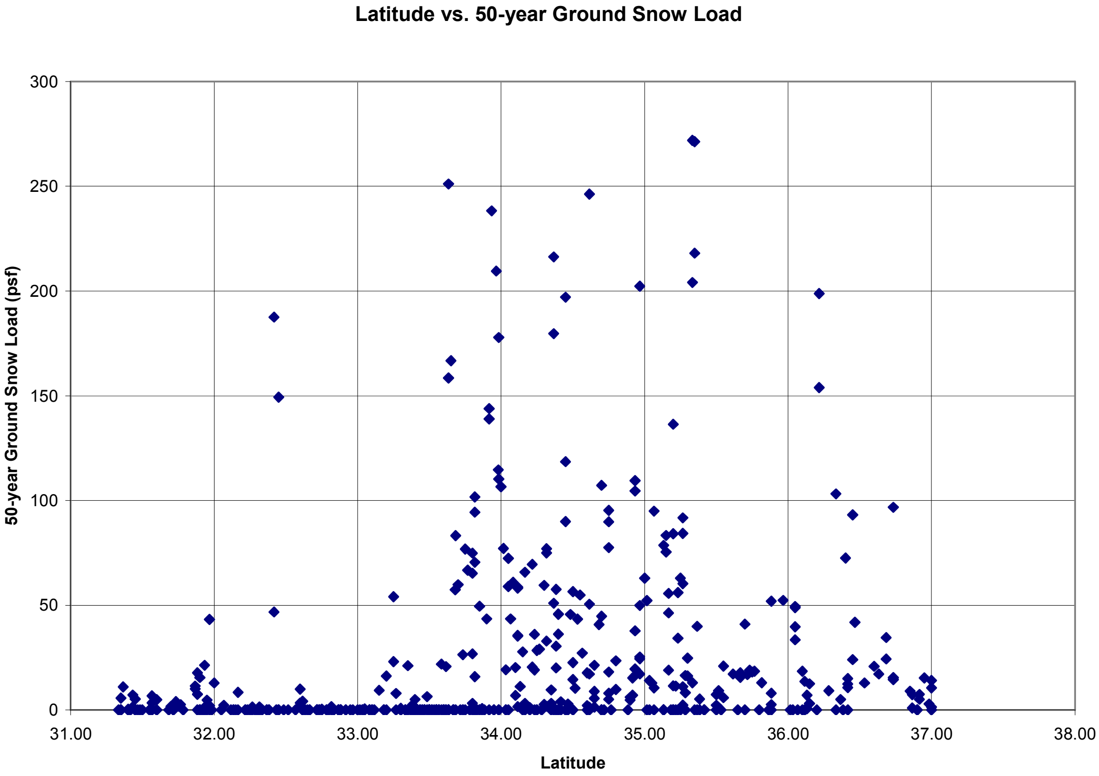


Figure 3.7
Latitude vs. 50-year Ground Snow Load

As can be seen in Figure 3.7 there is no relationship evident between the latitude and ground snow load. Sites at all latitudes have a 50-year ground snow load of zero, and conversely, sites with 50-year ground snow loads are located at almost all latitudes.

Figures 3.8 through 3.13 illustrate the relationship between ground snow load and elevation separated by Climate Division. Climate Division 5 is not included since every site has a 50-year ground snow load of zero.

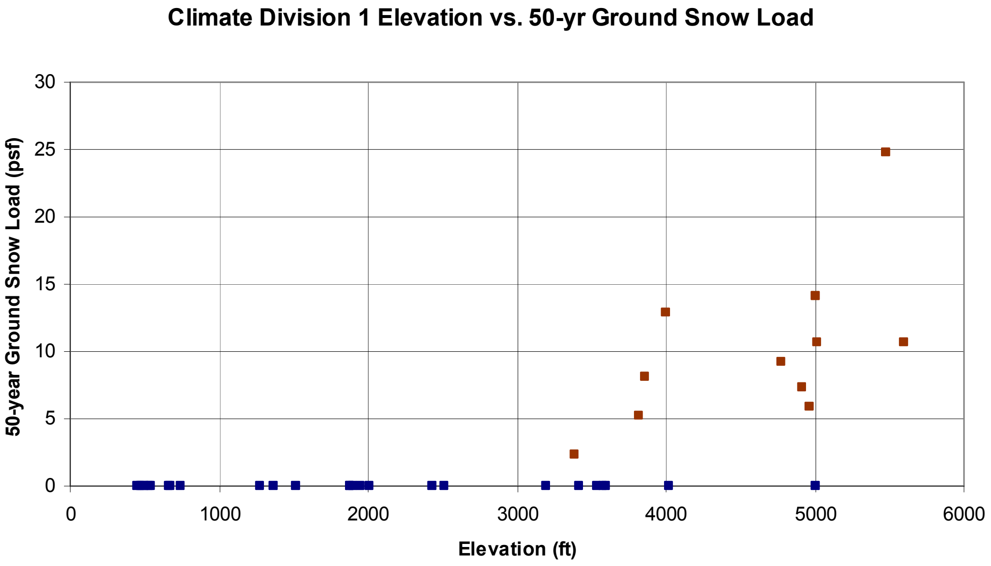


Figure 3.8
Elevation vs. 50-year Ground Snow Load—Climate Division 1

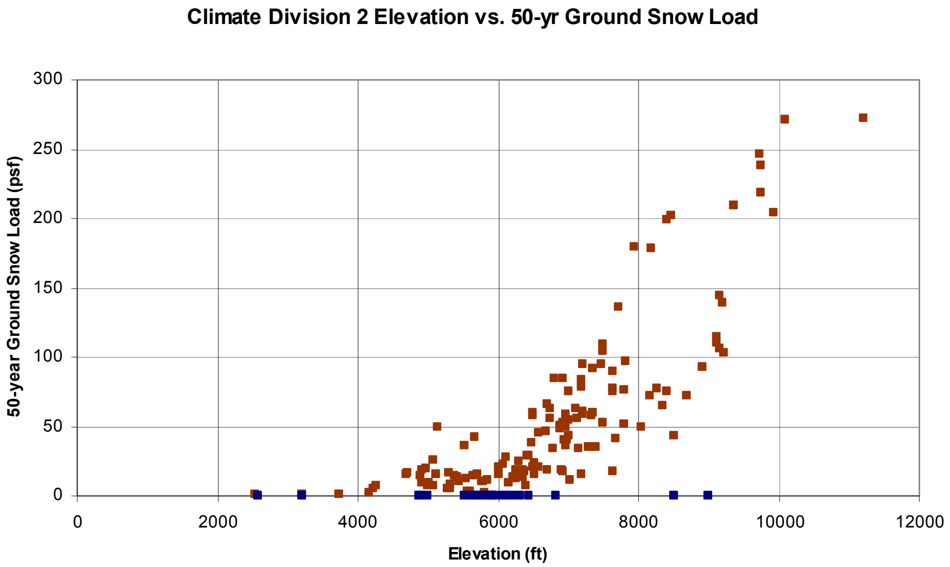


Figure 3.9
Elevation vs. 50-year Ground Snow Load—Climate Division 2

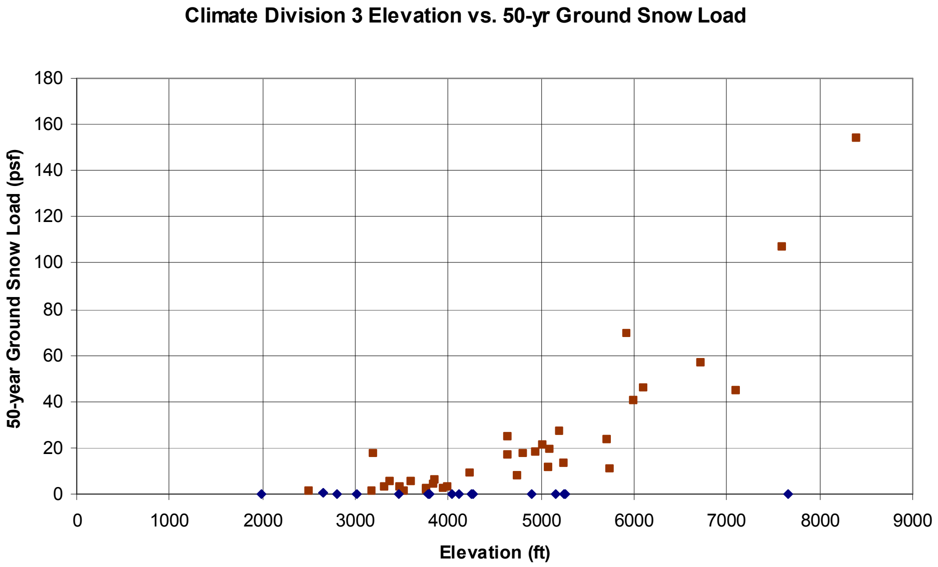


Figure 3.10
Elevation vs. 50-year Ground Snow Load—Climate Division 3

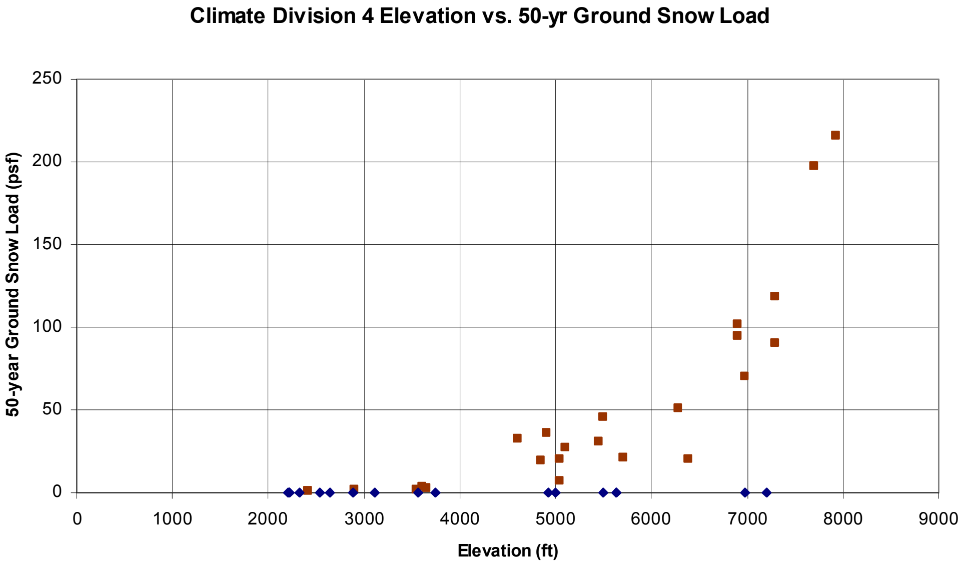


Figure 3.11
Elevation vs. Ground Snow Load-Climate Division 4

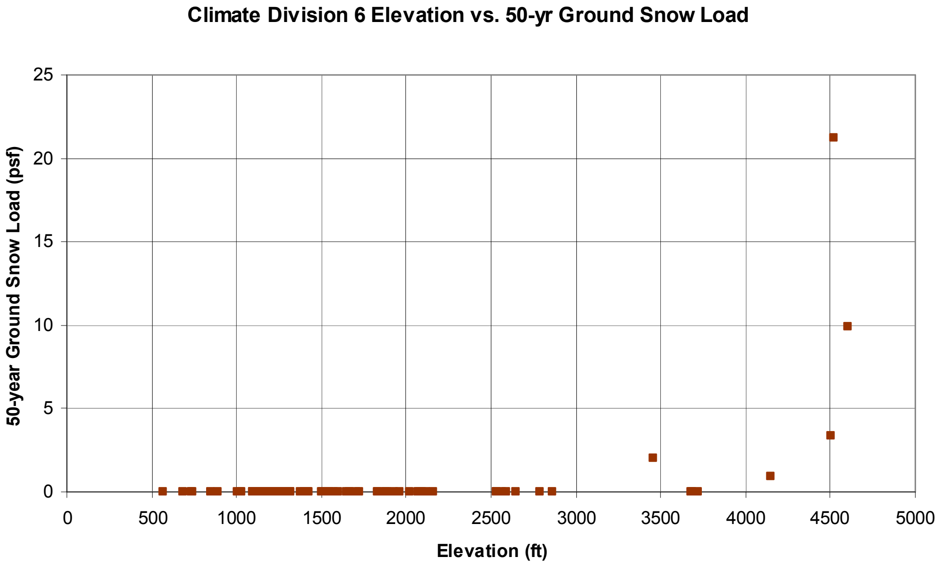


Figure 3.12
Elevation vs. 50-year Ground Snow Load—Climate Division 6

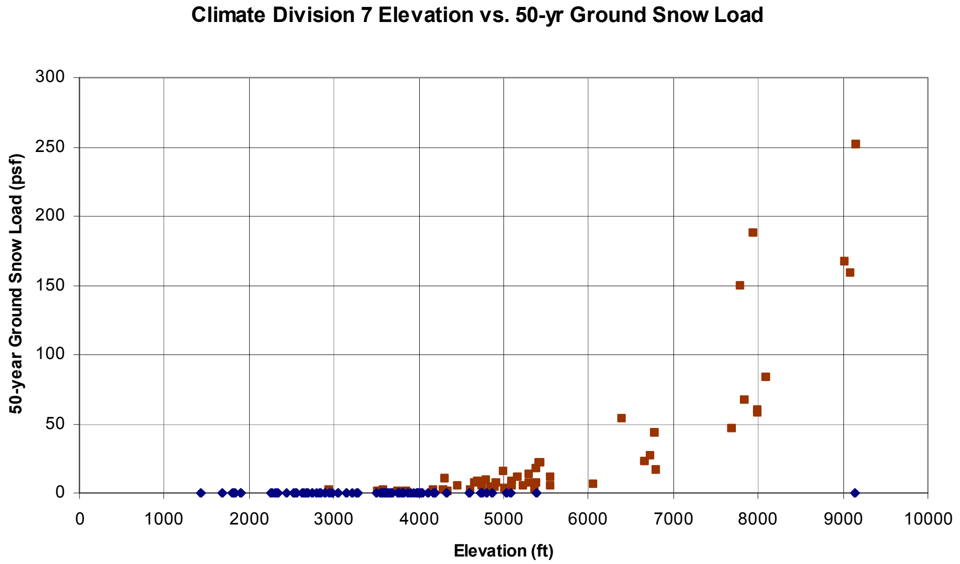


Figure 3.13
Elevation vs. 50-year Ground Snow Load—Climate Division 7

As can be seen from the graphs in Figures 3.8 through 3.13, the obvious relationship exists that as elevation increases so does the 50-year ground snow load. There exist so much scatter and error that it is impossible to accurately quantify this relationship without significant error. In the future, when the Climate Divisions are reorganized to more closely align with homogeneous weather behavior these relationships may be more refined as well.

3.7 COMPARISON OF GROUND SNOW LOAD DATA

If some random sites are taken and ground snow load value comparisons are made between currently used resources and those values determined in this study the impact of this study can be determined. Table 3.5 shows this comparison.

Table 3.5
Comparison of Ground Snow Loads

				Ground Snow Loads (psf)			
Site	Climate Division	Elevation (ft.)	Data Source for this study	A Review of Climatological Data for Ground Snow Loads in Arizona		ASCE 7-05 Ground Snow Load Map	Snow Load Data For Arizona
				50-year	30-year	50-year	30-year
Kingman AAF	1	3385	NCDC	2	2	5	20
Alpine	2	8048	NCDC	50	40	CS	50
Fredonia	2	4681	NCDC	15	13	CS	20
Happy Jack	2	7630	SC	90	79	CS	95
Pinetop 2E	2	7198	NCDC	59	51	CS	50
Gaddes Canyon	3	7600	SC	107	93	CS	100
Seligman	3	5249	NCDC	13	10	10	20
Payson 12NNE	4	5504	NCDC	46	39	CS	50
Oracle 2SE	6	4509	NCDC	3	3	5	20
Hannigan Meadows	7	9090	SC	159	141	CS	100
Sala Ranch	7	5163	NCDC	11	9	CS	20

In some instances the loads presented in this report are higher and in some cases lower than those listed in Snow Load Data for Arizona (Elliot, 1981). They are surprisingly close in most cases. For instance, Happy Jack had a recommended ground snow load of 95 psf in Snow Load Data for Arizona compared to a 50-year ground snow load from this study of 90 psf. In the case of Hannigan Meadows, however, the difference between the basic ground snow load in Snow Load Data for Arizona and this study is 59%. The ground snow load for Hannigan Meadows in this study is a result of 36 years of data with a COV of 0.56. It appears that this would give accurate results. This would lead to the conclusion that the previous data is unconservative. Out of the 10 sites considered only 3 had ground snow loads attainable from the ASCE 7-05 map. From this comparison it is evident that additional information could be very beneficial, and should be implemented among the structural design community for use in designing for snow in Arizona.

CHAPTER FOUR

LIMITATIONS

4.1 MAPPING OF SNOW LOADS

Many other states have developed a guide for ground snow loads specific to their state. Some of these states have mapped their ground snow loads with isolines, similar to what is presented in ASCE 7. (Idaho, 1984, Washington 1995) In the ASCE 7 ground snow load maps the isolines determine the depth directly. Another method developed to try to be even more accurate is to determine a relationship between the elevation and the ground snow load. Ground Snow Loads for Idaho contains a map where the contours or isolines separate coefficients to be used in an equation relating the elevation to the ground snow load (Sack and Sheik-Taheri, 1986). Not every location in between two isolines has the same ground snow load, but the elevation of the site and the contours together help to determine the ground snow load to be used for design. This is similar to what Elliott (1981) had in mind originally in Snow Load Data for Arizona as mentioned previously in Chapter 2.2. This would prove to be a very useful tool for designers if this relationship could be determined for each division of homogenous climate and advance software could be used to develop the isolines.

4.2 MISSING DATA

There is data presented in Snow Load Data for Arizona (Elliot, 1981) that could not be located. Some of the sites are not included in the NCDC database. There are most likely other agencies that keep historical data on snow depth or snow water equivalents that were either not contacted or no response was received. Although efforts were made to be as comprehensive as possible, some locations were not represented in this study.

The recommendations in the ASCE 7-05 for conducting the Case Studies include finding the values for all known sites within a fifty-mile radius of the site of interest. For many locations along the borders of the state of Arizona this would require having the historical data for locations in Utah and New Mexico. For this report to be more complete it would make sense to include data available for all sites in New Mexico and Utah within fifty miles of the Arizona border. Nevada and California could be ignored since the elevations along the Arizona border adjacent to these two states is less than 4,000 feet above mean sea level and there are no records of significant snow fall for the Arizona sites in this area.

4.3 STATISTICAL MODELING

When the data from the NCDC sites was manipulated and reduced for modeling the maximum snow depths were determined for a calendar year instead of a winter year. This may not have a consequential affect, except that if there was a large storm at the end of December the maximum snow depth for the calendar year of December and for the calendar year of January might be determined from the same storm. If the data was rearranged to be considered by winter years this theoretical end-of-the-year storm would be counted only once. The data from the NWCC was recorded by winter year, not calendar year; hence this concern only applies to the data obtained from the NCDC database.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 SUMMARY

Comprehensive structural design requires consideration for snow loads. Modern building codes determine snow loads on structures by applying coefficients for exposure, roof shape, etc. to basic ground snow loads. Basic ground snow loads are currently loads with a mean recurrence interval of 50 years and are illustrated in ground snow load maps found in the code. These maps contain areas with a "CS" designation indicating that a site-specific Case Study is required to determine the basic ground snow load within that area. A snow load design guide was published for Arizona in 1973 with a second printing in 1981. Nothing has been done since this time to update the snow loads presented in that guide. Although it is a great guide for designers, it is not completely consistent with current code and modern standards of practice, e.g., the loads published are presented as having a 30-year mean recurrence interval.

Research over the past 25 years has indicated that modeling annual extreme snow depth and SWE with a lognormal distribution is a reliable approach. Advances have also been made in finding an appropriate snow depth-density relationship. To update available ground snow loads historical Snow Water Equivalent data and snow depth data were collected for over 500 sites in Arizona. The annual maximum SWE or snow depth was gleaned from the data and the records for each site were modeled as a lognormal distribution to determine the SWE or snow depth with a 50-year mean recurrence interval. For the sites with SWE data, the 50-year ground snow load was calculated using the weight of water multiplied by the SWE. A snow density prediction relating snow density to depth was determined from historical records for 41 sites that contained both SWE and snow depth data. For the sites with snow depth data, this relationship was applied to the 50-year snow depth to determine the 50-year ground snow load. Table 3.4 is a summary of sites across Arizona with their respective 50-year ground snow loads. For convenience and comparison, the 30-year ground snow loads are listed also. Further work could be done to improve this report as a design guide by developing a contour map for the 50-year basic ground snow loads in Arizona.

5.2 CONCLUSION

This report presents improved basic ground snow loads for Arizona consistent with recent research and modern building code standards. The attempt of this study was to provide up-to-date ground snow loads to be used in structural design in Arizona and fill some of the voids in current design practices with a scientific approach of applying reliable statistical methods to historical climatological data. Inasmuch as the historical data is accurate and the statistical methods reliable the ground snow loads presented herein are satisfactory for use in structural design and should be encouraged in the structural design community in Arizona.

These loads are believed to be accurate from a statistical modeling stand point, but caution should be used when applying the information presented in this report to structural design. In the immortal words of Elliott (1981) “Statistics are helpful, Judgment is essential.”

APPENDIX A

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	50-yr Ground Snow Load (psf) [Eqn. 2.1]	50-yr Ground Snow Load (psf) [Eqn. 3.12]	30-yr Ground Snow Load (psf) [Eqn. 2.1]	30-yr Ground Snow Load (psf) [Eqn. 3.12]
	BEAVER DAM	MOHAVE	1	-113.95	36.90	1875 (572)	--	--	--	--	43	0	0	0	0
*	BEAVER DAM	MOHAVE	1	-113.95	36.90	1875 (572)	--	--	--	--	1	0	0	0	0
	BULLHEAD CITY	MOHAVE	1	-114.57	35.13	540 (165)	--	--	--	--	29	0	0	0	0
*	CHLORIDE	MOHAVE	1	-114.20	35.42	4021 (1226)	--	--	--	--	1	0	0	0	0
	COLORADO CITY	MOHAVE	1	-112.97	37.00	5009 (1527)	13	--	1979	2	43	10	14	8	11
*	COLORADO CITY	MOHAVE	1	-112.98	37.00	5012 (1528)	8	--	1951	4	13	8	11	6	8
*	DAVIS DAM	MOHAVE	1	-114.57	35.18	531 (162)	--	--	--	--	11	0	0	0	0
	DAVIS DAM # 2	MOHAVE	1	-114.57	35.20	659 (201)	--	--	--	--	20	0	0	0	0
*	DIAMOND BAR RANCH		1	-114.00	35.88	3601 (1098)	--	--	--	--	5	0	0	0	0
*	DIAMOND M RANCH	MOHAVE	1	-113.37	35.30	5479 (1670)	15	--	2001	1	7	19	25	15	21
*	HACKBERRY		1	-113.73	35.37	3582 (1092)	--	--	--	--	5	0	0	0	0
*	KATHERINE RANGER STN	MOHAVE	1	-114.57	35.23	670 (204)	--	--	--	--	2	0	0	0	0
	KINGMAN AAF	MOHAVE	1	-113.93	35.27	3385 (1032)	7	--	1922	3	67	2	2	1	2
*	KINGMAN AIRPORT	MOHAVE	1	-113.93	35.25	3419 (1042)	--	--	--	--	3	0	0	0	0
	KINGMAN NO 2	MOHAVE	1	-114.02	35.20	3538 (1079)	--	--	--	--	27	0	0	0	0
	LAKE HAVASU	MOHAVE	1	-114.37	34.45	482 (147)	--	--	--	--	25	0	0	0	0
	LAKE HAVASU CITY	MOHAVE	1	-114.37	34.50	468 (143)	--	--	--	--	15	0	0	0	0
*	LITTLEFIELD 1 NE	MOHAVE	1	-113.90	36.90	1904 (581)	--	--	--	--	12	0	0	0	0
*	LITTLEFIELD 25 SSW	MOHAVE	1	-114.03	36.53	4002 (1220)	12	--	1949	1	5	9	13	7	10
*	LOOKOUT RANCH		1	-113.38	35.20	5002 (1525)	--	--	--	--	7	0	0	0	0
*	MEADVIEW 1SE	MOHAVE	1	-114.08	36.02	3199 (975)	--	--	--	--	10	0	0	0	0
	MOUNT TRUMBULL	MOHAVE	1	-113.35	36.42	5603 (1708)	40	--	1945	12	57	8	11	6	8
	PEACH SPRINGS	MOHAVE	1	-113.42	35.55	4969 (1515)	27	--	1967	12	56	4	6	3	5
*	PIERCE FERRY	MOHAVE	1	-114.00	36.12	1371 (418)	--	--	--	--	5	0	0	0	0
	PIERCE FERRY 17 SSW	MOHAVE	1	-114.08	35.88	3857 (1176)	11	--	1979	2	22	6	8	4	6
	PIPE SPRINGS NATL MON	MOHAVE	1	-112.73	36.87	4919 (1500)	18	--	1973	1	43	5	7	4	6
*	SIGNAL	MOHAVE	1	-113.63	34.47	1522 (464)	--	--	--	--	1	0	0	0	0
*	SIGNAL 13 SW		1	-113.80	34.37	2512 (766)	--	--	--	--	9	0	0	0	0
	TEMPLE BAR	MOHAVE	1	-114.33	36.03	1280 (390)	--	--	--	--	19	0	0	0	0
*	TOPOCK	MOHAVE	1	-114.48	34.72	449 (137)	--	--	--	--	3	0	0	0	0
*	TOPOCK 2 SSE		1	-114.45	34.70	502 (153)	--	--	--	--	13	0	0	0	0
	TRUXTON CANYON	MOHAVE	1	-113.67	35.38	3819 (1164)	12	--	1932	12	54	4	5	3	4
	TUWEEP	MOHAVE	1	-113.07	36.28	4774 (1455)	15	--	1967	12	45	7	9	5	7
*	WHITE HILLS 5 WSW	MOHAVE	1	-114.48	35.70	2430 (741)	--	--	--	--	4	0	0	0	0
	WIKIEUP	MOHAVE	1	-113.62	34.70	2009 (613)	--	--	--	--	54	0	0	0	0
	WILLOW BEACH	MOHAVE	1	-114.67	35.87	740 (226)	--	--	--	--	39	0	0	0	0
	YUCCA 1 NNE	MOHAVE	1	-114.13	34.88	1950 (594)	--	--	--	--	53	0	0	0	0
	ALPINE	APACHE	2	-109.15	33.85	8048 (2454)	60	--	1967	12	97	38	50	31	40
	ARBABS FOREST	APACHE	2	-109.20	35.70	7680 (2341)	--	6	98	2	21	41	41	36	36
*	ASH FORK 5 N	COCONINO	2	-112.47	35.28	5325 (1623)	8	--	1978	3	8	6	8	6	8
	ASH FORK 6 N	COCONINO	2	-112.48	35.30	5304 (1617)	38	--	1967	12	71	12	16	9	13
	Baldy	Apache	2	-109.50	33.98	9125 (2782)	--	17.6	83	4	23	115	115	103	103
	BALDY #1 - SNOW COURSE AND AER	APACHE	2	-109.52	33.98	9125 (2782)	--	18.3	79	3	50	110	110	99	99
	BALDY #2	APACHE	2	-109.55	33.93	9750 (2973)	--	41.8	79	3	36	238	238	214	214
	BEAR PAW	COCONINO	2	-111.65	35.35	10100 (3079)	--	51	93	E/ST	37	271	271	244	244
	BEAVER SPRING	APACHE	2	-109.05	36.33	9220 (2811)	--	16.8	93	3	20	103	103	96	96
*	BELLEMONT NWFO	COCONINO	2	-111.82	35.23	7150 (2180)	20	--	2005	1	7	26	34	22	29
	BETATAKIN	NAVAJO	2	-110.53	36.68	7284 (2221)	38	--	1967	12	67	26	35	23	30
*	BIG LAKE		2	-109.42	33.87	9004 (2745)	--	--	--	--	2	0	0	0	0
*	BITA HOCHEE TRADING POST	NAVAJO	2	-110.08	35.42	5904 (1800)	--	--	--	--	8	0	0	0	0
*	BLACK MOUNTAIN MISSION	APACHE	2	-109.87	36.12	6353 (1937)	12	--	1961	12	9	10	14	8	11
	BLUE RIDGE RANGER STN	COCONINO	2	-111.18	34.62	6878 (2097)	38	--	1997	1	39	39	50	31	41
	BRIGHT ANGEL RS	COCONINO	2	-112.07	36.22	8398 (2560)	89	--	1993	2	81	164	199	138	169
*	BUCK SPRING	APACHE	2	-109.85	34.12	7400 (2256)	--	5.4	98	2	8	35	35	30	30
*	BUFFALO RANCH		2	-111.95	36.47	5662 (1726)	21	--	1960	12	4	32	42	25	33
	BURRUS RANCH	COCONINO	2	-111.53	35.27	6802 (2074)	70	--	1949	2	25	67	84	54	68
	CAMERON 1 NNE	COCONINO	2	-111.40	35.88	4163 (1269)	18	--	1967	12	31	2	3	1	2
*	CAMP GERONIMO	GILA	2	-111.37	34.40	5514 (1681)	15	--	1978	2	2	28	36	22	29
	CANYON DE CHELLY	APACHE	2	-109.53	36.15	5608 (1710)	8	--	1974	1	36	2	3	2	2
*	CEDAR RIDGE TRADING POST	COCONINO	2	-111.52	36.38	5923 (1806)	--	--	--	--	6	0	0	0	0
	CHALENDER	COCONINO	2	-112.07	35.25	7100 (2165)	--	12	73	3	59	63	63	55	55
	CHEESE SPRINGS	APACHE	2	-109.50	34.05	8700 (2652)	--	12.4	73	3	37	72	72	66	66
	CHEVELON RS	COCONINO	2	-110.92	34.55	7004 (2135)	52	--	1967	12	45	43	55	35	45
	CHINLE	APACHE	2	-109.53	36.15	5544 (1690)	14	--	1967	12	57	9	13	7	10
	CIBECUE	NAVAJO	2	-110.48	34.03	4979 (1518)	18	--	1937	1	52	14	19	11	15
	CLAY SPRINGS	NAVAJO	2	-110.32	34.38	6318 (1926)	--	--	--	--	16	0	0	0	0
	COPPER MINE TRADING POST	COCONINO	2	-111.42	36.63	6383 (1946)	23	--	1960	12	38	13	17	10	14
	Coronado Trail	Apache	2	-109.15	33.80	8400 (2561)	--	13.8	93	3	23	75	75	66	66
	CORONADO TRAIL	APACHE	2	-109.15	33.80	8350 (2546)	--	12.5	49	2	68	65	65	57	57
*	COTTONWOOD INDIAN SCHOOL		2	-109.88	36.07	6052 (1845)	--	--	--	--	3	0	0	0	0
*	COW SPRINGS TRADING POST	COCONINO	2	-110.85	36.42	5704 (1739)	--	--	--	--	6	0	0	0	0
*	DILKON		2	-110.32	35.38	5002 (1525)	--	--	--	--	1	0	0	0	0
	DINNEHOTSO	APACHE	2	-109.85	36.85	5022 (1531)	9	--	1967	12	19	6	9	5	7
	FLAGSTAFF 4 SW	COCONINO	2	-111.73	35.17	7123 (2172)	38	--	1997	1	22	43	56	39	50
	FLAGSTAFF PULLIAM ARPT	COCONINO	2	-111.67	35.15	7001 (2135)	83	--	1967	12	72	59	75	50	64
*	FLAGSTAFF WB CITY		2	-111.67	35.20	6921 (2110)	68	--	1949	1	9	67	84	52	66
	FLUTED ROCK	APACHE	2	-109.25	35.88	7800 (2378)	--	7.8	98	2	21	52	52	46	46
*	FOREST DALE ALT.	NAVAJO	2	-110.08	34.22	6580 (2006)	--	2.5	87	2	6	20	20	18	18
	FORESTDALE	NAVAJO	2	-110.10	34.15	6104 (1861)	24	--	1965	2	25	21	28	18	24
	FORT APACHE	APACHE	2	-109.52	34.00	9160 (2793)	--	17.6	93	3	55	107	107	96	96
	FORT DEFIANCE		2	-109.08	35.75	6904 (2105)	14	--	1903	2	19	13	18	10	14
	FORT VALLEY	COCONINO	2	-111.75	35.27	7345 (2239)	57	--	1949	1	97	73	92	60	76
	FORT VALLEY	COCONINO	2	-111.75	35.27	7350 (2241)	--	11.6	49	2	59	60	60	52	52

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew-ness	COV	COV (trunc-ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
	BEAVER DAM	NCDC	20672	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	BEAVER DAM	NCDC	20671	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BULLHEAD CITY	NCDC	21050	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	CHLORIDE	NCDC	21680	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	COLORADO CITY	NCDC	21920	14	0	--	3.7	3.6	3.0	0.0	0.79	0.99	0.99	0.952	0.828	14.2	--	11.8	--
*	COLORADO CITY	NCDC	27837	3	0	--	2.9	3.0	2.0	0.0	0.91	1.01	1.00	0.726	0.833	11.4	--	9.5	--
*	DAVIS DAM	NCDC	22440	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DAVIS DAM # 2	NCDC	22439	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	DIAMOND BAR RANCH	NCDC	22525	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	DIAMOND M RANCH	NCDC	22527	1	0	--	7.1	5.1	6.0	#N/A	0.20	0.72	0.72	1.757	0.647	21.9	--	19.0	--
*	HACKBERRY	NCDC	23788	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	KATHERINE RANGER STN	NCDC	24558	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	KINGMAN AAF	NCDC	24639	44	0	--	0.9	1.7	0.0	0.0	2.29	1.88	1.00	-0.424	0.833	3.6	--	3.0	--
*	KINGMAN AIRPORT	NCDC	24640	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	KINGMAN NO 2	NCDC	24645	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	LAKE HAVASU	NCDC	24759	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	LAKE HAVASU CITY	NCDC	24761	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	LITTLEFIELD 1 NE	NCDC	24995	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	LITTLEFIELD 25 SSW	NCDC	24999	2	0	--	3.4	5.0	2.0	0.0	1.87	1.46	1.00	0.877	0.833	13.3	--	11.1	--
*	LOOKOUT RANCH	NCDC	25064	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	MEADVIEW 1SE	NCDC	25426	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MOUNT TRUMBULL	NCDC	25744	33	0	--	2.9	6.5	0.0	0.0	3.99	2.23	1.00	0.728	0.833	11.5	--	9.5	--
	PEACH SPRINGS	NCDC	26328	38	0	--	1.9	4.2	0.0	0.0	4.22	2.27	1.00	0.272	0.833	7.3	--	6.0	--
*	PIERCE FERRY	NCDC	26536	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PIERCE FERRY 17 SSW	NCDC	26538	11	0	--	2.4	3.4	0.5	0.0	1.60	1.46	1.00	0.514	0.833	9.2	--	7.7	--
	PIPE SPRINGS NATL MON	NCDC	26616	22	0	--	2.2	3.6	0.0	0.0	2.54	1.62	1.00	0.446	0.833	8.6	--	7.2	--
*	SIGNAL	NCDC	27884	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SIGNAL 13 SW	NCDC	27888	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TEMPLE BAR	NCDC	28516	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TOPOCK	NCDC	28678	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TOPOCK 2 SSE	NCDC	28686	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TRUXTON CANYON	NCDC	28778	31	0	--	1.7	2.7	0.0	0.0	1.84	1.56	1.00	0.186	0.833	6.7	--	5.5	--
	TUWEEP	NCDC	28895	18	0	--	2.6	3.4	1.0	0.0	1.65	1.29	1.00	0.617	0.833	10.3	--	8.5	--
*	WHITE HILLS 5 WSW	NCDC	29269	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WIKIEUP	NCDC	29309	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WILLOW BEACH	NCDC	29376	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YUCCA 1 NNE	NCDC	29645	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ALPINE	NCDC	20159	12	0	--	11.3	9.0	10.0	0.0	1.83	0.80	0.80	2.179	0.701	37.3	--	32.0	--
	ARBABS FOREST	SC	09P02	1	--	0	2.9	1.8	2.3	2.0	0.20	0.62	0.62	0.892	0.571	--	7.9	--	7.0
*	ASH FORK 5 N	NCDC	20490	0	5	--	6.6	1.2	6.0	6.0	0.29	0.18	0.18	1.875	0.178	9.4	--	9.0	--
	ASH FORK 6 N	NCDC	20482	27	0	--	4.0	5.7	2.0	0.0	3.22	1.42	1.00	1.050	0.833	15.8	--	13.2	--
	Baldy	ST	310	0	--	2.2	9.4	4.7	8.9	10.4	0.38	0.50	0.50	2.130	0.469	--	22.0	--	19.9
	BALDY #1 - SNOW COURSE AND AER	SC	09S01	0	--	2.3	8.7	4.6	8.1	2.4	0.45	0.53	0.53	2.038	0.494	--	21.2	--	19.0
	BALDY #2	SC	09S15	1	--	0	18.8	9.8	18.1	10.3	0.26	0.52	0.52	2.813	0.492	--	45.8	--	41.1
	BEAR PAW	SC	11P09	0	--	5.6	21.8	11.1	20.6	15.0	0.80	0.51	0.51	2.964	0.482	--	52.2	--	46.9
	BEAVER SPRING	SC	09N05	0	--	4.4	10.5	3.7	10.4	6.3	0.04	0.35	0.35	2.289	0.340	--	19.8	--	18.4
*	BELLEMONT NWFO	NCDC	20678	1	0	--	9.9	6.4	10.0	#N/A	0.04	0.65	0.65	2.110	0.596	28.1	--	24.6	--
	BETATAKIN	NCDC	20750	0	3	--	12.2	6.0	12.0	16.0	1.26	0.49	0.49	2.396	0.462	28.3	--	25.6	--
*	BIG LAKE	NCDC	20758	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	BITA HOCHEE TRADING POST	NCDC	24317	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	BLACK MOUNTAIN MISSION	NCDC	20800	5	0	--	3.6	4.6	0.0	0.0	0.84	1.28	1.00	0.922	0.833	13.9	--	11.6	--
	BLUE RIDGE RANGER STN	NCDC	20871	5	0	--	10.9	9.3	9.0	0.0	1.04	0.85	0.85	2.116	0.739	37.9	--	32.2	--
	BRIGHT ANGEL RS	NCDC	21001	5	0	--	40.0	24.4	40.0	40.0	0.01	0.61	0.61	3.529	0.563	108.5	--	95.8	--
*	BUCK SPRING	SC	09R11	0	--	0.2	2.0	1.6	1.8	1.6	1.16	0.80	0.80	0.462	0.706	--	6.8	--	5.8
*	BUFFALO RANCH	NCDC	21042	0	3	--	9.0	8.2	6.0	#N/A	1.76	0.91	0.91	1.897	0.775	32.8	--	27.6	--
	BURRUS RANCH	NCDC	21101	0	4	--	16.4	13.7	13.0	10.0	2.84	0.83	0.83	2.536	0.726	56.1	--	47.8	--
	CAMERON 1 NNE	NCDC	21169	23	0	--	1.0	3.3	0.0	0.0	4.99	3.39	1.00	-0.379	0.833	3.8	--	3.2	--
*	CAMP GERONIMO	NCDC	21193	1	0	--	7.5	10.6	7.5	#N/A	#####	1.41	1.00	1.668	0.833	29.3	--	24.4	--
	CANYON DE CHELLY	NCDC	21248	22	0	--	1.1	2.0	0.0	0.0	2.41	1.77	1.00	-0.217	0.833	4.5	--	3.7	--
*	CEDAR RIDGE TRADING POST	NCDC	21427	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CHALENDER	SC	12P01	0	--	0.4	4.2	2.8	3.8	0.6	0.88	0.67	0.67	1.237	0.611	--	12.1	--	10.6
	CHEESE SPRINGS	SC	09R07	0	--	1.5	6.8	2.7	6.8	4.0	0.19	0.40	0.40	1.841	0.386	--	13.9	--	12.8
	CHEVELON RS	NCDC	21574	4	0	--	13.0	9.5	12.0	12.0	1.71	0.74	0.74	2.345	0.658	40.3	--	34.9	--
	CHINLE	NCDC	21634	2	0	--	4.1	3.1	3.0	3.0	1.42	0.76	0.76	1.175	0.676	13.0	--	11.2	--
	CIBECUE	NCDC	21749	10	0	--	5.1	4.4	4.0	0.0	1.12	0.87	0.87	1.345	0.752	18.0	--	15.3	--
	CLAY SPRINGS	NCDC	21760	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	COPPER MINE TRADING POST	NCDC	22099	12	0	--	4.2	5.3	3.0	0.0	2.01	1.26	1.00	1.097	0.833	16.6	--	13.8	--
	Coronado Trail	ST	416	0	--	0.9	5.0	3.3	4.1	2.5	1.00	0.67	0.67	1.423	0.606	--	14.4	--	12.6
	CORONADO TRAIL	SC	09S07	1	--	0	4.1	3.0	3.2	3.1	0.73	0.72	0.72	1.196	0.649	--	12.5	--	10.9
*	COTTONWOOD INDIAN SCHOOL	NCDC	22197	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	COW SPRINGS TRADING POST	NCDC	22246	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	DILKON	NCDC	22536	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DINNEHOTSO	NCDC	22545	6	0	--	2.6	2.6	2.0	0.0	0.89	1.01	1.00	0.601	0.833	10.1	--	8.4	--
	FLAGSTAFF 4 SW	NCDC	23009	0	9	--	20.3	7.8	19.0	18.0	0.57	0.39	0.39	2.942	0.373	40.8	--	37.6	--
	FLAGSTAFF PULLIAM ARPT	NCDC	23010	1	0	--	19.5	11.5	18.0	14.0	2.49	0.59	0.59	2.822	0.545	51.5	--	45.7	--
*	FLAGSTAFF WB CITY	NCDC	23007	1	0	--	14.3	21.0	8.0	8.0	2.57	1.46	1.00	2.316	0.833	56.1	--	46.7	--
	FLUTED ROCK	SC	09P01	0	--	0.2	3.9	2.2	3.8	2.2	-0.06	0.56	0.56	1.224	0.524	--	10.0	--	8.9
*	FOREST DALE ALT.	SC	10R10	0	--	0.2	1.4	0.9	1.5	#N/A	-0.17	0.62	0.62	0.197	0.571	--	3.9	--	3.5
	FORESTDALE	NCDC	23082	2	0	--	8.8	5.4	8.0	8.0	0.78	0.61	0.61	2.022	0.562	23.9	--	21.1	--
	FORT APACHE	SC	09R05	0	--	1.6	9.0	4.3	8.1	6.6	0.41	0.47	0.47	2.097	0.449	--	20.5	--	18.6
	FORT DEFIANCE	NCDC	23102	8	0	--	4.4	5.6	2.0	0.0	0.83	1.28	1.00	1.140	0.833	17.3	--	14.4	--
	FORT VALLEY	NCDC	23160	20	0	--	19.2	14.2	20.0	0.0	0.37	0.74	0.74	2.740	0.658	59.9	--	51.8	--
	FORT VALLEY	SC	11P02	1	--	0	3.7	2.8	2.9	1.6	1.02	0.75	0.75	1.081	0.666	--	11.6	--	10.0

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	50-yr Ground Snow Load (psf) [Eqn. 2.1]	50-yr Ground Snow Load (psf) [Eqn. 3.12]	30-yr Ground Snow Load (psf) [Eqn. 2.1]	30-yr Ground Snow Load (psf) [Eqn. 3.12]
	FREDONIA	COCONINO	2	-112.53	36.95	4681 (1427)	18	--	1973	1	41	11	15	9	13
	Fry	Coconino	2	-111.85	35.07	7200 (2195)	--	15	93	3	23	95	95	86	86
	GANADO	APACHE	2	-109.57	35.72	6338 (1932)	24	--	1967	12	77	12	17	10	13
	GRAND CANYON	COCONINO	2	-111.97	35.97	7500 (2287)	--	10.6	73	3	59	52	52	45	45
	GRAND CANYON AIRWAYS	COCONINO	2	-112.13	36.05	6973 (2126)	40	--	1949	1	20	38	49	31	40
	GRAND CANYON HDQS		2	-112.13	36.05	6891 (2101)	38	--	1949	1	54	38	49	32	41
	GRAND CANYON N P 2	COCONINO	2	-112.15	36.05	6783 (2068)	28	--	1979	2	30	25	34	22	29
	GRAND CANYON NATL PARK	COCONINO	2	-112.13	36.05	6953 (2120)	29	--	1967	12	21	30	40	27	35
*	GRAY MOUNTAIN TRADING POST		2	-111.48	35.73	4914 (1498)	15	--	1962	1	7	14	19	11	15
	GREER	APACHE	2	-109.45	34.02	8273 (2522)	54	--	1967	12	81	61	77	50	64
*	GREER LAKES	APACHE	2	-109.45	34.03	8505 (2593)	--	--	--	--	1	0	0	0	0
	HAPPY JACK	COCONINO	2	-111.40	34.75	7630 (2326)	--	20.1	73	3	55	90	90	79	79
*	Happy Jack	Coconino	2	-111.42	34.75	7630 (2326)	--	11.6	05	3	6	78	78	69	69
	HAPPY JACK RS	COCONINO	2	-111.42	34.75	7478 (2280)	58	--	1997	1	37	76	95	63	80
	HAWLEY LAKE	APACHE	2	-109.75	33.98	8178 (2493)	91	--	1967	12	22	146	178	132	161
	HEBER	COCONINO	2	-110.75	34.32	7640 (2329)	--	16.2	73	3	50	77	77	68	68
	Heber	Coconino	2	-110.75	34.32	7640 (2329)	--	11.6	98	3	23	75	75	68	68
*	HEBER		2	-110.58	34.38	6504 (1983)	30	--	1922	2	14	45	58	36	47
	HEBER (BLACK MESA) RANGER STA	NAVAJO	2	-110.55	34.40	6588 (2009)	48	--	1967	12	56	35	46	29	38
	HOLBROOK	NAVAJO	2	-110.15	34.92	5084 (1550)	19	--	1967	12	111	5	7	4	6
*	HOUCK 2 W		2	-109.23	35.28	5812 (1772)	--	--	--	--	1	0	0	0	0
*	HOUSE ROCK		2	-112.05	36.73	5382 (1641)	15	--	1948	12	7	11	15	8	11
*	INDIAN WELLS TRADING POST	NAVAJO	2	-110.07	35.42	5904 (1800)	--	--	--	--	1	0	0	0	0
	INNER CANYON USGS	COCONINO	2	-112.10	36.10	2571 (784)	--	--	--	--	21	0	0	0	0
	JACOB LAKE	COCONINO	2	-112.22	36.73	7823 (2385)	60	--	1973	4	32	77	97	64	81
	JEDDITO		2	-110.13	35.77	6704 (2044)	16	--	1937	1	25	14	19	11	15
	JUNIPINE	COCONINO	2	-111.75	34.97	5134 (1565)	44	--	1937	1	47	39	50	31	41
*	KAIBITO		2	-111.08	36.60	6002 (1830)	14	--	1960	12	11	16	21	13	17
	KAYENTA	NAVAJO	2	-110.28	36.73	5704 (1739)	24	--	1915	12	64	11	15	9	12
*	KAYENTA 21 SSW	NAVAJO	2	-110.40	36.45	6524 (1989)	12	--	1974	1	4	18	24	15	20
	KEAMS CANYON	NAVAJO	2	-110.20	35.82	6203 (1891)	12	--	1906	11	69	10	13	8	11
*	KLAGETOH		2	-109.53	35.50	6402 (1952)	7	--	1952	11	9	5	7	4	6
	KLAGETOH 12 WNW	APACHE	2	-109.70	35.55	6498 (1981)	36	--	1967	12	35	16	21	12	16
	LAKE MARY	COCONINO	2	-111.45	35.02	6930 (2113)	--	7.8	79	2	31	52	52	46	46
	LAKESIDE RANGER STN	NAVAJO	2	-109.98	34.17	6704 (2044)	52	--	1967	12	44	52	66	43	55
	LEES FERRY	COCONINO	2	-111.60	36.87	3209 (978)	8	--	1967	12	84	1	1	0	1
	LEUPP	COCONINO	2	-110.97	35.28	4704 (1434)	55	--	1918	12	50	12	16	9	13
	LUKACHUKAI	APACHE	2	-109.23	36.42	6518 (1987)	20	--	1961	12	59	11	15	9	12
*	LUPTON		2	-109.05	35.35	6212 (1894)	--	--	--	--	3	0	0	0	0
	MANY FARMS SCHOOL	APACHE	2	-109.62	36.37	5314 (1620)	13	--	1961	12	25	3	5	3	4
	MAVERICK	APACHE	2	-109.55	33.75	7803 (2379)	42	--	1961	12	20	61	77	53	67
	Maverick Fork	Apache	2	-109.47	33.92	9200 (2805)	--	23.6	93	3	23	139	139	125	125
	MAVERICK FORK SNOW COURSE & A	APACHE	2	-109.45	33.92	9150 (2790)	--	23.5	93	E/ST	50	144	144	128	128
	MC NARY 2 N	NAVAJO	2	-109.87	34.12	7338 (2237)	42	--	1967	12	73	45	58	40	52
	MCNARY (DISC.)	NAVAJO	2	-109.92	34.08	7200 (2195)	--	11.6	73	3	51	61	61	54	54
*	METEOR CRATER	COCONINO	2	-111.02	35.03	5662 (1726)	--	--	--	--	6	0	0	0	0
	MILK RANCH (DISC.)	NAVAJO	2	-109.95	34.07	7000 (2134)	--	8	73	3	49	43	43	38	38
	MONUMENT VALLEY	NAVAJO	2	-110.12	36.98	5563 (1696)	8	--	1989	2	26	2	3	2	2
	MORMON LAKE RNGR STN	COCONINO	2	-111.45	34.92	7183 (2190)	20	--	1963	1	30	11	15	9	12
	Mormon Mountain	Coconino	2	-111.52	34.93	7500 (2287)	--	17	93	3	23	105	105	93	93
	MORMON MOUNTAIN - SNOW COURS	COCONINO	2	-111.52	34.93	7500 (2287)	--	24.1	73	3	50	110	110	97	97
	MORMON MOUNTAIN SUMMIT #2	COCONINO	2	-111.52	34.97	8470 (2582)	--	33.6	93	2	31	202	202	181	181
	MUND'S PARK	COCONINO	2	-111.63	34.93	6468 (1972)	22	--	1990	2	20	29	38	26	34
	NAVAJO	APACHE	2	-109.53	35.13	5583 (1702)	--	--	--	--	16	0	0	0	0
	NEWMAN PARK	COCONINO	2	-111.68	35.00	6750 (2058)	--	14.4	73	3	43	63	63	55	55
	NUTRIOSO	APACHE	2	-109.15	33.90	8500 (2591)	--	9.3	49	2	68	43	43	38	38
	OAK CREEK CANYON	COCONINO	2	-111.77	34.97	5074 (1547)	19	--	1999	4	24	19	25	15	20
*	ORAIBI	NAVAJO	2	-110.62	35.87	5934 (1809)	--	--	--	--	13	0	0	0	0
	PAGE	COCONINO	2	-111.45	36.92	4269 (1302)	9	--	1967	12	47	5	7	4	6
	PAINTED DESERT N P	APACHE	2	-109.78	35.07	5758 (1756)	11	--	1976	11	33	8	11	6	8
	PETRIFIED FOREST N P	NAVAJO	2	-109.88	34.80	5444 (1660)	14	--	1967	12	75	7	10	6	8
	PHANTOM RANCH	COCONINO	2	-112.10	36.13	2529 (771)	8	--	1971	1	40	0	1	0	1
	PINEDALE	NAVAJO	2	-110.25	34.30	6504 (1983)	42	--	1937	1	57	46	60	37	48
	PINETOP	NAVAJO	2	-109.93	34.12	6958 (2121)	31	--	1987	2	18	27	36	24	32
	PINETOP 2E	NAVAJO	2	-109.92	34.12	7198 (2195)	54	--	1967	12	63	46	59	39	51
	PINON	NAVAJO	2	-110.23	36.10	6364 (1940)	21	--	1967	12	15	14	18	11	15
	PINTA		2	-109.65	35.05	5422 (1653)	12	--	1908	2	18	9	13	8	11
	Promontory	Coconino	2	-111.02	34.37	7930 (2418)	--	28.8	91	3	22	180	180	161	161
*	RAINBOW LODGE		2	-110.90	37.00	6432 (1961)	--	--	--	--	1	0	0	0	0
*	RED SANDS TRADING POST	COCONINO	2	-110.88	35.13	4904 (1495)	--	--	--	--	4	0	0	0	0
*	ROUGH ROCK SCHOOL	APACHE	2	-109.85	36.42	6251 (1906)	10	--	1971	12	7	9	12	7	10
*	RYAN STATION		2	-112.35	36.68	6304 (1922)	18	--	1924	12	10	18	24	16	21
	SAINT JOHNS	APACHE	2	-109.40	34.52	5789 (1765)	12	--	1976	11	101	7	10	6	8
	SANDERS	APACHE	2	-109.32	35.22	5852 (1784)	14	--	1967	12	49	8	11	6	9
	SANDERS 11 ESE	APACHE	2	-109.17	35.17	6248 (1905)	20	--	1967	12	26	14	19	11	15
*	SEBA DALKAI SCHOOL	NAVAJO	2	-110.43	35.50	5904 (1800)	--	--	--	--	10	0	0	0	0
	SEDONA	COCONINO	2	-111.77	34.90	4219 (1286)	16	--	1949	1	62	3	5	3	4
*	SHONGOPOVI		2	-110.53	35.80	6123 (1867)	--	--	--	--	2	0	0	0	0
	SHOW LOW	NAVAJO	2	-110.00	34.27	6412 (1955)	20	--	1905	4	39	22	29	18	25
	SHOW LOW CITY	NAVAJO	2	-110.03	34.25	6438 (1963)	41	--	1967	12	40	21	28	17	22
	SILVER CREEK RANCH	NAVAJO	2	-109.98	34.35	6153 (1876)	14	--	1952	11	20	7	10	5	8
	SNOW BOWL #1 ALT.	COCONINO	2	-111.70	35.33	9920 (3024)	--	40.2	93	3	22	204	204	182	182
	SNOW BOWL #2	COCONINO	2	-111.70	35.33	11200 (3415)	--	51.6	93	3	41	272	272	246	246

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew-ness	COV	COV (trunc-ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
	FREDONIA	NCDC	23250	3	0	--	4.7	3.6	4.0	4.0	1.77	0.77	0.77	1.309	0.685	15.1	--	13.0	--
	Fry	ST	488	0	--	2.1	8.1	3.8	7.8	3.3	0.03	0.47	0.47	1.988	0.446	--	18.3	--	16.6
	GANADO	NCDC	23303	24	0	--	4.2	4.7	3.0	0.0	1.73	1.14	1.00	1.081	0.833	16.3	--	13.6	--
	GRAND CANYON	SC	11P01	3	--	0	3.2	2.4	2.5	0.0	1.11	0.74	0.74	0.957	0.658	--	10.1	--	8.7
	GRAND CANYON AIRWAYS	NCDC	23586	3	0	--	10.8	9.1	9.0	9.0	1.74	0.84	0.84	2.110	0.734	37.3	--	31.7	--
	GRAND CANYON HDQS	NCDC	23591	4	0	--	13.2	8.4	12.0	6.0	0.87	0.63	0.63	2.413	0.582	36.9	--	32.4	--
	GRAND CANYON N P 2	NCDC	23596	1	0	--	10.8	6.1	10.0	12.0	1.13	0.56	0.56	2.242	0.524	27.7	--	24.6	--
	GRAND CANYON NATL PARK	NCDC	23595	0	4	--	13.7	6.6	13.0	14.0	0.87	0.48	0.48	2.511	0.457	31.5	--	28.5	--
*	GRAY MOUNTAIN TRADING POST	NCDC	23663	0	1	--	4.6	5.2	2.0	1.0	1.74	1.14	1.00	1.173	0.833	17.9	--	14.9	--
	GREER	NCDC	23683	5	0	--	17.4	12.3	15.0	5.0	0.78	0.70	0.70	2.657	0.634	52.4	--	45.6	--
*	GREER LAKES	NCDC	23688	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	HAPPY JACK	SC	11R05	1	--	0	5.9	4.0	5.0	2.2	0.97	0.67	0.67	1.595	0.611	--	17.3	--	15.1
*	Happy Jack	ST	969	0	--	2.8	6.1	3.2	6.0	#N/A	0.98	0.53	0.53	1.679	0.498	--	14.9	--	13.4
	HAPPY JACK RS	NCDC	23828	3	0	--	21.0	14.3	18.0	16.0	0.54	0.68	0.68	2.854	0.617	61.7	--	53.8	--
	HAWLEY LAKE	NCDC	23926	0	30	--	52.9	18.2	53.5	32.0	0.34	0.34	0.34	3.912	0.335	99.6	--	92.5	--
	HEBER	SC	10R04	0	--	0.5	5.3	3.4	4.4	2.5	1.08	0.63	0.63	1.506	0.579	--	14.8	--	13.0
	Heber	ST	519	0	--	1.9	6.6	2.9	7.1	7.1	0.14	0.44	0.44	1.805	0.420	--	14.4	--	13.1
*	HEBER	NCDC	23958	1	0	--	12.6	10.1	7.0	7.0	0.51	0.80	0.80	2.290	0.703	41.9	--	35.9	--
	HEBER (BLACK MESA) RANGER STA	NCDC	23961	4	0	--	11.3	8.3	10.0	6.0	1.95	0.74	0.74	2.205	0.659	35.1	--	30.4	--
	HOLBROOK	NCDC	24089	47	0	--	2.1	2.9	1.0	0.0	2.51	1.38	1.00	0.408	0.833	8.3	--	6.9	--
*	HOUCK 2 W	NCDC	24228	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	HOUSE ROCK	NCDC	24240	4	0	--	3.7	5.6	0.0	0.0	1.64	1.51	1.00	0.966	0.833	14.5	--	12.1	--
*	INDIAN WELLS TRADING POST	NCDC	20781	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	INNER CANYON USGS	NCDC	24335	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	JACOB LAKE	NCDC	24418	1	0	--	20.6	14.6	18.5	26.0	0.67	0.71	0.71	2.821	0.639	62.4	--	54.2	--
	JEDDITO	NCDC	24438	3	0	--	5.7	4.1	6.0	4.0	0.51	0.72	0.72	1.535	0.646	17.5	--	15.2	--
	JUNIPINE	NCDC	24508	1	0	--	11.0	9.1	9.0	9.0	2.04	0.83	0.83	2.138	0.724	37.5	--	32.0	--
*	KAIBITO	NCDC	24528	1	0	--	5.7	4.6	4.0	4.0	0.94	0.81	0.81	1.492	0.712	19.2	--	16.4	--
	KAYENTA	NCDC	24578	22	0	--	3.9	5.2	2.0	0.0	2.16	1.33	1.00	1.016	0.833	15.3	--	12.7	--
*	KAYENTA 21 SSW	NCDC	24580	1	0	--	7.0	5.0	8.0	8.0	-1.13	0.72	0.72	1.738	0.646	21.4	--	18.6	--
	KEAMS CANYON	NCDC	24586	11	0	--	4.4	3.1	4.0	5.0	0.60	0.71	0.71	1.278	0.641	13.4	--	11.6	--
*	KLAGETOH	NCDC	24683	0	2	--	3.4	1.9	3.0	2.0	1.20	0.55	0.55	1.107	0.510	8.6	--	7.7	--
	KLAGETOH 12 WNW	NCDC	24686	9	0	--	4.9	6.4	4.0	0.0	3.49	1.30	1.00	1.246	0.833	19.2	--	16.0	--
	LAKE MARY	SC	11P12	0	--	0.2	3.8	2.2	3.6	1.6	0.01	0.59	0.59	1.191	0.543	--	10.0	--	8.9
	LAKESIDE RANGER STN	NCDC	24779	3	0	--	15.3	10.9	14.0	14.0	1.55	0.71	0.71	2.527	0.638	46.4	--	40.3	--
	LEES FERRY	NCDC	24849	69	0	--	0.5	1.3	0.0	0.0	3.69	2.79	1.00	-1.114	0.833	1.8	--	1.5	--
	LEUPP	NCDC	24872	17	0	--	4.1	8.2	3.0	0.0	5.27	2.00	1.00	1.060	0.833	16.0	--	13.3	--
	LUKACHUKAI	NCDC	25129	30	0	--	3.8	5.2	0.0	0.0	1.41	1.36	1.00	0.996	0.833	15.0	--	12.5	--
*	LUPTON	NCDC	25156	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MANY FARMS SCHOOL	NCDC	25204	13	0	--	1.6	2.8	0.0	0.0	2.92	1.73	1.00	0.148	0.833	6.4	--	5.3	--
	MAVERICK	NCDC	25312	1	0	--	22.9	10.9	25.0	32.0	-0.36	0.48	0.48	3.027	0.452	52.3	--	47.3	--
	Maverick Fork	ST	617	0	--	2.4	11.0	5.7	10.1	#N/A	0.57	0.52	0.52	2.281	0.489	--	26.7	--	24.0
	MAVERICK FORK SNOW COURSE & A	SC	09S02	0	--	2.3	10.9	6.1	9.9	7.0	0.54	0.56	0.56	2.253	0.519	--	27.7	--	24.7
	MC NARY 2 N	NCDC	25412	0	8	--	20.3	8.3	19.0	16.0	0.73	0.41	0.41	2.933	0.394	42.2	--	38.7	--
	MCNARY (DISC.)	SC	09R02	1	--	0	4.2	2.7	3.4	1.8	0.81	0.63	0.63	1.281	0.575	--	11.7	--	10.3
*	METEOR CRATER	NCDC	25494	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MILK RANCH (DISC.)	SC	09R01	2	--	0	2.9	1.9	2.6	1.5	0.96	0.68	0.68	0.863	0.613	--	8.4	--	7.3
	MONUMENT VALLEY	NCDC	25665	18	0	--	1.1	2.1	0.0	0.0	2.20	1.96	1.00	-0.272	0.833	4.2	--	3.5	--
	MORMON LAKE RNGR STN	NCDC	25708	13	0	--	3.9	5.3	2.0	0.0	1.59	1.37	1.00	1.006	0.833	15.1	--	12.6	--
	Mormon Mountain	ST	640	0	--	2	8.0	4.4	7.5	9.9	0.57	0.55	0.55	1.944	0.515	--	20.1	--	17.9
	MORMON MOUNTAIN - SNOW COURS	SC	11R03	0	--	0.8	7.8	4.7	7.0	4.9	0.93	0.61	0.61	1.896	0.560	--	21.1	--	18.6
	MORMON MOUNTAIN SUMMIT #2	SC	11R12	0	--	3.8	15.9	8.4	13.6	10.0	0.51	0.53	0.53	2.645	0.494	--	38.9	--	34.9
	MUND'S PARK	NCDC	25780	0	2	--	16.2	5.5	18.5	19.0	-1.00	0.34	0.34	2.730	0.332	30.3	--	28.2	--
	NAVAJO	NCDC	25837	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	NEWMAN PARK	SC	11P05	1	--	0	4.0	2.8	3.3	0.5	1.29	0.72	0.72	1.170	0.644	--	12.1	--	10.5
	NUTRIOSO	SC	09S04	1	--	0	2.7	2.0	2.1	1.9	1.16	0.73	0.73	0.775	0.656	--	8.4	--	7.2
	OAK CREEK CANYON	NCDC	26037	6	0	--	6.4	5.5	5.5	0.0	0.65	0.85	0.85	1.587	0.737	22.2	--	18.9	--
*	ORAIBI	NCDC	26124	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PAGE	NCDC	26180	23	0	--	2.2	2.9	1.0	0.0	1.14	1.29	1.00	0.457	0.833	8.7	--	7.3	--
	PAINTED DESERT N P	NCDC	26190	12	0	--	2.9	2.9	3.0	0.0	0.81	0.98	0.98	0.739	0.823	11.4	--	9.5	--
	PETRIFIED FOREST N P	NCDC	26468	23	0	--	2.8	3.2	2.0	0.0	1.63	1.15	1.00	0.669	0.833	10.8	--	9.0	--
	PHANTOM RANCH	NCDC	26471	35	0	--	0.4	1.4	0.0	0.0	5.11	3.86	1.00	-1.396	0.833	1.4	--	1.1	--
	PINEDALE	NCDC	26581	11	0	--	11.7	10.8	10.0	0.0	0.97	0.92	0.92	2.149	0.784	43.0	--	36.1	--
	PINETOP	NCDC	26597	0	7	--	14.4	5.6	14.0	14.0	1.40	0.39	0.39	2.601	0.373	29.0	--	26.7	--
	PINETOP 2E	NCDC	26601	2	0	--	17.3	9.2	16.0	16.0	1.44	0.53	0.53	2.723	0.499	42.5	--	38.1	--
	PINON	NCDC	26604	7	0	--	4.5	6.2	2.0	0.0	1.63	1.38	1.00	1.150	0.833	17.5	--	14.5	--
	PINTA	NCDC	26606	2	0	--	5.1	3.0	5.0	3.0	0.32	0.59	0.59	1.473	0.543	13.3	--	11.8	--
	Promontory	ST	705	0	--	3.1	13.9	7.5	12.7	#N/A	0.53	0.54	0.54	2.509	0.503	--	34.5	--	30.9
*	RAINBOW LODGE	NCDC	26940	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	RED SANDS TRADING POST	NCDC	27069	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ROUGH ROCK SCHOOL	NCDC	27291	4	0	--	3.3	4.3	0.0	0.0	0.77	1.32	1.00	0.843	0.833	12.9	--	10.7	--
*	RYAN STATION	NCDC	27349	0	1	--	8.5	4.7	8.0	7.0	0.42	0.56	0.56	2.005	0.521	21.6	--	19.3	--
	SAINT JOHNS	NCDC	27435	38	0	--	2.9	3.0	2.0	0.0	0.80	1.05	1.00	0.708	0.833	11.2	--	9.3	--
	SANDERS	NCDC	27488	20	0	--	3.1	3.9	1.0	0.0	1.21	1.26	1.00	0.779	0.833	12.1	--	10.0	--
	SANDERS 11 ESE	NCDC	27496	15	0	--	4.6	6.4	0.0	0.0	1.19	1.41	1.00	1.174	0.833	17.9	--	14.9	--
*	SEBA DALKAI SCHOOL	NCDC	27671	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SEDONA	NCDC	27708	42	0	--	1.6	3.2	0.0	0.0	3.01	2.06	1.00	0.101	0.833	6.1	--	5.1	--
*	SHONGOPOVI	NCDC	27829	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SHOW LOW	NCDC	27849	5	0	--	9.1	5.6	10.0	0.0	0.04	0.62	0.62	2.042	0.568	24.8	--	21.8	--
	SHOW LOW CITY	NCDC	27855	9	0	--	6.2	6.9	5.0	0.0	3.43	1.10	1.00	1.482	0.833	24.4	--	20.3	--
	SILVER CREEK RANCH	NCDC	27921	13	0	--	2.7	4.6	0.0	0.0	1.54	1.70	1.00	0.647	0.833	10.6	--	8.8	--
	SNOW BOWL #1 ALT.	SC	11P14	0	--	2.4	15.6	8.6	13.4	#N/A	1.14	0.55	0.55	2.612	0.515	--	39.3	--	35.0
	SNOW BOWL #2	SC	11P06	0	--	3.2	22.7	10.9	20.8	15.6	0.67	0.48	0.48	3.020	0.456	--	52.3	--	47.3

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf) [Eqn. 2.1]**	**50-yr Ground Snow Load (psf) [Eqn. 3.12]**	**30-yr Ground Snow Load (psf) [Eqn. 2.1]**	**30-yr Ground Snow Load (psf) [Eqn. 3.12]**
	SNOWFLAKE	NAVAJO	2	-110.08	34.50	5641 (1720)	30	--	1967	12	106	**11**	**15**	**8**	**11**
	SNOWFLAKE 15 W	NAVAJO	2	-110.33	34.50	6078 (1853)	24	--	1967	12	34	**17**	**23**	**13**	**18**
*	Snowslide Canyon	Coconino	2	-111.65	34.62	9730 (2966)	--	41	05	4	8	**246**	**246**	**222**	**222**
	SNOWSLIDE CANYON	COCONINO	2	-111.65	35.35	9750 (2973)	--	47.5	93	E/ST	37	**218**	**218**	**194**	**194**
	SPRINGERVILLE	APACHE	2	-109.30	34.13	7035 (2145)	14	--	1961	11	95	**8**	**11**	**6**	**9**
	ST MICHAELS 6 WNW	APACHE	2	-109.20	35.67	7642 (2330)	14	--	1913	2	22	**13**	**18**	**11**	**14**
	SUNRISE MOUNTAIN	APACHE	2	-109.57	33.97	9368 (2856)	85	--	1973	4	16	**173**	**210**	**135**	**165**
	SUNSET CRATER NATL MONUMENT	COCONINO	2	-111.55	35.37	6978 (2128)	31	--	1973	3	37	**31**	**40**	**27**	**35**
	SUPAI	COCONINO	2	-112.70	36.20	3203 (977)	--	--	--	--	44	**0**	**0**	**0**	**0**
	TEEC NOS POS	APACHE	2	-109.08	36.92	5289 (1612)	10	--	1974	1	44	**4**	**5**	**3**	**4**
*	TEES TO		2	-110.42	35.50	5803 (1769)	7	--	1959	12	8	**1**	**2**	**1**	**2**
*	TIMBER RANGER STN	COCONINO	2	-111.18	34.62	6812 (2077)	--	--	--	--	3	**0**	**0**	**0**	**0**
*	TONALEA		2	-110.95	36.33	5514 (1681)	--	--	--	--	2	**0**	**0**	**0**	**0**
	TSAILE CANYON #1	APACHE	2	-109.10	36.40	8160 (2488)	--	11.2	95	3	21	**73**	**73**	**67**	**67**
	TSAILE CANYON #3	APACHE	2	-109.10	36.45	8920 (2720)	--	15.4	93	2	20	**93**	**93**	**87**	**87**
	TUBA CITY	COCONINO	2	-111.25	36.13	4987 (1520)	20	--	1967	12	98	**5**	**7**	**4**	**6**
*	VALLE	COCONINO	2	-112.20	35.65	5891 (1796)	--	--	--	--	2	**0**	**0**	**0**	**0**
*	VALLE AIRPORT	COCONINO	2	-112.15	35.67	6002 (1830)	10	--	1949	1	12	**11**	**16**	**9**	**13**
	WAHWEAP	COCONINO	2	-111.48	37.00	3729 (1137)	8	--	1967	12	45	**1**	**1**	**1**	**1**
	WALLACE RANGER STN		2	-110.92	34.53	7012 (2138)	30	--	1949	1	41	**33**	**43**	**27**	**36**
	WALNUT CANYON NATL MONUMENT	COCONINO	2	-111.50	35.17	6683 (2038)	54	--	1967	12	57	**36**	**46**	**30**	**40**
	WHITE HORSE LAKE JCT	COCONINO	2	-112.15	35.13	7180 (2189)	--	16.6	73	3	33	**79**	**79**	**69**	**69**
	Whitehorse Lake	Coconino	2	-112.15	35.15	7180 (2189)	--	13.5	93	3	23	**83**	**83**	**74**	**74**
	WHITERIVER 1 SW	NAVAJO	2	-109.98	33.82	5119 (1561)	21	--	1960	1	101	**12**	**16**	**9**	**13**
	WILLIAMS	COCONINO	2	-112.18	35.23	6748 (2057)	52	--	1949	1	106	**44**	**56**	**36**	**47**
*	WILLIAMS 24 NNW	COCONINO	2	-112.40	35.53	5753 (1754)	--	--	--	--	4	**0**	**0**	**0**	**0**
	WILLIAMS CREEK FISH HATCHERY	APACHE	2	-109.82	34.05	6963 (2123)	38	--	1967	12	15	**46**	**59**	**38**	**50**
	WILLIAMS SKI RUN	COCONINO	2	-112.20	35.20	7720 (2354)	--	24.6	73	4	39	**136**	**136**	**122**	**122**
	WINDOW ROCK 4 SW	APACHE	2	-109.12	35.62	6918 (2109)	18	--	1967	12	62	**13**	**17**	**10**	**14**
*	WINSLOW	NAVAJO	2	-110.70	35.02	4868 (1484)	--	--	--	--	2	**0**	**0**	**0**	**0**
	WINSLOW MUNICIPAL AP	NAVAJO	2	-110.72	35.03	4885 (1489)	29	--	1967	12	89	**10**	**14**	**8**	**11**
	WUPATKI NM	COCONINO	2	-111.37	35.52	4907 (1496)	32	--	1967	12	63	**7**	**9**	**5**	**7**
*	ANVIL ROCK		3	-113.13	35.07	5261 (1604)	--	--	--	--	2	**0**	**0**	**0**	**0**
*	ASH FORK 12 WNW	YAVAPAI	3	-112.67	35.27	5739 (1750)	9	--	1988	1	8	**8**	**11**	**7**	**9**
	ASH FORK 3	YAVAPAI	3	-112.48	35.20	5074 (1547)	12	--	1990	1	17	**8**	**12**	**7**	**9**
*	ASH FORK CAMPGROUND	YAVAPAI	3	-112.48	35.22	5150 (1570)	--	--	--	--	1	**0**	**0**	**0**	**0**
*	BAGDAD		3	-113.20	34.60	3201 (976)	17	--	1927	2	9	**13**	**18**	**10**	**14**
	BAGDAD	YAVAPAI	3	-113.17	34.60	3954 (1206)	10	--	1932	12	73	**1**	**2**	**1**	**2**
*	BAGDAD 2	YAVAPAI	3	-113.13	34.60	4116 (1255)	--	--	--	--	9	**0**	**0**	**0**	**0**
	BAGDAD 8 NE	YAVAPAI	3	-113.08	34.65	4241 (1293)	15	--	1967	12	26	**6**	**9**	**5**	**7**
	BEAVER CREEK	YAVAPAI	3	-111.78	34.65	3524 (1074)	6	--	1965	4	50	**1**	**1**	**1**	**1**
	BRIGHT ANGEL	COCONINO	3	-112.07	36.22	8400 (2561)	--	27.9	93	3	59	**154**	**154**	**135**	**135**
	BUMBLE BEE	YAVAPAI	3	-112.15	34.20	2502 (763)	11	--	1967	12	28	**1**	**1**	**1**	**1**
	CAMP WOOD	YAVAPAI	3	-112.87	34.80	5713 (1742)	36	--	1967	12	31	**18**	**24**	**14**	**19**
	CASTLE HOT SPRINGS	YAVAPAI	3	-112.37	33.98	1990 (607)	--	--	--	--	48	**0**	**0**	**0**	**0**
*	CASTLE HOT SPRINGS 4 N		3	-112.35	34.05	2801 (854)	--	--	--	--	10	**0**	**0**	**0**	**0**
	CEDAR GLADE		3	-112.38	34.97	4651 (1418)	28	--	1930	1	40	**18**	**24**	**14**	**19**
	CHILDS	YAVAPAI	3	-111.70	34.35	2649 (808)	10	--	1937	1	91	**0**	**0**	**0**	**0**
	CHINO VALLEY	YAVAPAI	3	-112.45	34.75	4749 (1448)	22	--	1967	12	65	**6**	**8**	**4**	**6**
*	CONGRESS	YAVAPAI	3	-112.87	34.17	3021 (921)	--	--	--	--	11	**0**	**0**	**0**	**0**
	COPPER BASIN DIVIDE	YAVAPAI	3	-112.55	34.50	6720 (2049)	--	11.3	68	12	35	**57**	**57**	**49**	**49**
	CORDES	YAVAPAI	3	-112.17	34.30	3770 (1149)	15	--	1967	12	74	**2**	**3**	**1**	**2**
	CROWN KING	YAVAPAI	3	-112.35	34.22	5918 (1804)	54	--	1967	12	82	**55**	**70**	**43**	**55**
*	DRAKE RANGER STN		3	-112.38	34.97	4651 (1418)	12	--	1961	12	9	**13**	**17**	**10**	**13**
*	DUGAS 2 SE	YAVAPAI	3	-111.95	34.35	4041 (1232)	--	--	--	--	13	**0**	**0**	**0**	**0**
	FOSSIL SPRINGS	YAVAPAI	3	-111.57	34.42	4271 (1302)	--	--	--	--	20	**0**	**0**	**0**	**0**
	GADDES CANYON	YAVAPAI	3	-112.13	34.70	7600 (2317)	--	20.8	73	3	36	**107**	**107**	**93**	**93**
	GROOM CREEK	YAVAPAI	3	-112.45	34.48	6104 (1861)	36	--	1949	1	32	**35**	**46**	**29**	**38**
*	HILLSIDE		3	-112.92	34.42	3851 (1174)	10	--	1949	1	8	**3**	**4**	**2**	**3**
	HILLSIDE 4 NNE	YAVAPAI	3	-112.88	34.47	3319 (1012)	9	--	1967	12	44	**2**	**3**	**2**	**2**
	IRVING	YAVAPAI	3	-111.62	34.40	3794 (1157)	--	--	--	--	55	**0**	**0**	**0**	**0**
	JEROME	YAVAPAI	3	-112.12	34.75	4949 (1509)	40	--	1967	12	109	**13**	**18**	**10**	**14**
	MINGUS MOUNTAIN	YAVAPAI	3	-112.13	34.70	7100 (2165)	--	10.8	49	2	43	**45**	**45**	**37**	**37**
*	MINGUS MOUNTAIN LOOKOUT	YAVAPAI	3	-112.13	34.70	7662 (2336)	--	--	--	--	1	**0**	**0**	**0**	**0**
	MONTEZUMA CASTLE N M	YAVAPAI	3	-111.83	34.62	3179 (969)	19	--	1967	12	68	**1**	**1**	**1**	**1**
*	PERKINSVILLE	YAVAPAI	3	-112.20	34.90	3861 (1177)	10	--	1968	1	11	**4**	**6**	**3**	**5**
*	POLAND JUNCTION	YAVAPAI	3	-112.27	34.45	4904 (1495)	--	--	--	--	1	**0**	**0**	**0**	**0**
	PRESCOTT	YAVAPAI	3	-112.43	34.57	5204 (1587)	31	--	1949	1	107	**20**	**27**	**16**	**21**
	PRESCOTT MUNICIPAL AP	YAVAPAI	3	-112.43	34.65	5019 (1530)	28	--	1967	12	22	**16**	**21**	**12**	**17**
	RIMROCK		3	-111.73	34.65	3601 (1098)	10	--	1949	1	18	**4**	**6**	**3**	**4**
	SELIGMAN	YAVAPAI	3	-112.88	35.33	5249 (1600)	16	--	1906	1	101	**9**	**13**	**7**	**10**
	SELIGMAN 13 SSW	YAVAPAI	3	-112.92	35.13	5242 (1598)	--	--	--	--	20	**0**	**0**	**0**	**0**
*	SKULL VALLEY	YAVAPAI	3	-112.68	34.50	4251 (1296)	--	--	--	--	9	**0**	**0**	**0**	**0**
	STANTON	YAVAPAI	3	-112.73	34.17	3480 (1061)	10	--	1967	12	25	**2**	**3**	**2**	**3**
	SYCAMORE RANGER STN	YAVAPAI	3	-111.97	34.35	4002 (1220)	8	--	1937	1	41	**2**	**3**	**2**	**3**
	TONTO SPRINGS RANGER STN 4 W	YAVAPAI	3	-112.75	34.62	4802 (1464)	24	--	1915	12	42	**13**	**17**	**10**	**14**
	TUZIGOOT	YAVAPAI	3	-112.03	34.77	3469 (1058)	--	--	--	--	29	**0**	**0**	**0**	**0**
	TUZIGOOT NATL MONUMENT	YAVAPAI	3	-112.03	34.75	3382 (1031)	26	--	1967	12	31	**4**	**5**	**3**	**4**
	WALNUT CREEK	YAVAPAI	3	-112.82	34.93	5089 (1551)	55	--	1948	2	91	**14**	**19**	**11**	**15**
	WALNUT GROVE	YAVAPAI	3	-112.57	34.32	3763 (1147)	14	--	1913	2	112	**1**	**2**	**1**	**1**
	YAEGER CANYON	YAVAPAI	3	-112.17	34.68	6002 (1830)	30	--	1933	1	32	**31**	**41**	**25**	**33**
	YAVA 6 ESE	YAVAPAI	3	-112.80	34.45	3782 (1153)	--	--	--	--	28	**0**	**0**	**0**	**0**
	BAKER BUTTE	GILA	4	-111.40	34.45	7300 (2226)	--	23.9	73	3	34	**119**	**119**	**105**	**105**

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew-ness	COV	COV (trunc-ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
	SNOWFLAKE	NCDC	28012	26	0	--	3.7	4.2	3.0	0.0	2.84	1.13	1.00	0.966	0.833	14.5	--	12.1	--
	SNOWFLAKE 15 W	NCDC	28018	4	0	--	5.6	5.1	4.0	3.0	2.18	0.91	0.91	1.417	0.780	20.5	--	17.2	--
*	Snowslide Canyon	ST	927	0	--	8.5	19.9	10.1	17.6	#N/A	1.45	0.51	0.51	2.877	0.477	--	47.4	--	42.6
	SNOWSLIDE CANYON	SC	11P08	0	--	4.2	16.5	9.2	15.3	9.1	1.17	0.56	0.56	2.665	0.521	--	41.9	--	37.4
	SPRINGERVILLE	NCDC	28162	33	0	--	3.1	3.2	3.0	0.0	1.11	1.05	1.00	0.769	0.833	11.9	--	9.9	--
	ST MICHAELS 6 WNW	NCDC	27440	2	0	--	5.1	4.1	4.5	2.0	0.85	0.80	0.80	1.391	0.700	16.9	--	14.5	--
	SUNRISE MOUNTAIN	NCDC	28326	6	0	--	28.9	33.7	9.5	0.0	0.72	1.17	1.00	3.016	0.833	113.0	--	94.0	--
	SUNSET CRATER NATL MONUMENT	NCDC	28329	0	6	--	14.6	6.4	13.0	13.0	0.82	0.44	0.44	2.595	0.418	31.6	--	28.8	--
	SUPAI	NCDC	28343	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TEEC NOS POS	NCDC	28468	29	0	--	1.7	2.7	0.0	0.0	1.56	1.65	1.00	0.160	0.833	6.5	--	5.4	--
*	TEES TO	NCDC	28483	7	0	--	0.9	2.5	0.0	0.0	2.83	2.83	1.00	-0.480	0.833	3.4	--	2.8	--
*	TIMBER RANGER STN	NCDC	28576	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TONALEA	NCDC	28634	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TSAILE CANYON #1	SC	09N02	0	--	3.2	7.3	2.6	8.0	3.3	-0.37	0.36	0.36	1.927	0.345	--	14.0	--	12.9
	TSAILE CANYON #3	SC	09N04	0	--	4.5	10.2	3.1	10.0	#N/A	-0.06	0.31	0.31	2.273	0.298	--	17.9	--	16.8
	TUBA CITY	NCDC	28792	45	0	--	2.1	3.4	1.0	0.0	2.89	1.62	1.00	0.406	0.833	8.3	--	6.9	--
*	VALLE	NCDC	29005	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	VALLE AIRPORT	NCDC	29007	3	0	--	4.3	3.8	4.0	0.0	0.18	0.88	0.88	1.181	0.755	15.4	--	13.0	--
	WAHWEAP	NCDC	29114	39	0	--	0.6	1.8	0.0	0.0	3.44	3.00	1.00	-0.857	0.833	2.3	--	2.0	--
	WALLACE RANGER STN	NCDC	29150	10	0	--	10.3	8.1	11.0	0.0	0.23	0.78	0.78	2.097	0.691	33.7	--	28.9	--
	WALNUT CANYON NATL MONUMENT	NCDC	29156	1	0	--	13.6	7.8	12.0	10.0	2.60	0.58	0.58	2.469	0.535	35.5	--	31.5	--
	WHITE HORSE LAKE JCT	SC	12P02	0	--	0.2	5.4	3.5	5.4	2.3	0.94	0.64	0.64	1.509	0.588	--	15.1	--	13.3
	Whitehorse Lake	ST	861	0	--	1.3	6.3	3.5	6.1	1.9	0.47	0.56	0.56	1.696	0.524	--	16.0	--	14.3
	WHITERIVER 1 SW	NCDC	29271	20	0	--	4.5	3.8	4.0	0.0	1.16	0.85	0.85	1.227	0.740	15.6	--	13.2	--
	WILLIAMS	NCDC	29359	5	0	--	13.9	9.5	13.0	12.0	1.16	0.68	0.68	2.440	0.620	41.0	--	35.8	--
*	WILLIAMS 24 NNW	NCDC	29362	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WILLIAMS CREEK FISH HATCHERY	NCDC	29367	0	2	--	15.0	9.8	16.0	18.0	0.75	0.65	0.65	2.531	0.594	42.6	--	37.4	--
	WILLIAMS SKI RUN	SC	12P03	0	--	2.4	10.8	5.6	10.8	8.3	0.42	0.52	0.52	2.262	0.489	--	26.2	--	23.5
	WINDOW ROCK 4 SW	NCDC	29410	10	0	--	5.4	3.9	5.0	5.0	0.70	0.72	0.72	1.477	0.647	16.6	--	14.4	--
*	WINSLOW	NCDC	29437	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WINSLOW MUNICIPAL AP	NCDC	29439	16	0	--	3.6	4.4	3.0	0.0	3.36	1.20	1.00	0.942	0.833	14.2	--	11.8	--
	WUPATKI NM	NCDC	29542	25	0	--	2.6	4.7	1.0	0.0	4.33	1.80	1.00	0.616	0.833	10.2	--	8.5	--
*	ANVIL ROCK	NCDC	20291	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ASH FORK 12 WNW	NCDC	20492	1	0	--	3.8	2.8	3.5	4.0	0.70	0.75	0.75	1.098	0.669	11.8	--	10.2	--
	ASH FORK 3	NCDC	20487	5	0	--	3.2	3.1	3.0	0.0	1.42	0.97	0.97	0.823	0.815	12.2	--	10.2	--
*	ASH FORK CAMPGROUND	NCDC	20494	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	BAGDAD	NCDC	20582	2	0	--	4.3	5.3	2.0	2.0	1.98	1.23	1.00	1.120	0.833	17.0	--	14.1	--
	BAGDAD	NCDC	20586	52	0	--	0.8	1.8	0.0	0.0	2.93	2.16	1.00	-0.510	0.833	3.3	--	2.8	--
*	BAGDAD 2	NCDC	20584	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BAGDAD 8 NE	NCDC	20590	9	0	--	2.5	3.2	2.0	0.0	2.50	1.25	1.00	0.585	0.833	9.9	--	8.3	--
	BEAVER CREEK	NCDC	20670	40	0	--	0.6	1.4	0.0	0.0	2.43	2.30	1.00	-0.825	0.833	2.4	--	2.0	--
	BRIGHT ANGEL	SC	12N01	3	--	0	10.6	6.7	10.1	0.0	0.82	0.63	0.63	2.195	0.580	--	29.6	--	26.0
	BUMBLE BEE	NCDC	21059	26	0	--	0.5	2.2	0.0	0.0	4.52	4.08	1.00	-0.971	0.833	2.1	--	1.7	--
	CAMP WOOD	NCDC	21216	16	0	--	5.4	9.3	0.0	0.0	2.09	1.73	1.00	1.337	0.833	21.1	--	17.5	--
	CASTLE HOT SPRINGS	NCDC	21353	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	CASTLE HOT SPRINGS 4 N	NCDC	21356	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CEDAR GLADE	NCDC	21419	10	0	--	5.6	6.6	2.0	0.0	1.52	1.18	1.00	1.367	0.833	21.7	--	18.1	--
	CHILDS	NCDC	21614	86	0	--	0.2	1.2	0.0	0.0	6.63	5.41	1.00	-1.813	0.833	0.9	--	0.8	--
	CHINO VALLEY	NCDC	21654	24	0	--	2.4	3.5	1.0	0.0	3.25	1.50	1.00	0.509	0.833	9.2	--	7.7	--
*	CONGRESS	NCDC	22020	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	COPPER BASIN DIVIDE	SC	12R06	2	--	0	3.4	2.6	3.0	0.0	1.42	0.77	0.77	0.977	0.686	--	10.9	--	9.3
	CORDES	NCDC	22109	51	0	--	1.0	2.4	0.0	0.0	3.88	2.35	1.00	-0.333	0.833	4.0	--	3.3	--
	CROWN KING	NCDC	22329	11	0	--	13.0	12.1	10.0	0.0	1.38	0.93	0.93	2.255	0.791	48.4	--	40.7	--
*	DRAKE RANGER STN	NCDC	22705	3	0	--	4.2	4.4	3.0	0.0	0.71	1.03	1.00	1.094	0.833	16.5	--	13.7	--
*	DUGAS 2 SE	NCDC	22742	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FOSSIL SPRINGS	NCDC	23185	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GADDES CANYON	SC	12R04	0	--	0.9	7.0	4.8	5.5	1.1	1.00	0.69	0.69	1.747	0.622	--	20.6	--	18.0
	GROOM CREEK	NCDC	23713	2	0	--	11.6	8.2	9.5	6.0	1.19	0.70	0.70	2.251	0.635	35.0	--	30.5	--
*	HILLSIDE	NCDC	24049	6	0	--	1.4	3.5	0.0	0.0	2.77	2.55	1.00	-0.028	0.833	5.4	--	4.5	--
	HILLSIDE 4 NNE	NCDC	24053	32	0	--	1.1	2.1	0.0	0.0	2.24	1.97	1.00	-0.281	0.833	4.2	--	3.5	--
	IRVING	NCDC	24391	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	JEROME	NCDC	24453	40	0	--	4.4	6.4	2.0	0.0	2.60	1.44	1.00	1.136	0.833	17.2	--	14.3	--
	MINGUS MOUNTAIN	SC	12R03	5	--	0	2.2	2.2	1.8	0.0	2.11	1.00	1.00	0.442	0.833	--	8.6	--	7.2
*	MINGUS MOUNTAIN LOOKOUT	NCDC	25567	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MONTEZUMA CASTLE N M	NCDC	25635	61	0	--	0.6	2.6	0.0	0.0	6.09	4.35	1.00	-0.877	0.833	2.3	--	1.9	--
*	PERKINSVILLE	NCDC	26424	6	0	--	1.9	3.1	0.0	0.0	2.04	1.65	1.00	0.300	0.833	7.5	--	6.2	--
*	POLAND JUNCTION	NCDC	26676	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PRESCOTT	NCDC	26796	22	0	--	6.0	6.5	4.0	0.0	1.84	1.08	1.00	1.447	0.833	23.5	--	19.6	--
	PRESCOTT MUNICIPAL AP	NCDC	26801	1	0	--	5.0	6.1	3.0	3.0	2.99	1.22	1.00	1.263	0.833	19.6	--	16.3	--
	RIMROCK	NCDC	27131	8	0	--	1.8	2.7	1.0	0.0	2.17	1.53	1.00	0.229	0.833	7.0	--	5.8	--
	SELIGMAN	NCDC	27716	33	0	--	3.4	3.6	3.0	0.0	1.19	1.06	1.00	0.882	0.833	13.4	--	11.1	--
	SELIGMAN 13 SSW	NCDC	27720	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SKULL VALLEY	NCDC	27965	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	STANTON	NCDC	28184	13	0	--	1.2	2.1	0.0	0.0	3.27	1.84	1.00	-0.198	0.833	4.5	--	3.8	--
	SYCAMORE RANGER STN	NCDC	28391	29	0	--	1.2	2.2	0.0	0.0	1.83	1.86	1.00	-0.189	0.833	4.6	--	3.8	--
	TONTO SPRINGS RANGER STN 4 W	NCDC	28657	15	0	--	4.2	5.3	3.0	0.0	1.79	1.25	1.00	1.098	0.833	16.6	--	13.8	--
	TUZIGOOT	NCDC	28904	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUZIGOOT NATL MONUMENT	NCDC	22193	23	0	--	1.7	4.9	0.0	0.0	4.36	2.94	1.00	0.171	0.833	6.6	--	5.5	--
	WALNUT CREEK	NCDC	29158	49	0	--	4.7	8.7	0.0	0.0	3.08	1.87	1.00	1.192	0.833	18.2	--	15.2	--
	WALNUT GROVE	NCDC	29166	94	0	--	0.8	2.3	0.0	0.0	3.89	3.06	1.00	-0.622	0.833	3.0	--	2.5	--
	YAEGER CANYON	NCDC	29572	2	0	--	9.2	7.9	6.5	6.0	1.28	0.86	0.86	1.946	0.741	32.1	--	27.3	--
	YAVA 6 ESE	NCDC	29601	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BAKER BUTTE	SC	11R06	0	--	1.6	8.6	5.1	8.3	2.0	0.94	0.59	0.59	1.996	0.550	--	22.8	--	20.2

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf) [Eqn. 2.1]**	**50-yr Ground Snow Load (psf) [Eqn. 3.12]**	**30-yr Ground Snow Load (psf) [Eqn. 2.1]**	**30-yr Ground Snow Load (psf) [Eqn. 3.12]**
	Baker Butte	Gila	4	-111.40	34.45	7300 (2226)	--	14.7	83	3	23	**90**	**90**	**81**	**81**
	BAKER BUTTE NO. 2	GILA	4	-11.38	34.45	7700 (2348)	--	30.8	73	3	34	**197**	**197**	**175**	**175**
	BAR T BAR RANCH	GILA	4	-111.37	34.03	3103 (946)	--	--	--	--	25	**0**	**0**	**0**	**0**
	GISELA	GILA	4	-111.28	34.12	2899 (884)	19	--	1967	12	94	**1**	**2**	**1**	**1**
	GLOBE	GILA	4	-110.77	33.38	3649 (1113)	12	--	1985	2	25	**2**	**2**	**1**	**2**
*	GLOBE #2	GILA	4	-110.77	33.40	3749 (1143)	--	--	--	--	12	**0**	**0**	**0**	**0**
	GLOBE RANGER STN	GILA	4	-110.78	33.38	3552 (1083)	11	--	1967	12	76	**1**	**2**	**1**	**1**
*	GRAPEVINE		4	-111.05	33.63	2221 (677)	--	--	--	--	4	**0**	**0**	**0**	**0**
*	HILLTOP		4	-110.40	33.62	5704 (1739)	12	--	1945	3	6	**15**	**21**	**13**	**17**
	INTAKE		4	-110.93	33.62	2221 (677)	--	--	--	--	47	**0**	**0**	**0**	**0**
	MIAMI	GILA	4	-110.87	33.40	3559 (1085)	--	--	--	--	92	**0**	**0**	**0**	**0**
*	MILLERS RIM TRAIL RANCH		4	-111.23	34.40	5631 (1717)	--	--	--	--	1	**0**	**0**	**0**	**0**
	NATURAL BRIDGE	GILA	4	-111.45	34.32	4612 (1406)	36	--	1967	12	82	**25**	**33**	**19**	**26**
*	O W RANCH		4	-110.80	34.28	7203 (2196)	--	--	--	--	1	**0**	**0**	**0**	**0**
*	PARKER CREEK MNTC YRD	GILA	4	-110.95	33.80	5504 (1678)	--	--	--	--	1	**0**	**0**	**0**	**0**
	PAYSON	GILA	4	-111.33	34.23	4912 (1498)	48	--	1967	12	58	**28**	**36**	**21**	**28**
	PAYSON 12 NNE	GILA	4	-111.27	34.40	5504 (1678)	42	--	1967	12	25	**35**	**46**	**30**	**39**
	PAYSON RANGER STN	GILA	4	-111.33	34.23	4851 (1479)	24	--	1937	1	72	**14**	**19**	**11**	**15**
*	PAYSON RANGER STN 2	GILA	4	-111.30	34.25	5002 (1525)	--	--	--	--	3	**0**	**0**	**0**	**0**
*	PINE	GILA	4	-111.47	34.38	5452 (1662)	14	--	1974	1	2	**23**	**30**	**20**	**26**
	PLEASANT VALLEY R S	GILA	4	-110.95	34.10	5049 (1539)	27	--	1967	12	42	**5**	**7**	**4**	**6**
	PROMONTORY BUTTE	GILA	4	-111.02	34.37	7930 (2418)	--	35.4	80	4	17	**216**	**216**	**194**	**194**
	PUNKIN CENTER	GILA	4	-111.30	33.85	2325 (709)	--	--	--	--	33	**0**	**0**	**0**	**0**
	RENO R S	GILA	4	-111.32	33.87	2420 (738)	9	--	1967	12	59	**0**	**1**	**0**	**1**
*	RIM TRAIL RANCH	GILA	4	-111.27	34.40	5631 (1717)	--	--	--	--	2	**0**	**0**	**0**	**0**
	ROOSEVELT 1 WNW	GILA	4	-111.15	33.67	2204 (672)	--	--	--	--	101	**0**	**0**	**0**	**0**
	SALT RIVER	GILA	4	-110.50	33.80	3611 (1101)	12	--	1942	1	19	**2**	**3**	**2**	**3**
	SAN CARLOS	GILA	4	-110.45	33.35	2640 (805)	--	--	--	--	33	**0**	**0**	**0**	**0**
*	SAN CARLOS AIRPORT	GILA	4	-110.47	33.38	2889 (881)	--	--	--	--	4	**0**	**0**	**0**	**0**
	SAN CARLOS RESERVOIR	GILA	4	-110.53	33.18	2532 (772)	--	--	--	--	62	**0**	**0**	**0**	**0**
*	SENECA 3 NW		4	-110.53	33.78	4924 (1501)	--	--	--	--	2	**0**	**0**	**0**	**0**
	SIERRA ANCHA	GILA	4	-110.97	33.80	5099 (1555)	30	--	1967	12	50	**20**	**27**	**16**	**21**
	TONTO CREEK FISH HAT 2	GILA	4	-111.10	34.38	6388 (1948)	27	--	1997	1	31	**15**	**20**	**12**	**16**
	TONTO CREEK FISH HATCHERY	GILA	4	-111.10	34.37	6282 (1915)	58	--	1967	12	28	**39**	**51**	**31**	**40**
	WORKMAN CREEK	GILA	4	-110.92	33.82	6900 (2104)	--	20.1	73	3	42	**102**	**102**	**90**	**90**
	Workman Creek	Gila	4	-110.92	33.82	6900 (2104)	--	16.1	83	3	23	**94**	**94**	**85**	**85**
*	WORKMAN CREEK 1	GILA	4	-110.92	33.82	6973 (2126)	--	--	--	--	1	**0**	**0**	**0**	**0**
*	WORKMAN CREEK 2	GILA	4	-110.92	33.82	6973 (2126)	25	--	1942	1	2	**55**	**70**	**43**	**55**
	YOUNG	GILA	4	-110.93	34.10	5051 (1540)	31	--	1953	3	60	**15**	**20**	**12**	**16**
*	ALAMO 8 SW		5	-113.70	34.20	951 (290)	--	--	--	--	4	**0**	**0**	**0**	**0**
	ALAMO DAM	LA PAZ	5	-113.58	34.23	1290 (393)	--	--	--	--	31	**0**	**0**	**0**	**0**
*	ALAMO DAM 6 ESE	YUMA	5	-113.47	34.25	1480 (451)	--	--	--	--	13	**0**	**0**	**0**	**0**
*	ALAMO RANGER STN		5	-110.85	33.50	3040 (927)	--	--	--	--	4	**0**	**0**	**0**	**0**
	BOUSE	LA PAZ	5	-114.02	33.95	925 (282)	--	--	--	--	55	**0**	**0**	**0**	**0**
	DATELAND	YUMA	5	-113.53	32.80	449 (137)	--	--	--	--	17	**0**	**0**	**0**	**0**
	DATELAND WHITEWING RANCH	YUMA	5	-113.50	32.97	520 (159)	--	--	--	--	34	**0**	**0**	**0**	**0**
	EHRENBERG	YUMA	5	-114.53	33.60	322 (98)	--	--	--	--	30	**0**	**0**	**0**	**0**
	EHRENBERG 2 E	LA PAZ	5	-114.47	33.62	465 (142)	--	--	--	--	29	**0**	**0**	**0**	**0**
*	IMPERIAL DAM		5	-114.47	32.88	171 (52)	--	--	--	--	2	**0**	**0**	**0**	**0**
	KOFA MINE	YUMA	5	-113.97	33.27	1774 (541)	--	--	--	--	54	**0**	**0**	**0**	**0**
	MOHAWK		5	-113.77	32.73	541 (165)	--	--	--	--	52	**0**	**0**	**0**	**0**
	PARKER	LA PAZ	5	-114.28	34.15	420 (128)	--	--	--	--	113	**0**	**0**	**0**	**0**
	QUARTZSITE	LA PAZ	5	-114.23	33.67	875 (267)	--	--	--	--	37	**0**	**0**	**0**	**0**
	SALOME 1 ESE	YUMA	5	-113.62	33.78	1902 (580)	--	--	--	--	17	**0**	**0**	**0**	**0**
*	SALOME 17 SE	LA PAZ	5	-113.48	33.68	1599 (487)	--	--	--	--	12	**0**	**0**	**0**	**0**
	SALOME 6 SE		5	-113.53	33.73	1703 (519)	--	--	--	--	50	**0**	**0**	**0**	**0**
	TACNA 3 NE	YUMA	5	-113.92	32.72	324 (99)	--	--	--	--	37	**0**	**0**	**0**	**0**
	WELLTON	YUMA	5	-114.13	32.67	259 (79)	--	--	--	--	58	**0**	**0**	**0**	**0**
*	WELLTON 6 NE		5	-114.05	32.72	240 (73)	--	--	--	--	2	**0**	**0**	**0**	**0**
*	WENDEN	YUMA	5	-113.53	33.82	1859 (567)	--	--	--	--	1	**0**	**0**	**0**	**0**
	YUMA CITRUS STATION	YUMA	5	-114.63	32.62	191 (58)	--	--	--	--	86	**0**	**0**	**0**	**0**
*	YUMA FOOTHILLS	YUMA	5	-114.42	32.63	400 (122)	--	--	--	--	4	**0**	**0**	**0**	**0**
	YUMA INTL ARPT	YUMA	5	-114.60	32.67	206 (63)	--	--	--	--	48	**0**	**0**	**0**	**0**
	YUMA PROVING GROUND	YUMA	5	-114.40	32.83	324 (99)	--	--	--	--	50	**0**	**0**	**0**	**0**
*	YUMA QUARTERMASTER DEP	YUMA	5	-114.62	32.73	160 (49)	--	--	--	--	13	**0**	**0**	**0**	**0**
	YUMA VALLEY	YUMA	5	-114.72	32.72	120 (37)	--	--	--	--	60	**0**	**0**	**0**	**0**
	YUMA WB CITY	YUMA	5	-114.62	32.73	240 (73)	--	--	--	--	82	**0**	**0**	**0**	**0**
	AGUILA	MARICOPA	6	-113.18	33.95	2164 (660)	--	--	--	--	78	**0**	**0**	**0**	**0**
	ALHAMBRA	MARICOPA	6	-112.12	33.52	1142 (348)	--	--	--	--	29	**0**	**0**	**0**	**0**
	APACHE JUNCTION	PINAL	6	-111.55	33.42	1722 (525)	--	--	--	--	15	**0**	**0**	**0**	**0**
*	APACHE JUNCTION 4 NNW	PINAL	6	-111.58	33.47	1890 (576)	--	--	--	--	5	**0**	**0**	**0**	**0**
	APACHE JUNCTION 5 NE	PINAL	6	-111.48	33.47	2069 (631)	--	--	--	--	19	**0**	**0**	**0**	**0**
*	ARIZONA CITY	PINAL	6	-111.67	32.75	1505 (459)	--	--	--	--	4	**0**	**0**	**0**	**0**
	ARIZONA FALLS 1 WNW	MARICOPA	6	-111.97	33.48	1250 (381)	--	--	--	--	16	**0**	**0**	**0**	**0**
*	ARIZONA FALLS 1 WNW	MARICOPA	6	-111.98	33.50	1250 (381)	--	--	--	--	6	**0**	**0**	**0**	**0**
	ASHURST HAYDEN DAM	PINAL	6	-111.28	33.08	1549 (472)	--	--	--	--	50	**0**	**0**	**0**	**0**
	BARTLETT DAM	MARICOPA	6	-111.65	33.82	1650 (503)	--	--	--	--	67	**0**	**0**	**0**	**0**
	BEARDSLEY	MARICOPA	6	-112.38	33.67	1270 (387)	--	--	--	--	29	**0**	**0**	**0**	**0**
	BUCKEYE	MARICOPA	6	-112.58	33.38	890 (271)	--	--	--	--	110	**0**	**0**	**0**	**0**
	CAREFREE	MARICOPA	6	-111.90	33.82	2529 (771)	--	--	--	--	38	**0**	**0**	**0**	**0**
	CASA GRANDE	PINAL	6	-111.72	32.88	1403 (428)	--	--	--	--	105	**0**	**0**	**0**	**0**
	CASA GRANDE NATL MONUMENT	PINAL	6	-111.53	33.00	1419 (433)	--	--	--	--	85	**0**	**0**	**0**	**0**
*	CAVE CREEK		6	-111.95	33.83	2122 (647)	--	--	--	--	13	**0**	**0**	**0**	**0**

* indicates less than 15 years of data available
SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew-ness	COV	COV (trunc-ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
	Baker Butte	ST	308	0	--	2	7.6	3.6	7.6	#N/A	0.22	0.47	0.47	1.927	0.449	--	17.3	--	15.7
	BAKER BUTTE NO. 2	SC	11R07	0	--	2.4	14.8	8.3	12.8	28.6	0.35	0.56	0.56	2.556	0.525	--	37.9	--	33.7
	BAR T BAR RANCH	NCDC	20625	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GISELA	NCDC	23448	78	0	--	0.7	2.4	0.0	0.0	5.82	3.50	1.00	-0.731	0.833	2.7	--	2.2	--
	GLOBE	NCDC	23505	21	0	--	1.0	2.9	0.0	0.0	3.30	3.06	1.00	-0.387	0.833	3.8	--	3.1	--
*	GLOBE #2	NCDC	23500	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GLOBE RANGER STN	NCDC	23498	58	0	--	0.8	1.9	0.0	0.0	3.50	2.50	1.00	-0.600	0.833	3.0	--	2.5	--
*	GRAPEVINE	NCDC	23643	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	HILLTOP	NCDC	24069	0	2	--	6.3	4.5	4.0	4.0	0.83	0.70	0.70	1.645	0.634	19.1	--	16.6	--
	INTAKE	NCDC	24345	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MIAMI	NCDC	25512	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	MILLERS RIM TRAIL RANCH	NCDC	25560	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	NATURAL BRIDGE	NCDC	25825	18	0	--	7.0	7.1	5.0	0.0	1.56	1.02	1.00	1.594	0.833	27.2	--	22.7	--
*	O W RANCH	NCDC	26162	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	PARKER CREEK MNTC YRD	NCDC	28940	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PAYSON	NCDC	26323	4	0	--	7.5	7.5	6.0	5.0	3.15	1.01	1.00	1.666	0.833	29.3	--	24.4	--
	PAYSON 12 NNE	NCDC	26315	0	7	--	13.9	7.6	12.0	10.0	2.38	0.55	0.55	2.502	0.513	35.0	--	31.3	--
	PAYSON RANGER STN	NCDC	26320	24	0	--	4.6	5.3	3.5	0.0	1.42	1.16	1.00	1.176	0.833	17.9	--	14.9	--
*	PAYSON RANGER STN 2	NCDC	26321	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	PINE	NCDC	26571	0	6	--	10.0	5.7	10.0	#N/A	#####	0.57	0.57	2.164	0.527	25.7	--	22.9	--
	PLEASANT VALLEY R S	NCDC	26653	27	0	--	2.1	4.8	0.0	0.0	3.77	2.27	1.00	0.404	0.833	8.3	--	6.9	--
	PROMONTORY BUTTE	SC	11R10	0	--	6	17.3	8.9	14.7	#N/A	0.73	0.51	0.51	2.734	0.484	--	41.6	--	37.4
	PUNKIN CENTER	NCDC	26840	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	RENO R S	NCDC	27081	53	0	--	0.4	1.4	0.0	0.0	4.84	3.79	1.00	-1.333	0.833	1.5	--	1.2	--
*	RIM TRAIL RANCH	NCDC	27143	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ROOSEVELT 1 WNW	NCDC	27281	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SALT RIVER	NCDC	27466	17	0	--	1.2	3.5	0.0	0.0	2.85	3.01	1.00	-0.200	0.833	4.5	--	3.8	--
	SAN CARLOS	NCDC	27475	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SAN CARLOS AIRPORT	NCDC	27477	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SAN CARLOS RESERVOIR	NCDC	27480	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SENECA 3 NW	NCDC	27741	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SIERRA ANCHA	NCDC	27876	18	0	--	6.0	6.9	3.5	0.0	1.29	1.16	1.00	1.438	0.833	23.3	--	19.4	--
	TONTO CREEK FISH HAT 2	NCDC	28650	17	0	--	4.8	7.9	0.0	0.0	1.78	1.65	1.00	1.217	0.833	18.7	--	15.5	--
	TONTO CREEK FISH HATCHERY	NCDC	28649	12	0	--	9.8	13.5	4.0	0.0	1.95	1.38	1.00	1.931	0.833	38.1	--	31.7	--
	WORKMAN CREEK	SC	10S01	0	--	1.2	7.2	4.4	6.6	5.2	1.14	0.61	0.61	1.816	0.563	--	19.5	--	17.3
	Workman Creek	ST	877	0	--	1.7	7.8	3.8	7.0	8.5	0.64	0.49	0.49	1.951	0.461	--	18.2	--	16.4
*	WORKMAN CREEK 1	NCDC	29534	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WORKMAN CREEK 2	NCDC	29535	1	0	--	12.5	17.7	12.5	#N/A	#####	1.41	1.00	2.179	0.833	48.9	--	40.7	--
	YOUNG	NCDC	29622	15	0	--	4.8	5.5	4.0	0.0	2.76	1.16	1.00	1.222	0.833	18.8	--	15.6	--
*	ALAMO 8 SW	NCDC	20097	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ALAMO DAM	NCDC	20100	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ALAMO DAM 6 ESE	NCDC	20099	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ALAMO RANGER STN	NCDC	20098	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BOUSE	NCDC	20949	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DATELAND	NCDC	22430	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DATELAND WHITEWING RANCH	NCDC	22434	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	EHRENBERG	NCDC	22787	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	EHRENBERG 2 E	NCDC	22790	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	IMPERIAL DAM	NCDC	24299	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	KOFA MINE	NCDC	24702	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MOHAWK	NCDC	25627	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PARKER	NCDC	26250	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	QUARTZSITE	NCDC	26865	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SALOME 1 ESE	NCDC	27453	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SALOME 17 SE	NCDC	27462	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SALOME 6 SE	NCDC	27460	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TACNA 3 NE	NCDC	28396	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WELLTON	NCDC	29211	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WELLTON 6 NE	NCDC	29215	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WENDEN	NCDC	29223	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YUMA CITRUS STATION	NCDC	29652	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	YUMA FOOTHILLS	NCDC	29659	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YUMA INTL ARPT	NCDC	29660	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YUMA PROVING GROUND	NCDC	29654	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	YUMA QUARTERMASTER DEP	NCDC	29656	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YUMA VALLEY	NCDC	29657	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YUMA WB CITY	NCDC	29662	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	AGUILA	NCDC	20060	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ALHAMBRA	NCDC	20104	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	APACHE JUNCTION	NCDC	20306	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	APACHE JUNCTION 4 NNW	NCDC	20307	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	APACHE JUNCTION 5 NE	NCDC	20288	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ARIZONA CITY	NCDC	20404	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ARIZONA FALLS 1 WNW	NCDC	21161	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ARIZONA FALLS 1 WNW	NCDC	20406	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ASHURST HAYDEN DAM	NCDC	20498	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BARTLETT DAM	NCDC	20632	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BEARDSLEY	NCDC	20660	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BUCKEYE	NCDC	21026	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CAREFREE	NCDC	21282	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CASA GRANDE	NCDC	21306	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CASA GRANDE NATL MONUMENT	NCDC	21314	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	CAVE CREEK	NCDC	21361	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf) [Eqn. 2.1]**	**50-yr Ground Snow Load (psf) [Eqn. 3.12]**	**30-yr Ground Snow Load (psf) [Eqn. 2.1]**	**30-yr Ground Snow Load (psf) [Eqn. 3.12]**
*	CAVE CREEK 3 ESE	MARICOPA	6	-111.90	33.82	2529 (771)	--	--	--	--	2	0	0	0	0
	CAVE CREEK DAM	MARICOPA	6	-112.05	33.72	1670 (509)	--	--	--	--	21	0	0	0	0
	CHANDLER	MARICOPA	6	-111.83	33.30	1220 (372)	--	--	--	--	33	0	0	0	0
	CHANDLER HEIGHTS	MARICOPA	6	-111.68	33.20	1425 (434)	--	--	--	--	58	0	0	0	0
	DEER VALLEY	MARICOPA	6	-112.08	33.58	1257 (383)	--	--	--	--	36	0	0	0	0
*	EAST MESA	MARICOPA	6	-111.65	33.42	1518 (463)	--	--	--	--	4	0	0	0	0
*	EL MIRAGE		6	-112.32	33.63	1142 (348)	--	--	--	--	1	0	0	0	0
	ELOY 4 NE	PINAL	6	-111.52	32.78	1545 (471)	--	--	--	--	55	0	0	0	0
	FALCON FIELD	MARICOPA	6	-111.75	33.43	1322 (403)	--	--	--	--	29	0	0	0	0
	FLORENCE	PINAL	6	-111.38	33.03	1400 (427)	--	--	--	--	100	0	0	0	0
	FOUNTAIN HILLS	MARICOPA	6	-111.72	33.60	1580 (482)	--	--	--	--	27	0	0	0	0
	GILA BEND	MARICOPA	6	-112.72	32.95	735 (224)	--	--	--	--	111	0	0	0	0
	GILA BEND AIRPORT		6	-112.72	32.88	853 (260)	--	--	--	--	23	0	0	0	0
	GOULDS RANCH	MARICOPA	6	-112.07	33.38	1201 (366)	--	--	--	--	46	0	0	0	0
	GRANITE REEF DAM	MARICOPA	6	-111.70	33.52	1322 (403)	--	--	--	--	173	0	0	0	0
	GRIGGS 3 W	MARICOPA	6	-112.48	33.50	1160 (354)	--	--	--	--	41	0	0	0	0
	HARQUAHALA PLAINS		6	-113.17	33.53	1220 (372)	--	--	--	--	28	0	0	0	0
	HORSESHOE DAM	MARICOPA	6	-111.72	33.98	2019 (616)	--	--	--	--	58	0	0	0	0
	KEARNY	PINAL	6	-110.90	33.05	1830 (558)	--	--	--	--	22	0	0	0	0
	KELVIN	PINAL	6	-110.97	33.10	1850 (564)	--	--	--	--	37	0	0	0	0
	LAKE PLEASANT	MARICOPA	6	-112.27	33.83	1536 (468)	--	--	--	--	19	0	0	0	0
*	LAKE PLEASANT	MARICOPA	6	-112.27	33.85	1601 (488)	--	--	--	--	10	0	0	0	0
	LAVEEN 3 SSE	MARICOPA	6	-112.15	33.33	1135 (346)	--	--	--	--	58	0	0	0	0
	LITCHFIELD PARK	MARICOPA	6	-112.37	33.50	1030 (314)	--	--	--	--	86	0	0	0	0
	MARICOPA 4 N	PINAL	6	-112.03	33.12	1160 (354)	--	--	--	--	46	0	0	0	0
	MARICOPA 9 SSW		6	-112.10	32.92	1401 (427)	--	--	--	--	58	0	0	0	0
	MARINETTE	MARICOPA	6	-112.30	33.63	1152 (351)	--	--	--	--	48	0	0	0	0
	MESA	MARICOPA	6	-111.82	33.42	1235 (376)	--	--	--	--	108	0	0	0	0
*	MONTEZUMA	MARICOPA	6	-113.38	33.10	741 (226)	--	--	--	--	5	0	0	0	0
	MORMON FLAT	MARICOPA	6	-111.45	33.55	1705 (520)	--	--	--	--	83	0	0	0	0
	MUMMY MOUNTAIN	MARICOPA	6	-111.97	33.55	1421 (433)	--	--	--	--	16	0	0	0	0
	ORACLE		6	-110.78	32.60	4602 (1403)	16	--	1937	1	54	7	10	6	8
	ORACLE 2 SE	PINAL	6	-110.73	32.60	4509 (1375)	12	--	1967	12	56	2	3	2	3
*	PAINTED ROCK DAM	MARICOPA	6	-113.03	33.08	568 (173)	--	--	--	--	6	0	0	0	0
*	PARADISE VALLEY NO 2	MARICOPA	6	-111.95	33.55	1421 (433)	--	--	--	--	5	0	0	0	0
*	PARADISE VALLEY NO 2	MARICOPA	6	-111.97	33.57	1381 (421)	--	--	--	--	4	0	0	0	0
	PHOENIX CITY	MARICOPA	6	-112.08	33.45	1098 (335)	--	--	--	--	48	0	0	0	0
	PHOENIX INDIAN SCHOOL	MARICOPA	6	-112.07	33.50	1122 (342)	--	--	--	--	30	0	0	0	0
	PHOENIX SKY HARBOR INTL AP	MARICOPA	6	-112.00	33.43	1107 (337)	--	--	--	--	59	0	0	0	0
*	PHOENIX SOUTH MOUNTAIN	MARICOPA	6	-112.05	33.33	2645 (807)	--	--	--	--	9	0	0	0	0
	PICACHO 8 SE	PINAL	6	-111.40	32.65	1830 (558)	--	--	--	--	19	0	0	0	0
	PICACHO RESERVOIR	PINAL	6	-111.47	32.87	1512 (461)	--	--	--	--	28	0	0	0	0
	PINAL RANCH	PINAL	6	-110.98	33.35	4523 (1379)	25	--	1967	12	78	16	21	12	17
*	PINNACLE PEAK	MARICOPA	6	-111.87	33.73	2564 (782)	--	--	--	--	4	0	0	0	0
	RED ROCK 6 SSW	PINAL	6	-111.33	32.48	1879 (573)	--	--	--	--	53	0	0	0	0
	SACATON	PINAL	6	-111.75	33.08	1285 (392)	--	--	--	--	96	0	0	0	0
	SAN MANUEL	PINAL	6	-110.63	32.60	3459 (1055)	9	--	1958	11	52	1	2	1	2
	SCOTTSDALE	MARICOPA	6	-111.88	33.47	1201 (366)	--	--	--	--	18	0	0	0	0
	SENTINEL		6	-113.22	32.87	689 (210)	--	--	--	--	31	0	0	0	0
*	SLATE MOUNTAIN	PINAL	6	-111.88	32.52	1932 (589)	--	--	--	--	4	0	0	0	0
	SOUTH PHOENIX	MARICOPA	6	-112.07	33.38	1155 (352)	--	--	--	--	45	0	0	0	0
*	STANFIELD		6	-111.97	32.88	1312 (400)	--	--	--	--	2	0	0	0	0
	STEWART MOUNTAIN	MARICOPA	6	-111.53	33.55	1422 (433)	--	--	--	--	58	0	0	0	0
*	SUNDAD		6	-113.23	33.18	1010 (308)	--	--	--	--	2	0	0	0	0
	SUNFLOWER 3 NNW	MARICOPA	6	-111.48	33.92	3719 (1134)	--	--	--	--	41	0	0	0	0
	SUPERIOR	PINAL	6	-111.10	33.30	2859 (872)	--	--	--	--	86	0	0	0	0
	SUPERIOR 2 ENE	PINAL	6	-111.07	33.30	4154 (1266)	7	--	1985	12	23	1	1	0	1
*	SUPERIOR SMELTER		6	-111.10	33.30	2791 (851)	--	--	--	--	5	0	0	0	0
	SUPERSTITION MOUNTAIN		6	-111.43	33.37	1961 (598)	--	--	--	--	15	0	0	0	0
	TEMPE	MARICOPA	6	-111.93	33.43	1152 (351)	--	--	--	--	59	0	0	0	0
	TEMPE 3 S		6	-111.93	33.38	1181 (360)	--	--	--	--	48	0	0	0	0
	TEMPE ASU	MARICOPA	6	-111.93	33.42	1170 (357)	--	--	--	--	53	0	0	0	0
*	THORNBURG RANCHES		6	-112.40	33.57	1099 (335)	--	--	--	--	9	0	0	0	0
	TOLLESON 1 E	MARICOPA	6	-112.25	33.45	1025 (312)	--	--	--	--	55	0	0	0	0
	TONOPAH 5N	MARICOPA	6	-112.88	33.50	1150 (351)	--	--	--	--	31	0	0	0	0
*	TONTO HILLS	MARICOPA	6	-111.83	33.88	3680 (1122)	--	--	--	--	2	0	0	0	0
*	VALLEY CITRUS FARM	MARICOPA	6	-111.97	33.38	1181 (360)	--	--	--	--	5	0	0	0	0
*	WADDELL 3 SSE		6	-112.40	33.57	1099 (335)	--	--	--	--	2	0	0	0	0
	WILLOW SPRINGS RANCH	PINAL	6	-110.87	32.72	3690 (1125)	--	--	--	--	30	0	0	0	0
	WINKELMAN 6 S	PINAL	6	-110.72	32.92	2080 (634)	--	--	--	--	38	0	0	0	0
*	WINKLEMAN 12 SE	PINAL	6	-110.60	32.87	2589 (789)	--	--	--	--	11	0	0	0	0
	WITTMANN 4SW	MARICOPA	6	-112.60	33.75	1670 (509)	--	--	--	--	47	0	0	0	0
	YOUNGTOWN	MARICOPA	6	-112.30	33.60	1135 (346)	--	--	--	--	42	0	0	0	0
	AJO	PIMA	7	-112.87	32.37	1799 (549)	--	--	--	--	92	0	0	0	0
	AJO WELL	PIMA	7	-112.83	32.45	1430 (436)	--	--	--	--	28	0	0	0	0
*	ALPINE 18 SW	GREENLEE	7	-109.33	33.63	9158 (2792)	84	--	1987	3	4	209	251	171	207
	ALPINE 8 SSE	GREENLEE	7	-109.12	33.73	6728 (2051)	19	--	1999	4	17	20	26	17	23
	AMADO	SANTA CRUZ	7	-111.05	31.72	3050 (930)	--	--	--	--	28	0	0	0	0
	ANVIL RANCH	PIMA	7	-111.38	31.98	2749 (838)	--	--	--	--	58	0	0	0	0
	APACHE 6 WNW	COCHISE	7	-109.23	31.72	5382 (1641)	--	--	--	--	17	0	0	0	0
	APACHE POWDER COMPANY	COCHISE	7	-110.25	31.90	3688 (1124)	--	--	--	--	68	0	0	0	0
*	ARAVAIPA RANGER STN		7	-110.27	32.78	3670 (1119)	--	--	--	--	2	0	0	0	0
	ARIVACA	PIMA	7	-111.33	31.57	3619 (1103)	--	--	--	--	51	0	0	0	0

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew-ness	COV	COV (trunc-ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
*	CAVE CREEK 3 ESE	NCDC	21363	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CAVE CREEK DAM	NCDC	21365	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CHANDLER	NCDC	21511	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CHANDLER HEIGHTS	NCDC	21514	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DEER VALLEY	NCDC	22462	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	EAST MESA	NCDC	22782	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	EL MIRAGE	NCDC	22804	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ELOY 4 NE	NCDC	22807	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FALCON FIELD	NCDC	22927	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FLORENCE	NCDC	23027	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FOUNTAIN HILLS	NCDC	23190	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GILA BEND	NCDC	23393	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GILA BEND AIRPORT	NCDC	23398	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GOULDS RANCH	NCDC	23573	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GRANITE REEF DAM	NCDC	23621	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	GRIGGS 3 W	NCDC	23702	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	HARQUAHALA PLAINS	NCDC	23852	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	HORSESHOE DAM	NCDC	24182	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	KEARNY	NCDC	24590	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	KELVIN	NCDC	24594	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	LAKE PLEASANT	NCDC	24770	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	LAKE PLEASANT	NCDC	21295	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	LAVEEN 3 SSE	NCDC	24829	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	LITCHFIELD PARK	NCDC	24977	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MARICOPA 4 N	NCDC	25270	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MARICOPA 9 SSW	NCDC	25274	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MARINETTE	NCDC	25282	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MESA	NCDC	25467	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	MONTEZUMA	NCDC	25633	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MORMON FLAT	NCDC	25700	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	MUMMY MOUNTAIN	NCDC	26244	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ORACLE	NCDC	26116	25	0	--	2.8	3.8	1.0	0.0	1.54	1.35	1.00	0.675	0.833	10.9	--	9.0	--
	ORACLE 2 SE	NCDC	26119	40	0	--	1.2	2.5	0.0	0.0	2.59	2.09	1.00	-0.167	0.833	4.7	--	3.9	--
*	PAINTED ROCK DAM	NCDC	26194	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	PARADISE VALLEY NO 2	NCDC	25765	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	PARADISE VALLEY NO 2	NCDC	26246	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PHOENIX CITY	NCDC	26486	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PHOENIX INDIAN SCHOOL	NCDC	26476	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PHOENIX SKY HARBOR INTL AP	NCDC	26481	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	PHOENIX SOUTH MOUNTAIN	NCDC	26479	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PICACHO 8 SE	NCDC	26513	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PICACHO RESERVOIR	NCDC	26506	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PINAL RANCH	NCDC	26561	18	0	--	5.2	4.9	5.0	0.0	1.61	0.95	0.95	1.326	0.799	19.4	--	16.3	--
*	PINNACLE PEAK	NCDC	26603	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	RED ROCK 6 SSW	NCDC	27058	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SACATON	NCDC	27370	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SAN MANUEL	NCDC	27530	36	0	--	0.8	1.9	0.0	0.0	3.02	2.24	1.00	-0.537	0.833	3.2	--	2.7	--
	SCOTTSDALE	NCDC	27661	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SENTINEL	NCDC	27751	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SLATE MOUNTAIN	NCDC	27984	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SOUTH PHOENIX	NCDC	28112	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	STANFIELD	NCDC	28177	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	STEWART MOUNTAIN	NCDC	28214	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SUNDAD	NCDC	28268	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SUNFLOWER 3 NNW	NCDC	28273	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SUPERIOR	NCDC	28348	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SUPERIOR 2 ENE	NCDC	28349	21	0	--	0.4	1.6	0.0	0.0	3.90	3.59	1.00	-1.179	0.833	1.7	--	1.4	--
*	SUPERIOR SMELTER	NCDC	28351	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SUPERSTITION MOUNTAIN	NCDC	28356	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TEMPE	NCDC	28489	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TEMPE 3 S	NCDC	28494	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TEMPE ASU	NCDC	28499	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	THORNBURG RANCHES	NCDC	28566	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TOLLESON 1 E	NCDC	28598	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TONOPAH 5N	NCDC	28641	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TONTO HILLS	NCDC	28653	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	VALLEY CITRUS FARM	NCDC	29015	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WADDELL 3 SSE	NCDC	29095	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WILLOW SPRINGS RANCH	NCDC	29382	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WINKELMAN 6 S	NCDC	29420	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WINKLEMAN 12 SE	NCDC	29425	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	WITTMANN 4SW	NCDC	29464	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	YOUNGTOWN	NCDC	29634	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	AJO	NCDC	20080	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	AJO WELL	NCDC	20088	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ALPINE 18 SW	NCDC	20170	0	11	--	41.0	30.9	34.5	#N/A	1.17	0.75	0.75	3.489	0.670	129.8	--	111.9	--
	ALPINE 8 SSE	NCDC	20174	0	1	--	8.8	5.1	8.0	11.0	0.45	0.58	0.58	2.025	0.541	23.0	--	20.4	--
	AMADO	NCDC	20204	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ANVIL RANCH	NCDC	20287	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	APACHE 6 WNW	NCDC	20300	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	APACHE POWDER COMPANY	NCDC	20309	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ARAVAIPA RANGER STN	NCDC	20344	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ARIVACA	NCDC	20380	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	50-yr Ground Snow Load (psf) [Eqn. 2.1]	50-yr Ground Snow Load (psf) [Eqn. 3.12]	30-yr Ground Snow Load (psf) [Eqn. 2.1]	30-yr Ground Snow Load (psf) [Eqn. 3.12]
*	ARIZONA SONORA DESERT MUSEUM	PIMA	7	-111.17	32.25	2821 (860)	--	--	--	--	12	0	0	0	0
*	ARSENIC TUBS		7	-109.83	33.27	4704 (1434)	7	--	1948	2	3	6	8	4	6
*	BEACH RANCH	PIMA	7	-110.77	31.93	3762 (1147)	--	--	--	--	9	0	0	0	0
*	BEAR VALLEY		7	-111.18	31.42	4031 (1229)	--	--	--	--	12	0	0	0	0
	BEAVER HEAD	GREENLEE	7	-109.20	33.70	8000 (2439)	--	12.5	68	1	68	60	60	52	52
*	Beaverhead	Greenlee	7	-109.22	33.68	7990 (2436)	--	8.3	98	3	11	57	57	51	51
	BEAVERHEAD LODGE	GREENLEE	7	-109.22	33.68	8092 (2467)	44	--	1962	1	20	66	83	55	70
	BENSON	COCHISE	7	-110.28	31.97	3585 (1093)	17	--	1919	3	74	1	2	1	2
*	BENSON 23 NNW	COCHISE	7	-110.38	32.30	3142 (958)	--	--	--	--	5	0	0	0	0
	BENSON 6 SE	COCHISE	7	-110.23	31.88	3689 (1125)	--	--	--	--	16	0	0	0	0
	BISBEE	COCHISE	7	-109.92	31.43	5306 (1618)	20	--	1949	1	68	5	7	4	6
	BISBEE 1 WNW	COCHISE	7	-109.93	31.45	5559 (1695)	7	--	1988	1	17	4	5	3	4
	BISBEE 2	COCHISE	7	-109.90	31.43	5049 (1539)	6	--	1980	2	28	1	1	1	1
	BLACK RIVER PUMPS	GRAHAM	7	-109.75	33.48	6063 (1849)	15	--	1997	1	56	5	6	4	5
	BLUE	GREENLEE	7	-109.17	33.58	5419 (1652)	42	--	1967	12	58	16	22	13	17
*	BONITA CREEK		7	-109.78	33.15	4802 (1464)	10	--	1949	1	6	7	9	5	7
	BOSLEY RANCH	GRAHAM	7	-110.20	32.57	4802 (1464)	--	--	--	--	25	0	0	0	0
	BOWIE	COCHISE	7	-109.48	32.32	3759 (1146)	10	--	1978	1	104	1	1	1	1
*	BOWIE JUNCTION R15 ON W5		7	-109.70	32.43	4723 (1440)	--	--	--	--	1	0	0	0	0
	CANELO 1 NW	SANTA CRUZ	7	-110.53	31.57	5009 (1527)	11	--	1978	12	93	2	3	2	3
	CASCABEL	COCHISE	7	-110.42	32.32	3144 (959)	--	--	--	--	37	0	0	0	0
	CHIRICAHUA NATL MONUMENT	COCHISE	7	-109.35	32.00	5299 (1615)	28	--	1967	12	69	9	13	7	10
	CLIFTON	GREENLEE	7	-109.30	33.05	3519 (1073)	15	--	1949	1	112	0	1	0	0
	COCHISE 4 SSE	COCHISE	7	-109.88	32.07	4179 (1274)	10	--	1912	2	33	1	2	1	2
	COCHISE STRONGHOLD		7	-109.95	31.95	4749 (1448)	8	--	1928	2	20	3	5	3	4
	CORONADO N M HDQTRS	COCHISE	7	-110.25	31.35	5241 (1598)	16	--	1988	1	46	4	6	3	4
*	CORONADO NATL MONUMENT		7	-110.28	31.37	5553 (1693)	15	--	1958	3	5	8	11	6	9
	CORTARO 3 SW	PIMA	7	-111.12	32.33	2269 (692)	--	--	--	--	29	0	0	0	0
*	COVERED WELLS 1 E	PIMA	7	-112.15	32.15	2620 (799)	--	--	--	--	8	0	0	0	0
	DOS CABEZAS 1 SE	COCHISE	7	-109.60	32.17	5104 (1556)	12	--	1967	12	32	6	8	5	7
	DOUGLAS	COCHISE	7	-109.53	31.35	4039 (1231)	--	--	--	--	37	0	0	0	0
	DOUGLAS BISBEE-DOUGLAS INTL A	COCHISE	7	-109.60	31.47	4104 (1251)	--	--	--	--	58	0	0	0	0
	DOUGLAS SMELTER		7	-109.58	31.35	3972 (1211)	--	--	--	--	71	0	0	0	0
	DUNCAN	GREENLEE	7	-109.12	32.75	3659 (1116)	15	--	1949	1	72	0	0	0	0
	EAGLE CREEK	GREENLEE	7	-109.48	33.40	5104 (1556)	35	--	1967	12	46	4	5	3	4
	EAGLE CREEK 2	GREENLEE	7	-109.48	33.35	4869 (1484)	--	--	--	--	17	0	0	0	0
	ELGIN 5 N	SANTA CRUZ	7	-110.53	31.73	4904 (1495)	13	--	1916	1	59	3	4	2	3
	FAIRBANK 1 S	COCHISE	7	-110.18	31.72	3851 (1174)	10	--	1939	2	65	1	1	1	1
*	FLYING H RANCH		7	-110.23	31.40	5081 (1549)	--	--	--	--	11	0	0	0	0
	FORT HUACHUCA	COCHISE	7	-110.33	31.57	4664 (1422)	13	--	1916	1	51	5	7	4	5
*	FORT THOMAS	GRAHAM	7	-109.95	33.03	2679 (817)	--	--	--	--	9	0	0	0	0
	FORT THOMAS 2 SW	GRAHAM	7	-110.00	33.02	2799 (853)	--	--	--	--	40	0	0	0	0
	FRITZ RANCH	GREENLEE	7	-109.18	33.33	4323 (1318)	--	--	--	--	33	0	0	0	0
	FT GRANT	GRAHAM	7	-109.95	32.62	4849 (1478)	40	--	1935	3	67	3	4	2	3
	GRANVILLE	GREENLEE	7	-109.38	33.20	6802 (2074)	38	--	1968	12	21	12	16	9	13
	GREEN VALLEY	PIMA	7	-111.00	31.90	2899 (884)	--	--	--	--	18	0	0	0	0
*	GREY PEAK	GREENLEE	7	-109.38	33.25	6398 (1951)	30	--	1950	2	5	42	54	33	43
*	GREYS PEAK MNTC YD	GREENLEE	7	-109.38	33.25	6658 (2030)	15	--	1979	2	7	17	23	15	20
	Hannagan Meadows	Greenlee	7	-109.32	33.65	9020 (2750)	--	27.1	83	4	23	167	167	150	150
	HANNAGAN MEADOWS	GREENLEE	7	-109.32	33.63	9090 (2771)	--	27	93	2	36	159	159	141	141
*	HELMET PEAK		7	-111.05	31.95	3221 (982)	--	--	--	--	7	0	0	0	0
	HELMET PEAK RUBY STAR RANCH	PIMA	7	-111.08	31.92	3641 (1110)	--	--	--	--	33	0	0	0	0
*	HELMET PEAK RUBY STAR RANCH	PIMA	7	-111.08	31.92	3801 (1159)	--	--	--	--	3	0	0	0	0
	HELVETIA SANTA RITA RANGE RES		7	-110.78	31.87	4303 (1312)	12	--	1937	1	35	7	10	6	8
*	HEREFORD 8 SW		7	-110.23	31.40	5032 (1534)	--	--	--	--	1	0	0	0	0
	KITT PEAK	PIMA	7	-111.60	31.97	6788 (2070)	44	--	1966	2	46	33	43	26	35
	KLONDYKE 3 SE	GRAHAM	7	-110.30	32.80	3611 (1101)	--	--	--	--	26	0	0	0	0
	LESLIE CANYON	COCHISE	7	-109.57	31.60	4461 (1360)	35	--	1949	2	44	3	5	3	4
	MC NEAL	COCHISE	7	-109.67	31.60	4169 (1271)	--	--	--	--	46	0	0	0	0
*	MOUNT FAGAN RANCH	PIMA	7	-110.77	31.93	3762 (1147)	--	--	--	--	9	0	0	0	0
*	MOUNT LEMMON	PIMA	7	-110.75	32.45	7792 (2376)	72	--	1962	1	12	121	149	94	117
*	MOUNT LEMMON		7	-110.72	32.42	7692 (2345)	24	--	1953	3	7	36	47	31	41
*	MOUNT LEMMON SUMMIT		7	-110.78	32.45	9145 (2788)	--	--	--	--	2	0	0	0	0
	N LAZY H RANCH	PIMA	7	-110.68	32.12	3049 (930)	--	--	--	--	44	0	0	0	0
	NOGALES	SANTA CRUZ	7	-110.92	31.35	3811 (1162)	--	--	--	--	63	0	0	0	0
	NOGALES 6 N	SANTA CRUZ	7	-110.97	31.45	3559 (1085)	--	--	--	--	54	0	0	0	0
	NOGALES OLD NOGALES		7	-110.95	31.33	3903 (1190)	--	--	--	--	48	0	0	0	0
	ORGAN PIPE CACTUS NM	PIMA	7	-112.80	31.95	1678 (512)	--	--	--	--	59	0	0	0	0
	PAINTED CANYON	COCHISE	7	-109.20	31.88	5393 (1644)	8	--	1951	1	15	5	8	4	6
	PALISADE RANGER STN	PIMA	7	-110.72	32.42	7954 (2425)	86	--	1966	2	17	154	188	127	156
*	PAPAGO FARMS		7	-112.28	31.78	1820 (555)	--	--	--	--	2	0	0	0	0
	PARADISE		7	-109.22	31.93	5432 (1656)	27	--	1916	1	32	16	21	12	17
	PATAGONIA #2	SANTA CRUZ	7	-110.75	31.55	4041 (1232)	--	--	--	--	57	0	0	0	0
	PATAGONIA #2	SANTA CRUZ	7	-110.75	31.55	4189 (1277)	--	--	--	--	28	0	0	0	0
	PEARCE 5 W		7	-109.90	31.88	4924 (1501)	8	--	1928	2	18	5	8	4	6
	PEARCE SUNSITES	COCHISE	7	-109.83	31.93	4349 (1326)	8	--	1916	12	54	1	1	1	1
*	PIMA R4 ON W2		7	-110.02	32.83	3772 (1150)	--	--	--	--	1	0	0	0	0
*	PISINEMO		7	-112.32	32.05	1902 (580)	--	--	--	--	8	0	0	0	0
	PORTAL		7	-109.17	31.90	5002 (1525)	20	--	1923	12	41	11	15	9	12
	PORTAL 4 SW	COCHISE	7	-109.20	31.88	5389 (1643)	31	--	1967	12	41	13	18	10	14
	REDINGTON	PIMA	7	-110.47	32.38	2939 (896)	--	--	--	--	57	0	0	0	0
	RUBY 4 NW		7	-111.28	31.50	3982 (1214)	--	--	--	--	36	0	0	0	0
	RUCKER CANYON	COCHISE	7	-109.42	31.75	5369 (1637)	13	--	1978	12	92	1	2	1	1

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew- ness	COV	COV (trunc- ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
*	ARIZONA SONORA DESERT MUSEUM	NCDC	20415	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	ARSENIC TUBS	NCDC	20433	2	0	--	2.3	4.0	0.0	0.0	1.73	1.73	1.00	0.501	0.833	9.1	--	7.6	--
*	BEACH RANCH	NCDC	20640	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	BEAR VALLEY	NCDC	20665	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BEAVER HEAD	SC	09S06	0	--	0.2	4.0	2.6	3.4	2.9	0.83	0.66	0.66	1.201	0.604	--	11.5	--	10.1
*	Beaverhead	ST	902	0	--	1.2	4.3	2.4	4.7	#N/A	0.28	0.57	0.57	1.317	0.527	--	11.0	--	9.8
	BEAVERHEAD LODGE	NCDC	20675	1	0	--	20.1	12.6	17.5	18.0	0.29	0.63	0.63	2.832	0.577	55.6	--	48.9	--
	BENSON	NCDC	20680	61	0	--	0.8	2.5	0.0	0.0	4.57	3.13	1.00	-0.556	0.833	3.2	--	2.6	--
*	BENSON 23 NNW	NCDC	20690	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BENSON 6 SE	NCDC	20683	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BISBEE	NCDC	20768	33	0	--	2.2	3.5	1.0	0.0	2.93	1.61	1.00	0.424	0.833	8.5	--	7.0	--
	BISBEE 1 WNW	NCDC	20775	7	0	--	1.7	2.0	1.0	0.0	1.22	1.19	1.00	0.188	0.833	6.7	--	5.6	--
	BISBEE 2	NCDC	20773	23	0	--	0.6	1.6	0.0	0.0	2.56	2.51	1.00	-0.788	0.833	2.5	--	2.1	--
	BLACK RIVER PUMPS	NCDC	20808	38	0	--	2.0	3.6	0.0	0.0	1.95	1.80	1.00	0.338	0.833	7.8	--	6.5	--
	BLUE	NCDC	20855	20	0	--	5.1	7.3	2.5	0.0	2.74	1.44	1.00	1.283	0.833	20.0	--	16.6	--
*	BONITA CREEK	NCDC	20903	3	0	--	2.7	3.9	1.0	0.0	1.67	1.47	1.00	0.634	0.833	10.4	--	8.7	--
	BOSLEY RANCH	NCDC	20923	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	BOWIE	NCDC	20958	85	0	--	0.6	1.6	0.0	0.0	3.15	2.56	1.00	-0.786	0.833	2.5	--	2.1	--
*	BOWIE JUNCTION R15 ON W5	NCDC	20966	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CANELO 1 NW	NCDC	21231	62	0	--	1.2	2.3	0.0	0.0	2.24	1.86	1.00	-0.152	0.833	4.8	--	4.0	--
	CASCABEL	NCDC	21330	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	CHIRICAHUA NATL MONUMENT	NCDC	21664	25	0	--	3.4	4.7	2.0	0.0	2.68	1.37	1.00	0.879	0.833	13.3	--	11.1	--
	CLIFTON	NCDC	21849	105	0	--	0.3	1.6	0.0	0.0	7.35	5.41	1.00	-1.539	0.833	1.2	--	1.0	--
	COCHISE 4 SSE	NCDC	21870	23	0	--	0.9	2.0	0.0	0.0	3.44	2.25	1.00	-0.476	0.833	3.4	--	2.9	--
	COCHISE STRONGHOLD	NCDC	21874	10	0	--	1.6	2.0	1.0	0.0	1.76	1.32	1.00	0.092	0.833	6.1	--	5.0	--
	CORONADO N M HDQTRS	NCDC	22140	27	0	--	1.8	3.3	0.0	0.0	2.57	1.83	1.00	0.244	0.833	7.1	--	5.9	--
*	CORONADO NATL MONUMENT	NCDC	22139	4	0	--	3.0	6.7	0.0	0.0	2.24	2.24	1.00	0.752	0.833	11.7	--	9.8	--
	CORTARO 3 SW	NCDC	22159	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	COVERED WELLS 1 E	NCDC	22216	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DOS CABEZAS 1 SE	NCDC	22648	13	0	--	2.4	3.4	1.0	0.0	1.54	1.41	1.00	0.544	0.833	9.5	--	7.9	--
	DOUGLAS	NCDC	22659	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DOUGLAS BISBEE-DOUGLAS INTL A	NCDC	22664	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DOUGLAS SMELTER	NCDC	22669	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	DUNCAN	NCDC	22754	69	0	--	0.3	1.8	0.0	0.0	8.23	7.13	1.00	-1.733	0.833	1.0	--	0.8	--
	EAGLE CREEK	NCDC	22779	33	0	--	1.7	5.4	0.0	0.0	5.63	3.25	1.00	0.156	0.833	6.5	--	5.4	--
	EAGLE CREEK 2	NCDC	22781	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ELGIN 5 N	NCDC	22797	41	0	--	1.4	2.8	0.0	0.0	2.40	1.98	1.00	-0.005	0.833	5.5	--	4.6	--
	FAIRBANK 1 S	NCDC	22902	54	0	--	0.6	1.9	0.0	0.0	4.27	3.20	1.00	-0.883	0.833	2.3	--	1.9	--
*	FLYING H RANCH	NCDC	23071	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FORT HUACHUCA	NCDC	23120	22	0	--	2.1	2.9	1.0	0.0	2.10	1.40	1.00	0.376	0.833	8.1	--	6.7	--
*	FORT THOMAS	NCDC	23144	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FORT THOMAS 2 SW	NCDC	23150	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FRITZ RANCH	NCDC	23258	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	FT GRANT	NCDC	23110	47	0	--	1.4	5.1	0.0	0.0	6.80	3.57	1.00	0.013	0.833	5.6	--	4.7	--
	GRANVILLE	NCDC	23635	18	0	--	4.0	10.9	0.0	0.0	2.68	2.70	1.00	1.052	0.833	15.8	--	13.2	--
	GREEN VALLEY	NCDC	23668	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	GREY PEAK	NCDC	23697	1	0	--	10.2	11.8	8.0	#N/A	1.62	1.15	1.00	1.976	0.833	39.9	--	33.2	--
*	GREYS PEAK MNTC YD	NCDC	23698	0	3	--	9.6	4.2	10.0	#N/A	-0.37	0.44	0.44	2.171	0.419	20.8	--	18.9	--
	Hannagan Meadows	ST	511	0	--	2.2	13.8	6.7	11.8	#N/A	0.43	0.49	0.49	2.513	0.464	--	32.1	--	28.9
	HANNAGAN MEADOWS	SC	09S11	0	--	2.2	11.9	6.7	11.0	3.0	0.48	0.56	0.56	2.341	0.524	--	30.5	--	27.2
*	HELMET PEAK	NCDC	23973	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	HELMET PEAK RUBY STAR RANCH	NCDC	27330	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	HELMET PEAK RUBY STAR RANCH	NCDC	23975	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	HELVETIA SANTA RITA RANGE RES	NCDC	23981	14	0	--	2.8	3.5	2.0	0.0	1.36	1.23	1.00	0.683	0.833	11.0	--	9.1	--
*	HEREFORD 8 SW	NCDC	23996	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	KITT PEAK	NCDC	24675	3	0	--	9.2	8.4	7.0	6.0	2.42	0.91	0.91	1.923	0.775	33.6	--	28.3	--
	KLONDYKE 3 SE	NCDC	24698	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	LESLIE CANYON	NCDC	24864	31	0	--	1.6	5.4	0.0	0.0	5.78	3.34	1.00	0.132	0.833	6.3	--	5.3	--
	MC NEAL	NCDC	25418	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	MOUNT FAGAN RANCH	NCDC	25729	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	MOUNT LEMMON	NCDC	25732	4	0	--	22.3	27.3	7.0	0.0	0.90	1.23	1.00	2.756	0.833	87.1	--	72.4	--
*	MOUNT LEMMON	NCDC	25733	1	0	--	15.4	7.5	17.0	#N/A	-1.66	0.48	0.48	2.631	0.459	35.7	--	32.2	--
*	MOUNT LEMMON SUMMIT	NCDC	25734	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	N LAZY H RANCH	NCDC	25908	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	NOGALES	NCDC	25921	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	NOGALES 6 N	NCDC	25924	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	NOGALES OLD NOGALES	NCDC	25922	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	ORGAN PIPE CACTUS NM	NCDC	26132	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PAINTED CANYON	NCDC	26186	8	0	--	2.3	2.9	0.0	0.0	1.01	1.29	1.00	0.472	0.833	8.9	--	7.4	--
	PALISADE RANGER STN	NCDC	26202	0	9	--	33.7	24.4	24.0	14.0	1.13	0.72	0.72	3.306	0.650	103.7	--	89.9	--
*	PAPAGO FARMS	NCDC	26233	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PARADISE	NCDC	26242	5	0	--	5.0	5.9	3.5	2.0	2.52	1.18	1.00	1.263	0.833	19.6	--	16.3	--
	PATAGONIA #2	NCDC	26280	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PATAGONIA #2	NCDC	26282	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PEARCE 5 W	NCDC	26358	4	0	--	2.7	2.1	2.5	2.0	0.83	0.79	0.79	0.737	0.698	8.8	--	7.5	--
	PEARCE SUNSITES	NCDC	26353	42	0	--	0.6	1.4	0.0	0.0	3.54	2.41	1.00	-0.902	0.833	2.2	--	1.9	--
*	PIMA R4 ON W2	NCDC	26546	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	PISINEMO	NCDC	26630	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	PORTAL	NCDC	26706	19	0	--	3.9	5.1	1.0	0.0	1.53	1.30	1.00	1.015	0.833	15.3	--	12.7	--
	PORTAL 4 SW	NCDC	26716	9	0	--	4.3	5.7	2.0	0.0	2.92	1.30	1.00	1.122	0.833	17.0	--	14.1	--
	REDINGTON	NCDC	27036	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	RUBY 4 NW	NCDC	27326	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	RUCKER CANYON	NCDC	27334	79	0	--	0.8	2.3	0.0	0.0	3.49	2.96	1.00	-0.620	0.833	3.0	--	2.5	--

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	County	Climate Division	Longitude	Latitude	Elev. (ft (m))	Max Snow Depth (in)	Max SWE (in of H_2O)	Year of Max	Month of Max	# of Years of Data	**50-yr Ground Snow Load (psf) [Eqn. 2.1]**	**50-yr Ground Snow Load (psf) [Eqn. 3.12]**	**30-yr Ground Snow Load (psf) [Eqn. 2.1]**	**30-yr Ground Snow Load (psf) [Eqn. 3.12]**
	SABINO CANYON	PIMA	7	-110.82	32.32	2639 (805)	--	--	--	--	35	**0**	**0**	**0**	**0**
	SAFFORD	GRAHAM	7	-109.72	32.83	2903 (885)	--	--	--	--	50	**0**	**0**	**0**	**0**
	SAFFORD AGRI CENTER	GRAHAM	7	-109.68	32.82	2953 (900)	14	--	1967	12	57	**1**	**2**	**1**	**1**
	SAHUARITA 2 NW	PIMA	7	-110.97	31.97	2689 (820)	--	--	--	--	17	**0**	**0**	**0**	**0**
*	SAHUARITA 8 W	PIMA	7	-111.07	31.90	3559 (1085)	--	--	--	--	6	**0**	**0**	**0**	**0**
	SALA RANCH	COCHISE	7	-109.98	31.87	5163 (1574)	11	--	1967	12	32	**8**	**11**	**6**	**9**
	SAN RAFAEL RANCH	SANTA CRUZ	7	-110.62	31.35	4743 (1446)	--	--	--	--	53	**0**	**0**	**0**	**0**
	SAN SIMON	COCHISE	7	-109.23	32.27	3609 (1100)	--	--	--	--	74	**0**	**0**	**0**	**0**
*	SAN SIMON 5 NW		7	-109.27	32.33	3611 (1101)	--	--	--	--	13	**0**	**0**	**0**	**0**
	SAN SIMON 9 ESE	COCHISE	7	-109.08	32.17	3879 (1183)	--	--	--	--	25	**0**	**0**	**0**	**0**
*	SAN SIMON 9 NE		7	-109.13	32.37	4002 (1220)	--	--	--	--	2	**0**	**0**	**0**	**0**
	SANTA MARGARITA		7	-111.58	31.68	3933 (1199)	--	--	--	--	34	**0**	**0**	**0**	**0**
	SANTA RITA EXP RANGE	PIMA	7	-110.85	31.77	4299 (1311)	8	--	1951	1	56	**2**	**3**	**1**	**2**
	SANTA ROSA SCHOOL	PIMA	7	-112.05	32.32	1840 (561)	--	--	--	--	19	**0**	**0**	**0**	**0**
	SASABE	PIMA	7	-111.55	31.48	3589 (1094)	--	--	--	--	47	**0**	**0**	**0**	**0**
	SASABE 6 NNE	PIMA	7	-111.50	31.57	3494 (1065)	--	--	--	--	18	**0**	**0**	**0**	**0**
	SASABE 7 NW	PIMA	7	-111.60	31.60	3824 (1166)	--	--	--	--	55	**0**	**0**	**0**	**0**
	SELLS	PIMA	7	-111.88	31.92	2345 (715)	--	--	--	--	35	**0**	**0**	**0**	**0**
	SIERRA VISTA	COCHISE	7	-110.28	31.55	4599 (1402)	--	--	--	--	24	**0**	**0**	**0**	**0**
	SILVER BELL		7	-111.50	32.38	2739 (835)	--	--	--	--	37	**0**	**0**	**0**	**0**
	STEPHENS RANCH	COCHISE	7	-109.20	31.40	3998 (1219)	10	--	1980	2	55	**0**	**0**	**0**	**0**
*	TANQUE R9 ON W4		7	-109.62	32.62	3562 (1086)	--	--	--	--	1	**0**	**0**	**0**	**0**
	TOMBSTONE	COCHISE	7	-110.05	31.70	4609 (1405)	10	--	1997	1	109	**1**	**2**	**1**	**1**
	TUCSON 17 NW	PIMA	7	-111.20	32.25	2560 (781)	--	--	--	--	24	**0**	**0**	**0**	**0**
	TUCSON CAMP AVE EXP FM	PIMA	7	-110.95	32.28	2329 (710)	--	--	--	--	56	**0**	**0**	**0**	**0**
	TUCSON INTERNATIONAL AP	PIMA	7	-110.95	32.13	2548 (777)	--	--	--	--	58	**0**	**0**	**0**	**0**
	TUCSON MAGNETIC OBSY	PIMA	7	-110.83	32.25	2525 (770)	--	--	--	--	48	**0**	**0**	**0**	**0**
*	TUCSON MOUNTAIN PARK	PIMA	7	-111.17	32.25	2850 (869)	--	--	--	--	7	**0**	**0**	**0**	**0**
*	TUCSON MOUNTAIN PARK		7	-111.13	32.22	2679 (817)	--	--	--	--	1	**0**	**0**	**0**	**0**
*	TUCSON NURSERY 4 NW		7	-111.05	32.30	2250 (686)	--	--	--	--	1	**0**	**0**	**0**	**0**
	TUCSON WFO	PIMA	7	-110.95	32.23	2434 (742)	--	--	--	--	112	**0**	**0**	**0**	**0**
	TUMACACORI NATL MONMNT	SANTA CRUZ	7	-111.05	31.57	3266 (996)	--	--	--	--	58	**0**	**0**	**0**	**0**
	TUSCON U OF A #1	PIMA	7	-111.00	32.25	2314 (706)	--	--	--	--	24	**0**	**0**	**0**	**0**
*	VAIL 7 N	PIMA	7	-110.72	32.13	2979 (908)	--	--	--	--	13	**0**	**0**	**0**	**0**
*	WAHAK HOTRONTK	PIMA	7	-112.37	32.22	1902 (580)	--	--	--	--	4	**0**	**0**	**0**	**0**
*	WHITLOCK VALLEY R2 ON W1		7	-109.52	32.82	3290 (1003)	--	--	--	--	1	**0**	**0**	**0**	**0**
	Wildcat	Greenlee	7	-109.48	33.77	7850 (2393)	--	11.8	93	3	21	**67**	**67**	**59**	**59**
	WILLCOX	COCHISE	7	-109.85	32.27	4174 (1273)	9	--	1912	2	107	**1**	**1**	**1**	**1**
	Y LIGHTNING RANCH	COCHISE	7	-110.23	31.45	4589 (1399)	--	--	--	--	67	**0**	**0**	**0**	**0**

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

Ground Snow Loads with Statistical Data for All Sites

	Station Name	Data Source	Coop ID	# Years Zero Data	Min Snow Depth (in)	Min SWE (in of H_2O)	Mean	Standard Dev.	Median	Mode	Skew-ness	COV	COV (trunc-ated)	λ_x	ζ_x	50-yr Snow Depth (in)	50-yr SWE (in of water)	30-yr Snow Depth (in)	30-yr SWE (in of water)
	SABINO CANYON	NCDC	27355	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SAFFORD	NCDC	27388	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SAFFORD AGRI CENTER	NCDC	27390	44	0	--	0.7	2.0	0.0	0.0	5.34	3.07	1.00	-0.752	0.833	2.6	--	2.2	--
	SAHUARITA 2 NW	NCDC	27403	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SAHUARITA 8 W	NCDC	27419	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SALA RANCH	NCDC	27445	8	0	--	3.2	3.1	2.0	0.0	0.82	0.96	0.96	0.834	0.807	12.1	--	10.1	--
	SAN RAFAEL RANCH	NCDC	27555	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SAN SIMON	NCDC	27560	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SAN SIMON 5 NW	NCDC	27563	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SAN SIMON 9 ESE	NCDC	27567	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	SAN SIMON 9 NE	NCDC	27565	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SANTA MARGARITA	NCDC	27583	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SANTA RITA EXP RANGE	NCDC	27593	40	0	--	1.0	2.0	0.0	0.0	2.35	2.05	1.00	-0.365	0.833	3.8	--	3.2	--
	SANTA ROSA SCHOOL	NCDC	27600	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SASABE	NCDC	27619	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SASABE 6 NNE	NCDC	27625	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SASABE 7 NW	NCDC	27622	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SELLS	NCDC	27726	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SIERRA VISTA	NCDC	27880	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	SILVER BELL	NCDC	27915	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	STEPHENS RANCH	NCDC	28206	53	0	--	0.2	1.4	0.0	0.0	7.03	6.28	1.00	-1.869	0.833	0.9	--	0.7	--
*	TANQUE R9 ON W4	NCDC	28409	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TOMBSTONE	NCDC	28619	90	0	--	0.7	1.9	0.0	0.0	2.86	2.58	1.00	-0.656	0.833	2.9	--	2.4	--
	TUCSON 17 NW	NCDC	28795	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUCSON CAMP AVE EXP FM	NCDC	28796	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUCSON INTERNATIONAL AP	NCDC	28820	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUCSON MAGNETIC OBSY	NCDC	28800	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TUCSON MOUNTAIN PARK	NCDC	28805	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TUCSON MOUNTAIN PARK	NCDC	28806	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	TUCSON NURSERY 4 NW	NCDC	28810	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUCSON WFO	NCDC	28815	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUMACACORI NATL MONMNT	NCDC	28865	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	TUSCON U OF A #1	NCDC	28817	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	VAIL 7 N	NCDC	28998	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WAHAK HOTRONTK	NCDC	29109	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
*	WHITLOCK VALLEY R2 ON W1	NCDC	29279	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--
	Wildcat	ST	866	0	--	1	4.9	2.9	4.7	6.3	0.69	0.59	0.59	1.434	0.544	--	12.8	--	11.4
	WILLCOX	NCDC	29334	82	0	--	0.6	1.4	0.0	0.0	3.25	2.34	1.00	-0.845	0.833	2.4	--	2.0	--
	Y LIGHTNING RANCH	NCDC	29562	--	0	--	0	--	--	--	--	--	--	--	--	0	--	0	--

* indicates less than 15 years of data available

SHADED indicates 50-year Snow Load less than 12 PSF (negligible in typical design)

APPENDIX B

SNOW LOAD DATA for ARIZONA

STRUCTURAL ENGINEERS ASSOCIATION
OF ARIZONA

SNOW LOAD DATA FOR ARIZONA

Published By

Structural Engineers Association of Arizona

In Cooperation With

Arizona State University

Mac Elliott

Snow Load Committee Chairman - S.E.A.A.

1973

Second Printing - 1981

SNOW LOAD DATA FOR ARIZONA

Contents

FORWARD TO SECOND PRINTING OF SNOW LOAD DATA FOR ARIZONA. NOVEMBER, 1981

This Report originally advised caution in the use of the tabulated 30 year snow load figures. Caution is still advised. However, nothing has come to the attention of the Committee during the 8 years since the first printing to warrant significant revisions of the tabulated loads. Therefore, tables, charts, and text are left unchanged for this second printing.

It is strongly recommended that snow load records continue to be monitored, and compared with the data in this book. Individual changes should be made where warranted. Also, data from new stations is becoming available. Sometime in the future a thorough review of all the then available information, with subsequent updating and/or expansion of these tables may be advisable.

Perhaps the expanded data base available in the future would permit more formalized statistical projections, along the lines of the Weibull and Log Pearson Type III distributions used in much of the recent snow load work in other areas. However, even with such statistical approaches, considerable judgement will still be necessary in arriving at projected loads for specific sites. Arizona's winter weather is too variable. -- e.g. Weather coming from the Pacific Coast over a highly variable terrain and subject to a high degree of modification on the way, -- A warm State with a rain vs. snow picture extremely spotty and variable from year to year, -- Local conditions varying widely from point to point, -- etc.. Statistics are helpful, but judgement is essential.

The question has been raised as to how the tabulated 30 year loads relate to probable 50 and 100 year loads. In answer, most distributions used for hydrological predictions would show the 50 year recurrent load as about 15% higher than the 30 year load, and the 100 year recurrent load as about 25% greater than the 30 year load. These figures also seem reasonable for snow.

One more question that keeps coming up is how to turn inches of snow into weights on the ground. As stated in the Report, rules of thumb can be misleading. Densities routinely vary between 5% and 50% water. However, certain numbers may be useful as a rough guide in the higher, colder areas, where substantial snow pack remains for much of the winter. December, 10% to 20% water, January, 15% to 25% water, February, 20% to 30% water, March, 30% to 40% water, and April, 35% to 45% water.

Mac Elliott

SNOW LOAD DATA FOR ARIZONA

INTRODUCTION:

For many years a need has existed for a guide to aid in estimation of the weight of snow which might be expected to occur on structures in the Arizona high country. This report is intended to serve as such a guide.

SCOPE:

The report is based on available records of snow depths and water contents. Basic ground and roof snow loads representing probable 30 year maximums are developed, and a detailed listing of these loads is given for various reporting stations around the State.

Also included are recommendations for roof design load modifications due to the following factors: wind removal of roof snow, roof slopes, unbalanced loads, roof valleys, multilevel roofs, roof projections, and ice loads.

SOURCES OF DATA:

Two basic sets of records are available from which maximum snow loads may be estimated. U. S. Soil Conservation Service Snow Surveys and U. S. Weather Bureau records.

Soil Conservation Service (S.C.S.) readings are made twice a month and date back to 1938 at some stations. Measurements are taken for the most part away from populated areas, which somewhat limits their direct applicability to building in these areas. However, the data is extremely valuable due to inclusion of actual measurements of water content in the snow. Depths of snow are also recorded.

Available Weather Bureau (W.B.) records on the other hand list only snow depths, not water content, but do include reporting stations for nearly all of Arizona's inhabited communities. Some records date back to 1895, but longevity as well as completeness of these records varies greatly throughout the State.

Map No. 2 shows the Weather Bureau reporting stations and Map No. 3 the S.C.S. snow courses.

SOURCES OF DATA (Continued)

A third source of information is the report, "Actual Snow Loads in Arizona" by H. M. Elliott. This is a detailed study of the great storm of December 13 - 20, 1967, and lists snow loads in pounds per square foot as well as the snow depths for 111 different reporting stations around the State. As this storm produced the heaviest short period snowfall on record in most areas of the State, the report provides a useful guide in arriving at basic ground load criteria.

See Bibliography at end of this report for additional sources of information.

CONVERSION OF SNOW DEPTHS TO LOADS:

The foregoing data sources were searched to obtain the maximum recorded snow depths or loads at all reporting areas. (See Tables 1 - 5.) The snow depths without loads from the Weather Bureau records, and from a few incomplete Soil Conservation records, then had to be converted into pounds per square foot on the ground.

Any conversion at this time from depths listed on a printed page to maximum weights that existed on the ground years ago is fraught with error. To illustrate the problem, two listings are included for Hawley Lake. They give both the record maximum depth of 91" with a measured weight of 57 p.s.f. for 1967 (12% water), and the record maximum weight of 103 p.s.f. with a depth of only 45" for 1973, (44% water). These weights were not estimates, they were actual S.C.S. measurements. It is apparent that in spite of all the theoretical conversion data available in the literature (from snow depths to p.s.f.), an educated guess is the best we can hope for.

The process used to convert listed snow depths into pounds per square foot at stations without recorded loads was to search S.C.S. and Elliott data for comparable conditions. (S.C.S. and Elliott data contain both snow depths and p.s.f. loads.) Comparing this information with the depth at the station in question, a p.s.f. snow load estimate was made for that station. All listed Weather Bureau maximum p.s.f. data was arrived at in this manner, plus that for a few S.C.S. stations noted with asterisks (*). There is no way of judging accuracies of these weight estimates, but hopefully they are within 30%±

DEVELOPMENT OF BASIC GROUND SNOW LOADS:

Considerable effort was expended in an attempt to group geographical areas into "Snow Zones" so that meaningful snow load-to-elevation relationships could be developed for each zone. For convenience, areas used by the U.S. Weather Bureau in their Statewide reporting service were utilized in this grouping, since each such area has its own weather pattern. See Map No. 1.

Maximum recorded or estimated snow loads were plotted against elevation above sea level for each grouping. See Figs. 1 - 5. Curves were then drawn, generally but not always, through the high side of the plotted points. The final division of the State into five snow load zones provided helpful load-to-elevation curves for Zones I and V, and to a lesser degree for Zones II, III and IV.

The original intent was to use these curve values as Basic Ground Loads, similar to the approach taken in the Oregon and Colorado reports, (See Bibliography Nos. 4 and 5). However, due to the wide scatter of data this approach was finally abandoned. Each site was considered individually and a Basic Ground Load assigned accordingly. See Tables 1 - 5. The curves were used only as aids in arriving at Basic Ground Loads, and no curves have been reproduced with this report for fear of misleading.

This wide data scatter suggests the importance of considering all the pertinent features of an individual site rather than just the elevation. For example, south slopes and exposure to sun are very effective in reducing long term snow buildup. Flagstaff, with its south exposure, had almost no long term buildup during the spring of 1973, while Newman Park, 15 miles south hit 75 p.s.f. and Happy Jack, 35 miles south reached 105 p.s.f. on the ground.

A study of the Statewide storm pattern shows the higher elevations of Zones II, III and IV, "stripping" most of the snow out of winter storms before it reaches Zone I. Snow loads are light in the northeast, "Four Corners" area. (There was no reporting Zone I station above 7,500 feet, but a snow load increase seems possible above this elevation. An estimate of 30 p.s.f. Basic Ground Snow Load at 8,000 feet seems reasonable for Zone I.)

Due to scarcity of data and wide variation of conditions, structures above 8,500 ft. in Zones I and V, and above 10,000 ft. in Zones II, III and IV should have special investigations to determine design snow loads.

DEVELOPMENT OF BASIC GROUND SNOW LOADS (Continued)

Normal roof live loads should govern over snow loads below about 4,500 feet at Zones I and V, and below about 3,000 feet at Zones II, III and IV.

MISCELLANEOUS FACTORS AFFECTING RELIABILITY:

Probably the two factors most adversely affecting reliability have been shortage of data and the necessity of estimating snow weights from Weather Bureau depth records. Unfortunately for the purposes of this report, the populated areas containing most of the building activity do not have records of actual snow weight measurements. To compensate for these shortages, as much nearby data, (S.C.S., W.B., or H.M.E.) was considered as seemed applicable in arriving at Basic Loads for each specific station.

One specific factor tending towards the unconservative was as follows: Elliott utilized the daily water precipitation records of the Weather Bureau in his analysis of the December 1967 storm. Subsequent conversations with the Weather Bureau indicate that during heavy snow storms the amount of measured precipitation may be less than the actual precipitation, perhaps by 10 to 30%, due to losses in collecting and melting the snow. It is therefore quite possible that some of Elliott's loads were low.

However, on the conservative side, it seems much of the "hard" data, (obtained from Soil Conservation measurements and Elliott's report, and consisting of actual snow weights, not just depth measurements), represented something greater than a 30 year maximum.

The effects of the above factors were all estimated when arriving at Basic 30 Year Loads. No effort was made to err on either the conservative or unconservative side.

See also Conclusions at end of this report.

REDUCTIONS FOR WIND REMOVAL OF ROOF SNOW:

Wind can blow snow off roofs, and many codes make allowances for this. These allowances vary considerably however, between different geographical areas.

a. The Canadian code allows for snow blown off roofs by using a basic coefficient of 0.80. (Their roof load is assumed equal to 80% of the ground snow load.) Also allowed is an ultimate reduction down to 60% of ground snow if the roof is totally exposed to the wind on all sides.

b. Oregon allows approximately the same reductions as Canada, except in areas west of the Cascades where due to wetter snow and gentler winds further reduction to 60% is not allowed.

c. The California Division of Architecture allows no reduction for wind removal of roof snow. At one time they did allow a reduction down to 80% of the ground snow load, but extensive recent measurements seemed not to justify the reduction.

Unfortunately, there are no known available records of comparisons between roof and adjacent ground snow loads in Arizona, so experience in other areas must be utilized. In attempting to arrive at a recommendation for Arizona, the following items seemed pertinent:

a. Canadian winters are longer and colder than Arizona winters, giving more time for snow to be blown off Canadian roofs as well as colder, drier easier snow to blow off.

b. Canadian winter winds are generally stronger than Arizona winter winds.

c. Many of Arizona's maximum snow loads were recorded during the December 1967 storm of Elliott's report. This was a short period storm with little opportunity for blow off.

d. At many locations in Arizona (the lower elevations), maximum loads consist of wet sticky snow delivered during short period storms, with little chance for blow off. (Temperatures at these elevations tend to warm up and prevent long term build up between storms.)

REDUCTIONS FOR WIND REMOVAL OF ROOF SNOW (Continued)

The foregoing four points all argue against allowing as much wind reduction for Arizona as for Canada. However, not all Arizona snow is wet and sticky, and it would seem reasonable to allow reductions at higher altitudes in the colder parts of the State. Reductions equal to the Canadian wind reductions would seem reasonable at elevations above about 7,500 feet in the northern part of the State, (Zones I, II, III and IV). Reductions equal to say one half of the Canadian wind reductions would seem reasonable at elevations from about 6,000 feet to 7,500 feet in the north (Zones I, II, III and IV), and above about 7,000 feet in the south (Zone V).

In Zones I, II, III and IV, this would result in a Basic Roof Load equal to 80% of the Ground Snow Load at elevations above 7,500 feet, and equal to 90% of the Ground Snow Load between 6,000 feet and 7,500 feet. At Zone V Basic Roof Loads would be 90% of Ground Snow Loads at elevations above 7,000 feet. These values are listed in Tables 1 - 5. Also allowed would be further reductions for roofs fully exposed to wind on all sides, as explained in the Table footnotes.

None of the above reductions should be applied at lower elevations.

MODIFICATIONS DUE TO ROOF SLOPES, UNBALANCED LOADS, ROOF VALLEYS, MULTI LEVEL ROOFS, ROOF PROJECTIONS AND ICE LOADS:

The Canadian Building Code has recommendations for dealing with the above factors. Since Arizona conditions differ somewhat, as previously discussed under "Wind Removal of Roof Snow", the Canadian recommendations had to be modified to fit Arizona. Figs. C2-1 through C2-7 are patterned after the Canadian format as closely as possible. Coefficients are given to determine load patterns on the roof.

Caution!! As explained in Figs. C2-1 through C2-7, there are two types of coefficients, those with asterisks (C_s*), and those without asterisks (C). Coefficients C_s* are to be multiplied by the Basic Roof Snow Loads and coefficients C are to be multiplied by the Basic Ground Snow Loads in order to arrive at the adjusted roof loadings. (Basic Roof Loads given in Tables 1 - 5, including the further reductions for exposed buildings at higher elevations per footnotes in the Tables, are applicable to C_s*.)

a. Sloped Roofs: See Case I of Figs. C2-1, C2-2 and C2-3 for allowable reductions.

MODIFICATIONS DUE TO ROOF SLOPES, UNBALANCED LOADS, ROOF VALLEYS, MULTI LEVEL ROOFS, ROOF PROJECTIONS AND ICE LOADS (Continued)

b. Unbalanced Loads: Peaked and curved roofs produce an aerodynamic shade on the lee side. Snow from the windward side is blown over and dropped on the lee slope, building up an unbalanced load. See Case II at Figs. C2-2 and C2-3 for load distributions.

c. Roof Valleys: See Fig. C2-4 for load concentrations at roof valleys.

d. Multi Level Roofs: Lower roofs may build up snow which has either drifted or slid down from adjacent higher roofs. See Figs. C2-5 and C2-6 for load distributions.

e. Roof Projections: Snow may build up adjacent to roof projections. See Fig. C2-7 for distribution.

f. Ice Loads at Roof Edges: In addition to snow loads, ice loads should be applied at edges of sloped roofs. The following amounts appear reasonable for average conditions, but special conditions should receive special evaluation.

Basic Ground Snow Load (p.s.f.)	Ice Load Per Lin Ft at Lower Edge of Sloped Roof
20 - 30	50 p.l.f.
30 - 50	75 p.l.f.
Above 50	100 p.l.f.

GENERAL:

1. Skip Loading. All roof areas should have design snow load applied

   a. with full load on entire area or

   b. with full load on any portion of the area and zero load on the remainder,

whichever produces maximum stress on the member concerned. This is to guard against effects of partial snow removal, as well as recognizing the fact that snow loads are often uneven. This requirement applies to conditions shown in Figs. C2-1 through C2-7, as well as to all other snow loads.

GENERAL (Continued)

2. A distinction should be noted between say a normal 20 p.s.f. live load and a 20 p.s.f. snow load. The live load may be reduced according to roof slopes and tributary areas per building code allowances, whereas the 20 p.s.f. snow load is not subject to the same reductions.

3. Beware of rules of thumb for converting maximum snow depth into snow loads. New fallen snow at high cold areas can easily have only 5% water, while older snow may run up to 50% water. Water percentages are influenced by such factors as temperature of formation, temperature record on the ground, subsequent snowfalls, subsequent rain, depth of snow available to catch and refreeze melt or subsequent rain, clouds, sun, shade, weight pressing on the lower layers, etc.

4. Actual snow weight data (not just depths) will continue to be difficult to obtain at many areas. Observers are for the most part unpaid volunteers who have many other concerns, particularly during times of heavy storms, than the measurement of the water content of the snow on the roof.

5. Snow removal during heavy storms is unreliable. Streets impassable. Manpower blocked inside homes, etc. Designers cannot count on snow removal.

CONCLUSIONS:

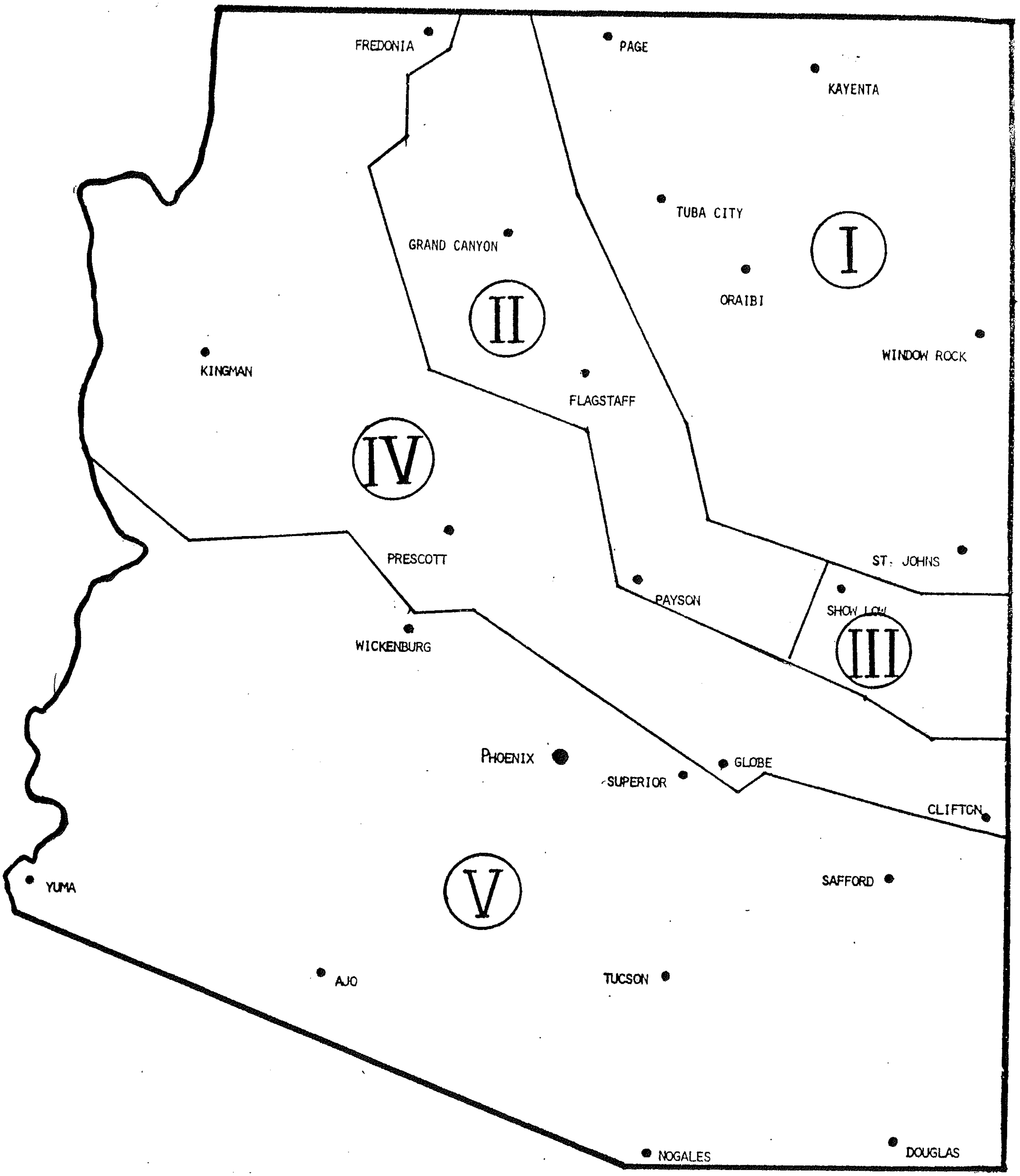
Until some future, more refined study is made, the Basic Snow Loads developed in this report seem to be a reasonable estimate of the maximum snow loads that might be expected over a 30 year period. As such, they could serve as a guide for design loads for structures. However, while as much information as possible was searched and reasonable care was used in the preparation of this report, there is obviously no way to guarantee that the loads listed will not be exceeded in the next 30 years. As stated earlier, no attempt was made to err on the conservative side. And no claim is made to Divine Revelation.

The listed values should be treated only as a guide. The designer must use his best judgment. Attention must be paid to local conditions that might cause increases; e.g. north slopes, shade, drifting, wind shelter that would prevent snow from blowing off roofs, etc., and particularly to any known history of heavier snow. And snow loads for structures requiring a high level of safety should always receive special consideration.

PREPARATION:

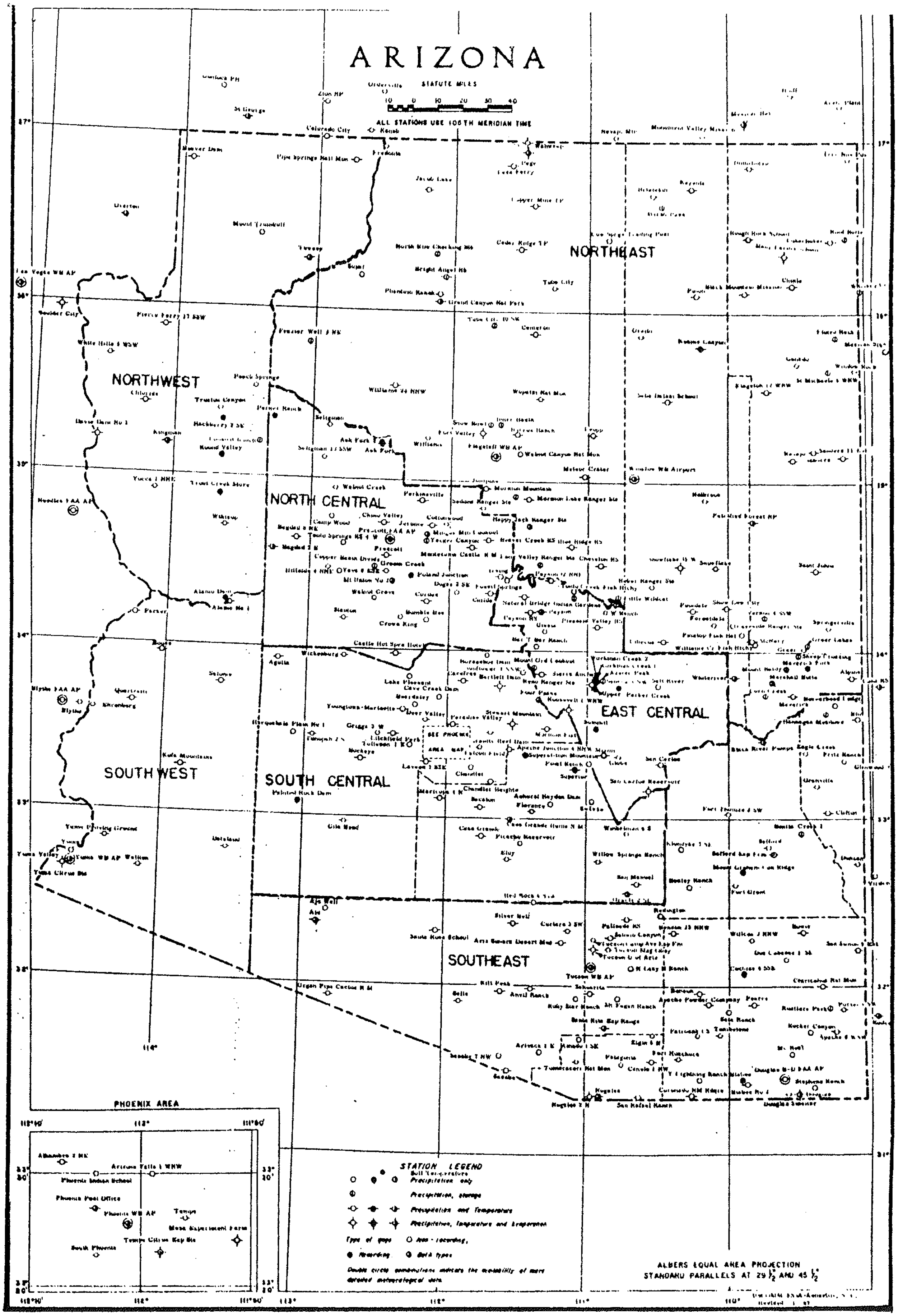
This report was prepared by a special Snow Load Committee of the Structural Engineers Association of Arizona, in cooperation with the Civil Engineering Department of Arizona State University. Much of the record search was done by John Nerison. Compilation and correlation of the data and preparation of the report was done under the direction of Mac Elliott.

After review by the board of directors of the Central Chapter of the S.E.A.A., and by other interested engineers, the report was circulated to building officials of the affected communities as well as to other pertinent government agencies, with requests for comments. Information received back generally correlated well with the report data. Where applicable, table values were adjusted slightly to reflect these comments, prior to publication.



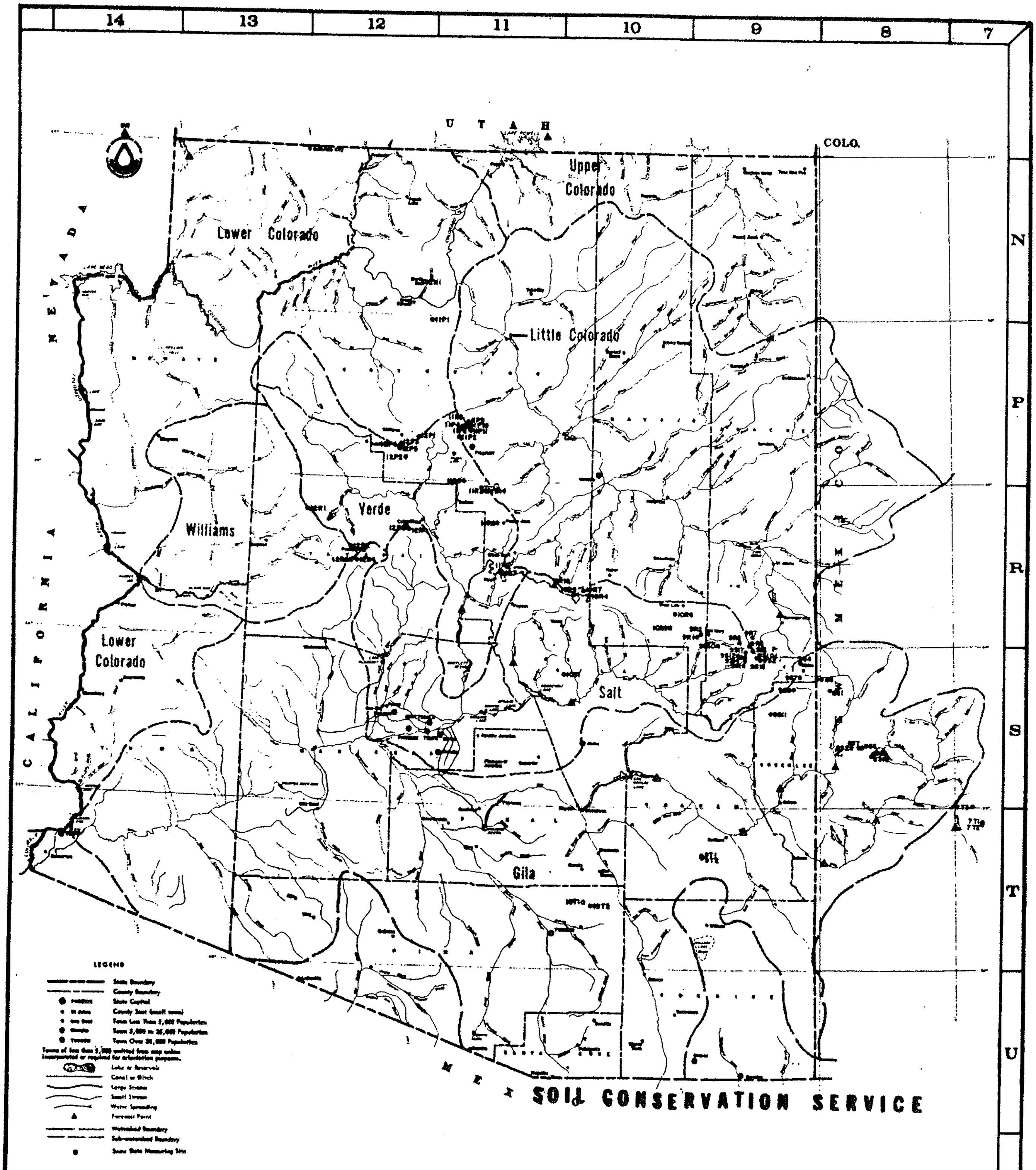
SNOW LOAD ZONES IN ARIZONA

MAP NO. 1



WEATHER BUREAU REPORTING STATIONS

MAP. NO 2



MAP NO. 3

SNOW COURSES AND RELATED DATA MEASURING SITES
ARIZONA

1973

SCALE 1:[illegible]
ALBERS EQUAL AREA PROJECTION

USGS National Atlas 1:[illegible] Albers Equal-area projection ([illegible]) used as source for base map and adapted for SCS use.

TABLE 1 SNOW ZONE I

Place	Elevation above Sea Level.	Month and Year of Maximum Snow.	Maximum Depth (inches)	Maximum Measured, Calculated, or Estimated Wt. of Snow on Ground (psf)	30 Year Basic Ground Snow Load (psf)	30 Year Basic Roof Snow Load (psf) **	Data Source †	Remarks
Betatakin	7286	12/67	38	10	20	18	HME	
Black Mountain Mission	6350	12/61	12	10*	20	18	WB	
Cameron	4165	12/67	18	8	12	12	HME	
Chinle	5538	12/67	11	9	16	16	HME	
Copper Mine T. P. (20 miles south of Page)	6380	12/60	23	16*	20	18	WB	
Dinnehotso	5020	12/67	--	8	16	16	HME	
Fort Defiance	6750	3/48	27.5	20*	20	18	WB	
Ganado	6350	12/67	24	10	20	18	HME	
Holbrook	5069	12/67	19	10	16	16	HME	
Jadito	6700	3/48	28	20*	20	18	WB	
Kaibato	6000	12/60	14	9*	20	18	WB	
Kayenta	5665	2/48	21	12*	16	16	WB	
Keams Canyon	6215	12/67	11	18	20	18	HME	
Leupp	4700	12/67	19	9	16	16	HME	
Lukachukai	6520	12/61	20	12*	20	18	WB	
Navajo (40 miles N.E. of Holbrook)	5580	12/67	—	8	16	16	HME	
Page	4270	12/67	9	7	12	12	HME	
Petrified Forest National Park	5460	11/31	20	12*	16	16	WB	
Pinon	6000	12/67	21	14	20	18	HME	
Saint Johns	5730	1/37	19	12*	16	16	WB	
Sanders 11 ESE	6250	12/67	20	8	20	18	HME	
Seba Dalkai School	5900	12/67	55	30*	25	25	WB	
Snowflake	5642	12/67	30	21	20	20	HME	
Tuba City	4936	12/67	20	7	16	16	HME	
Window Rock	6750	12/67	18	8	20	18	HME	
Winslow	4895	12/67	29	19	20	20	HME	
Wupatki National Monument	4908	12/67	32	13	16	16	HME	

† SCS = Soil Conservation Service. WB = Weather Bureau. HME = Elliott Report.

* Estimated weights (as opposed to measured or calculated weights).

** When roof is fully exposed to wind, 30 year Basic Roof Load may be further reduced 10% at elevations above 6000 ft., and 20% above 7500 ft. See Table 2 for example.

TABLE 2 SNOW ZONE II

	Elevation above Sea Level.	Month and Year of Maximum Snow	Maximum Depth (inches)	Maximum Measured, Calculated, or Estimated Wt. of Snow on Ground. (psf)	30 Year Basic Ground Snow Load (psf)	30 Year Basic Roof Snow Load (psf) **	Data Source †	Remarks
Agassiz (10 miles N. of Flagstaff)	11,200	4/73	126	220*	--	--	SCS	
Baker Butte (15 mi. North of Payson)	7,300	3/73	77	124	110	100	SCS	
Baker Butte #2 (15 mi. North of Payson)	7,700	3/73	97	160	145	115	SCS	
Bill Williams Intermediate (6 mi. So. Williams)	8,550	4/73	76	145	130	105	SCS	
Bill Williams Summit (6 mi. So. Williams)	8,950	3/73	108	164	150	120	SCS	
Bright Angel R.S. (No. Rim of Grand Canyon)	8,400	3/52	77	128	120	95	SCS	
Burrus Ranch (15 mi. N.E. of Flagstaff)	6,800	12/67	40	22	25	22	HME	
Canyon Creek #2 (13 mi. S.W. of Heber)	7,500	3/73	48	78	70	55	SCS	
Canyon Point (17 mi. S.W. of Heber)	7,600	3/73	59	90	80	65	SCS	
Chalender (7 mi. E. Williams)	7,100	3/73	44	62	55	50	SCS	
Chevelon R.S. (30 mi. N.E. of Payson)	7,006	12/67	52	39	50	45	HME	
Cibecue	4,950	12/67	16	31	30	30	HME	
Doyle Saddle (7 mi. No. of Flagstaff)	10,900	4/73	--	200*	--	--	SCS	
Flagstaff Airport	6,993	12/67	83	37	40	35	HME	May be light for some areas of city. e.g. see Fort Valley
Fort Valley (7 mi. No. of Flagstaff)	7,350	2/49	42	60	55	50	SCS	
Grand Canyon (10 mi. S.E. of Village.)	7,500	3/73	33	55	50	40	SCS	
Grand Canyon National Park	6,950	1/49	38	48*	45	40	WB	
Happy Jack (35 mi. So. of Flagstaff)	7,630	3/73	72	105	95	75	SCS	
Heber (12 mi. S.W. of Heber)	7,600	3/73	53	84	75	60	SCS	
Heber Ranger Station	6,590	12/67	48	44	40	36	HME	
Inner Basin #1 } 10 miles	10,000	4/73	125	228	205	165	SCS	
Inner Basin #2 } North of	9,750	4/73	95	162	145	115	SCS	
Inner Basin #3 } Flagstaff	10,250	4/73	--	240*	--	--	SCS	
Jacob Lake	7,920	4/73	60	85*	80	64	WB	
Mormon Lake | 20 mi. So.	7,350	2/49	73	116	105	95	SCS	
Mormon Mountain | of Flagstaff	7,500	3/73	78	125	110	90	SCS	
Natural Bridge (10 mi. N.W. of Payson)	4,607	12/67	--	36	30	30	HME	
Newman Park (15 mi. S.W. of Flagstaff)	6,750	3/73	57	75	65	60	SCS	
Payson	4,913	12/67	48	47	40	40	HME	
Payson (12 mi. NNE)	5,500	12/67	42	55	50	50	HME	
Pleasant Valley R.S. (20 mi. E. of Payson)	5,050	12/67	27	26	25	25	HME	
Snow Bowl #1 | 10 mi. No.	10,260	4/73	85	163*	--	--	SCS	
Snow Bowl #2 | of Flagstaff	11,000	4/73	130	222*	--	--	SCS	
Tonto Creek Fish Hatchery (15 mi. N.E. of Payson)	6,280	12/67	58	52	45	40	HME	
Walnut Canyon (10 mi. E. of Flagstaff)	6,685	12/67	54	43	40	36	HME	
White Horse Lake Junction (10 mi. So. of Williams)	7,180	3/73	57	86	75	70	SCS	
Williams	6,750	1/30	53	42*	40	36	WB	
Williams Ski Run (5 mi. So. of Williams)	7,720	4/73	70	128	115	105	SCS	
Young	5,200	2/44	25	20*	20	20	WB	

† SCS = Soil Conservation Service. WB = Weather Bureau. HME = Elliott Report.

* Estimated weights, (as opposed to measured or calculated weights).

** When roof is fully exposed to wind, 30 year Basic Roof Load may be further reduced 10% at elevations above 6,000 ft., and 20% above 7,500 ft. e.g. Could reduce Flagstaff A.P. to 35 x .9 = 32 psf. Could reduce Bright Angel to 95 x .8 = 76 psf.

TABLE 3 SNOW ZONE III

Place	Elevation above Sea Level.	Month and Year of Maximum Snow	Maximum Depth (inches)	Maximum Measured, Caculated, or Estimated Wt. of Snow on Ground. (psf)	30 Year Basic Ground Snow Load (psf)	30 Year Basic Roof Snow Load (psf) **	Data Source †	Remarks
Alpine	8,020	12/67	60	36	50	40	HME	
Baldy (Sheep Crossing)	9,125	3/62	47	90	90	70	SCS	
Baldy #2 20 mi. SE	9,750	4/73	83	173	155	125	SCS	
Baldy #3 of McNary	10,950	4/73	117	245	--	--	SCS	
Beaverhead Lodge (10 mi. S. of Alpine)	8,000	1/68	38	65	60	50	SCS	
Blue	5,760	12/67	42	36	35	35	HME	
Cheese Springs (18 mi. E. of McNary)	8,600	3/73	44	64	60	50	SCS	
Coronado Trail (4 mi. SW of Alpine)	8,000	2/49	38	64	60	50	SCS	
Forestdale (5 mi. SW of Show Low)	6,430	1/68	25	48	40	36	SCS	
Ft. Apache (17 mi. E. of McNary)	9,160	3/62	58	90	90	70	SCS	This is not the town of Ft. Apache.
Frisco Divide (15 mil. SE of Alpine)	8,000	1/68	31	50	50	40	SCS	
Greer	8,490	12/67	54	36	50	40	HME	
Hannagan Meadows	9,090	3/73	67	113	100	80	SCS	
Hawley Lake	8,300	12/67	91	57	95	75	HME	2 Sets Data Illustrate Different Wt/Depth Ratios
Hawley Lake	8,300	4/73	45	103	95	75	SCS	
Lakeside R.S.	6,700	12/67	52	36	40	36	HME	
Maverick Fork (20 mi. SE of McNary)	9,150	3/73	64	106	95	75	SCS	
McNary (2 mi. W. of McNary)	7,200	3/73	41	60	55	50	SCS	
McNary	7,320	1/37	71	60*	55	50	WB	
Milk Ranch (5 mi. SW of McNary)	7,000	3/73	32	42	45	40	SCS	
Mt. Ord (15 SE of McNary)	11,200	4/73	134	273*	--	--	SCS	
Nutrioso (3 mi. N. of Alpine)	8,500	2/49	34	47	50	40	SCS	
Pinedale (15 mi. W. of Showlow)	6,500	1/37	42	42*	40	36	WB	
Pinetop Fish Hatchery	7,200	12/67	54	52	50	45	HME	
Show Low	6,412	12/67	41	31	35	32	HME	
Smith Cienega (15 mi. SE of McNary)	10,050	3/73	97	191*	--	--	SCS	
Springerville	7,060	2/48	28	35*	35	32	WB	
State Line (7 mi. SE of Alpine)	8,000	1/68	33	42	50	40	SCS	
Sunrise Summit (17 mi. SE of McNary)	10,600	4/73	80	147	--	--	SCS	
Whiteriver	5,280	1/60	21	21*	25	25	WB	
Williams Creek Fish Hatchery (2 mi. SE of McNary)	6,960	1/49	52	55*	50	45	WB	
Wilson Lake (13 mi. E. of McNary)	9,000	3/73	73	112	100	80	SCS	

† SCS = Soil Conservation Service. WB = Weather Bureau. HME = Elliott Report.

* Estimated weights, (as opposed to measured or calculated weights).

** When roof is fully exposed to wind, 30 year Basic Roof Load may be further reduced 10% at elevations above 6,000 ft., and 20% above 7,500 ft. See Table 2 for example.

TABLE 4 SNOW ZONE IV

Place	Elevation above Sea Level.	Month and Year of Maximum Snow.	Maximum Depth (inches)	Maximum Measured, Calculated, or Estimated Wt. of Snow on Ground. (psf)	30 Year Basic Ground Snow Load (psf)	30 Year Basic Roof Snow Load (psf) **	Data Source †	Remarks
Ash Fork	5,200	12/67	38	14	20	20	HME	
Bagdad (8 mi. NE)	4,240	12/67	15	18	20	20	HME	
Beaver Creek R.S. (12 mi. S. of Sedona)	3,830	12/67	26	13	20	20	HME	
Call of the Canyon (10 mi. N. of Sedona)	5,329	2/44	60	48*	50	50	WB	
Camp Wood (30 mi. NW of Prescott)	5,700	2/49	33	45	40	40	SCS	
Chino Valley	4,750	12/67	22	16	20	20	HME	
Clifton	3,465	12/67	20	18	20	20	HME	
Copper Basin Divide (7 mi. SW of Prescott)	6,720	12/67	37	59	55	50	SCS	
Cordes Junction	3,773	12/67	15	23	20	20	HME	
Cottonwood	3,360	12/67	26	26	20	20	HME	
Crown King	6,000	12/67	54	60	55	50	HME	
Eagle Creek (20 mi. SW of Hannagan Meadows)	5,100	12/67	35	12	20	20	HME	
Fraziers Well 4 mi. NE (25 mi. NE Peach Springs)	6,500	2/44	22	30*	40	36	WB	
Fredonia	4,675	1/44	20	20*	20	20	WB	
Gaddes Canyon (20 mi. NE of Prescott)	7,600	3/73	72	108	100	90	SCS	
Globe	3,540	1/37	24	20*	20	20	WB	
Groom Creek	6,100	2/44	73	60*	50	45	WB	
Hilltop (55 mi. NE Peach Springs)	5,700	2/44	26	26	35	35	WB	
Highland Pines (7 mi. W. of Prescott)	7,000	12/67	48	52	55	50	HME	
Iron Springs (7 mi. W. of Prescott)	6,200	2/49	34	57	50	45	SCS	
Jerome	5,245	12/67	40	31*	30	30	HME	
Junipine (8 mi. N. of Sedona)	5,124	3/45	70	60*	50	50	WB	
Kingman	3,539	12/32	14	15*	20	20	WB	
Miami	3,560	12/67	16	21*	20	20	HME	
Mingus Mountain (20 mi. NE Prescott)	7,100	2/49	30	56	55	50	SCS	
Montezuma's Castle National Monument	3,180	12/67	19	16	20	20	HME	
Peach Springs	4,970	12/67	27	13	20	20	HME	
Pipe Springs National Monument	4,920	1/73	18	20*	20	20	WB	
Prescott	5,410	1/30	46	30	30	30	WB	
Sedona R.S.	4,223	12/67	15	18	20	20	HME	
Seligman	5,230	2/32	28	15*	20	20	HME	
Sierra Ancha (25 mi. N. of Miami)	5,100	12/67	30	47	40	40	HME	
Stanton (15 mi. N. of Wickenburg)	3,480	12/67	10	13	20	20	HME	
Tuweep (50 mi. SW of Jacob Lake)	4,775	12/41	17	17*	20	20	WB	
Walnut Creek R.S. (25 mi. SW of Ash Fork)	5,090	3/45	19	25*	20	20	WB	
Walnut Grove (16 mi. S. of Prescott)	3,764	2/44	25	25*	20	20	WB	
Workman Creek (30 mi. N. of Globe)	6,900	3/73	60	105	90	81	SCS	
Yaeger Canyon (10 mi. SW of Cottonwood)	6,000	1/45	30	30*	35	32	WB	
Yarnell	4,848	1/37	28	25*	25	25	WB	

† SCS = Soil Conservation Service. WB = Weather Bureau. HME = Elliott Report.

* Estimated weights, (as opposed to measured or calculated weights).

** When roof is fully exposed to wind, 30 year Basic Roof Load may be further reduced 10% at elevations above 6,000 ft., and 20% above 7,500 ft. See Table 2 for example.

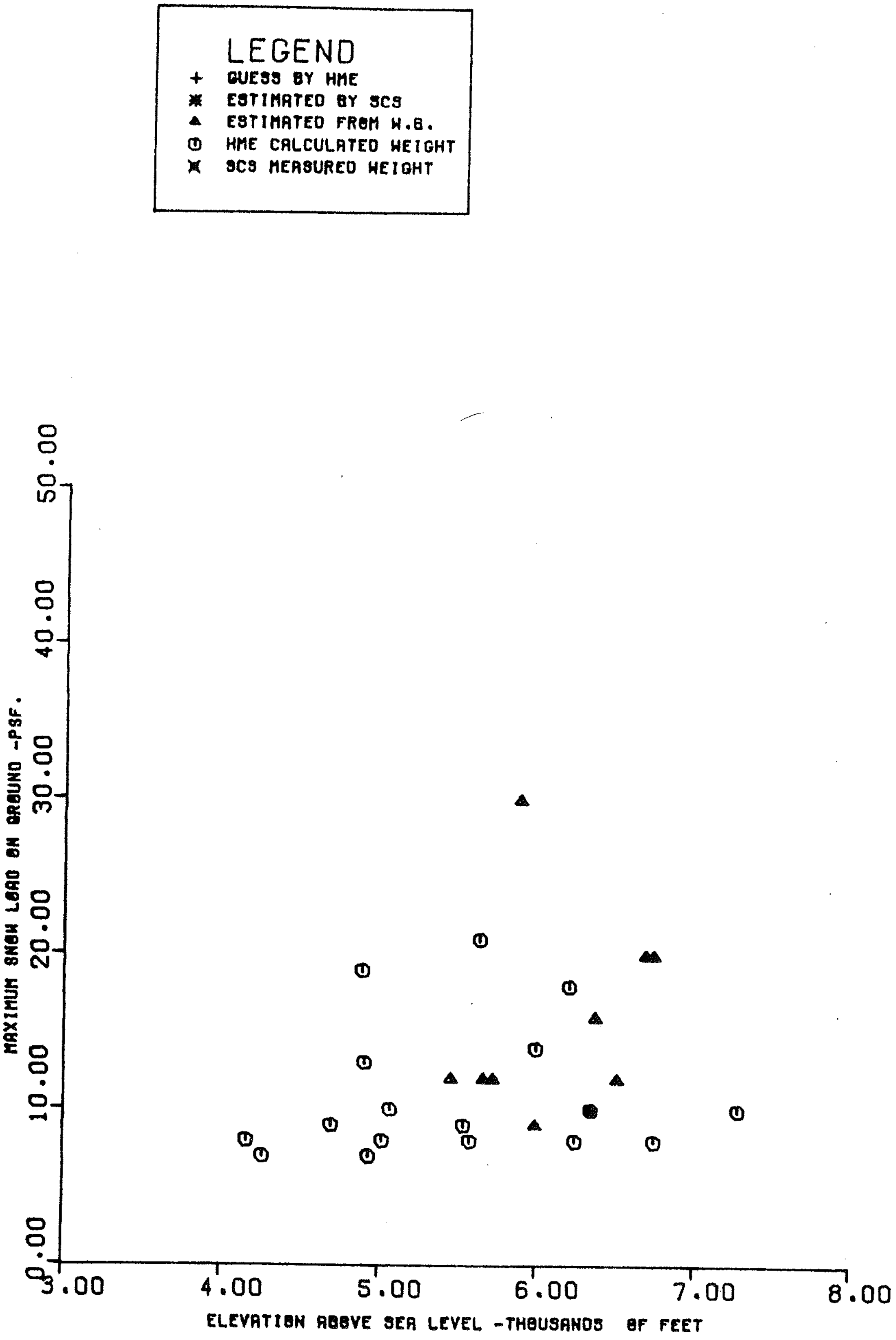
TABLE 5 SNOW ZONE V

Place	Elevation above Sea Level.	Month and Year of Maximum Snow.	Maximum Depth (inches)	Maximum Measured, Calculated or Estimated Wt. of Snow on Ground. (psf)	30 Year Basic Ground Snow Load (psf)	30 Year Basic Roof Snow Load (psf) **	Data Source †	Remarks
Bear Wallow (20 mi. NE of Tucson)	8,100	2/68	40	88	88	79	SCS	
Bisbee	5,440	12/67	24	17	20	20	HME	
Bisbee #2 (3 mi. SE of Bisbee)	5,020	1/49	20	10*	20	20	WB	
Chiricahua National Monument	5,300	12/67	28	16	20	20	HME	
Crazy Horse (14 mi. SW of Safford)	10,200	3/66	108	198*	--	--	SCS	
Dos Cabezas (15 mi. SE of Willcox)	5,100	12/67	12	16	20	20	HME	
Douglas	4,040	12/67	--	5	12	12	HME	
Ft. Grant	4,875	12/67	10	13	20	20	HME	
Ft. Huachuca	4,664	12/67	7	13	20	20	HME	
High Peak (14 mi. SW of Safford)	10,500	3/66	120	218*	--	--	SCS	
Kitt Peak	6,875	12/67	35	44	44	44	HME	
Nogales	3,800	12/71	--	10	12	12	HME	
Oracle 2 mi. SE	4,540	1/37	26	21*	20	20	WB	
Palisade R.S. - Mount Lemmon	7,945	2/66	86	86*	80	72	WB	
Patagonia	4,044	12/67	--	8*	12	12	HME	
Pearce (20 mi. NE of Tombstone)	4,420	12/67	4	5	12	12	HME	
Pinal Ranch (5 mi. E. of Superior)	4,520	12/67	25	26*	20	20	HME	
Portal 4 mi. SW	5,390	12/67	31	26	20	20	HME	
Rose Canyon (20 mi. NE of Tucson)	7,300	2/66	53	71	70	63	SCS	
Sala Ranch (10 mi. NE of Tombstone)	5,190	12/67	11	10	20	20	HME	
Safford	2,900	12/67	14	10	12	12	HME	
San Manuel	3,560	12/67	5	10	12	12	HME	
Santa Rita Experimental Range (25 mi. S. of Tucson)	4,300	12/67	--	10	12	12	HME	
Tombstone	4,540	12/67	--	10*	20	20	HME	
Willcox 3 mi. NNW	4,190	12/67	6	8	12	12	HME	

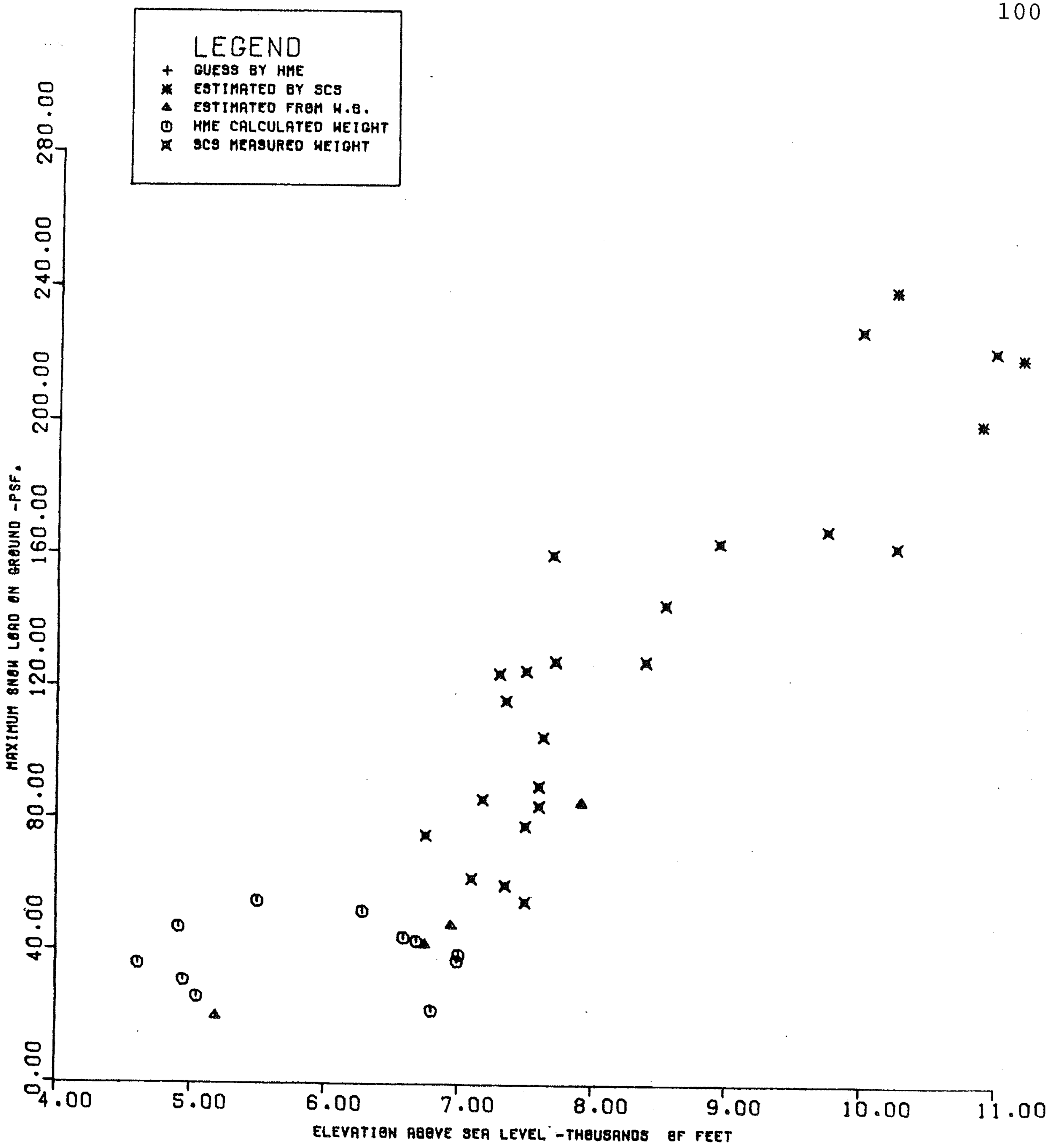
† SCS = Soil Conservation Service. WB = Weather Bureau. HME = Elliott Report.

* Estimated weights, (as opposed to measured or calculated weights).

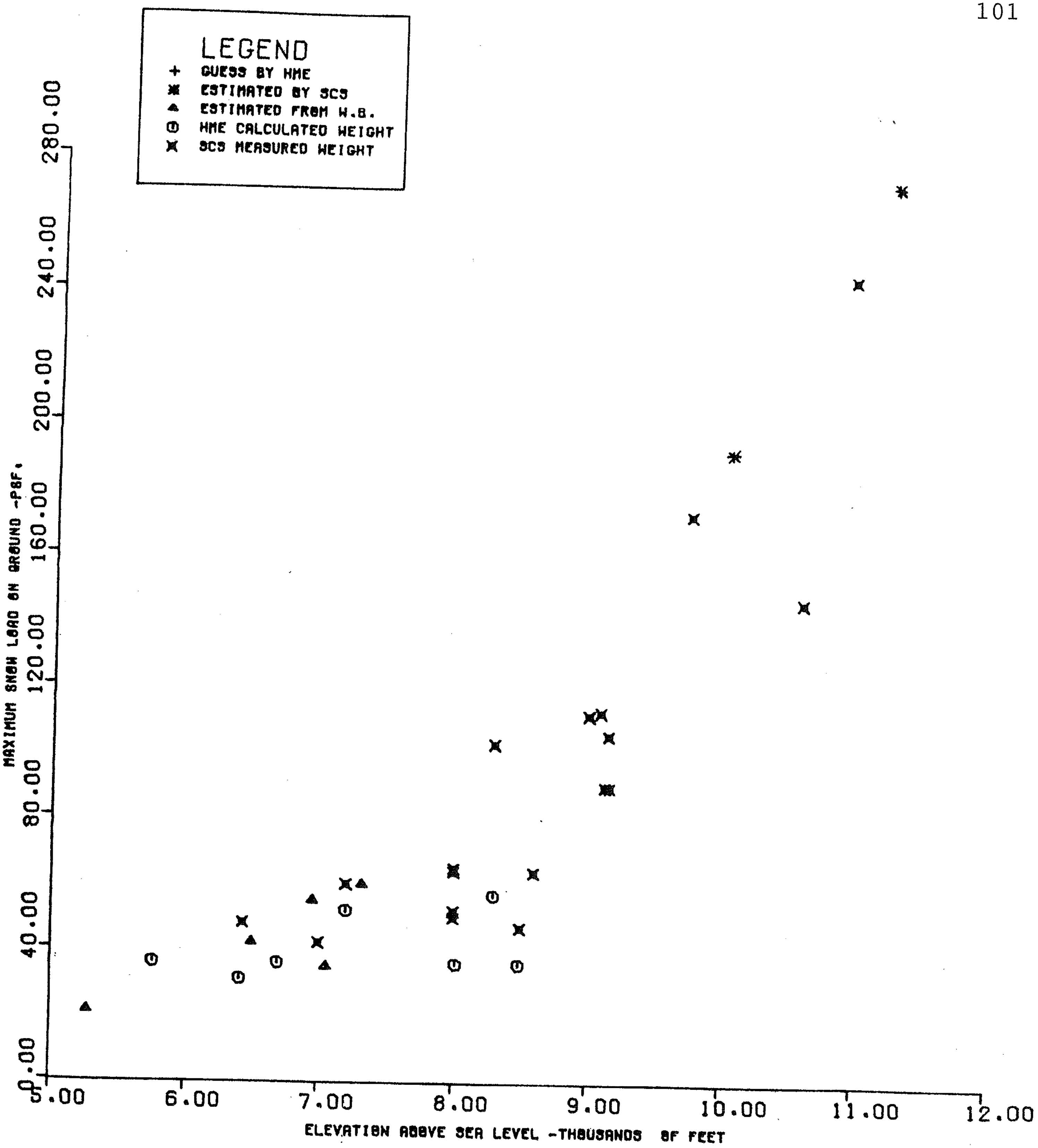
** When roof is fully exposed to wind, 30 year Basic Roof Load may be further reduced 10% at elevations above 7,000 ft. See Table 2 for example.



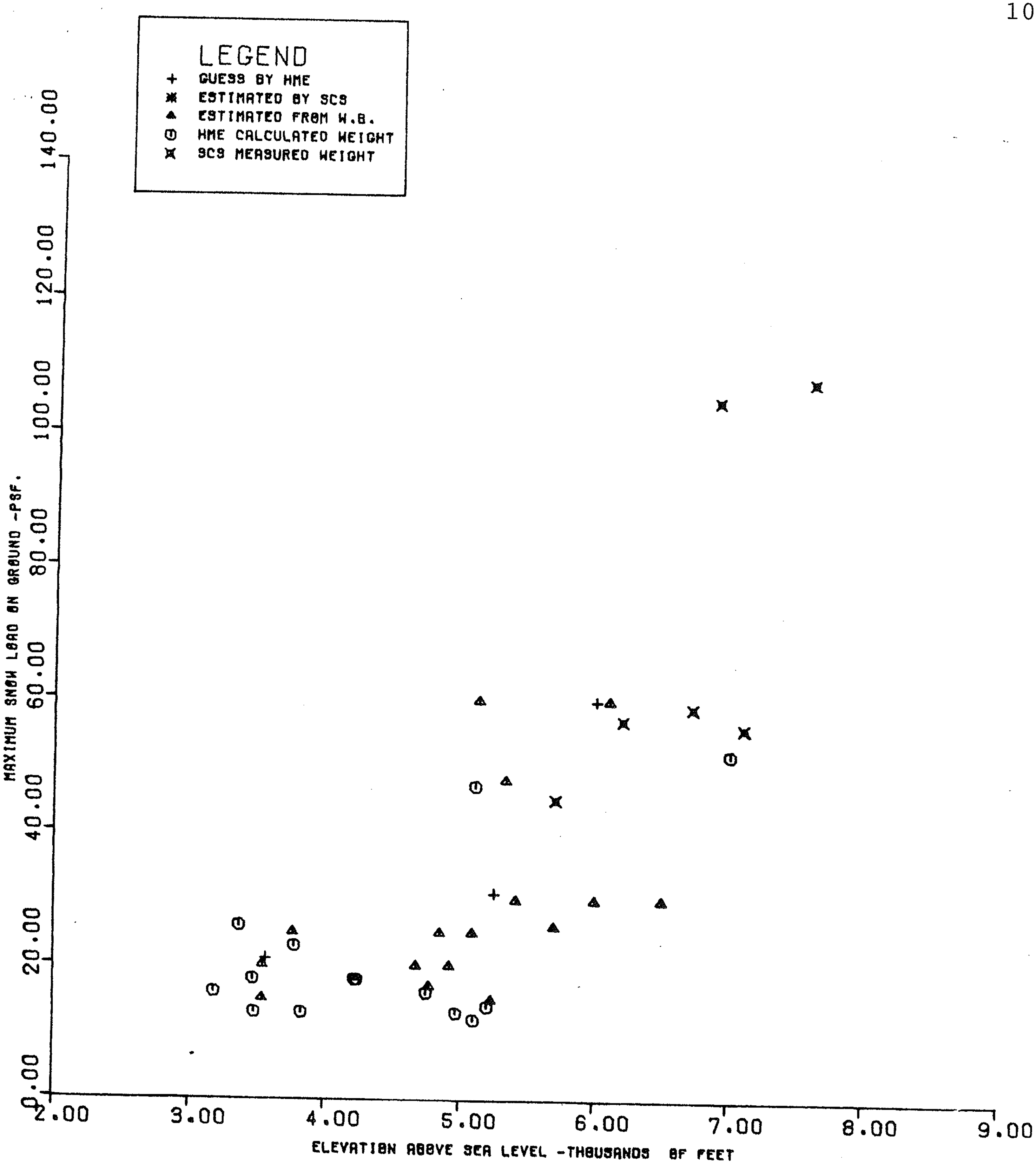
MAXIMUM GROUND SNOW LOADS VS ELEVATIONS-ZONE I
FIGURE 1



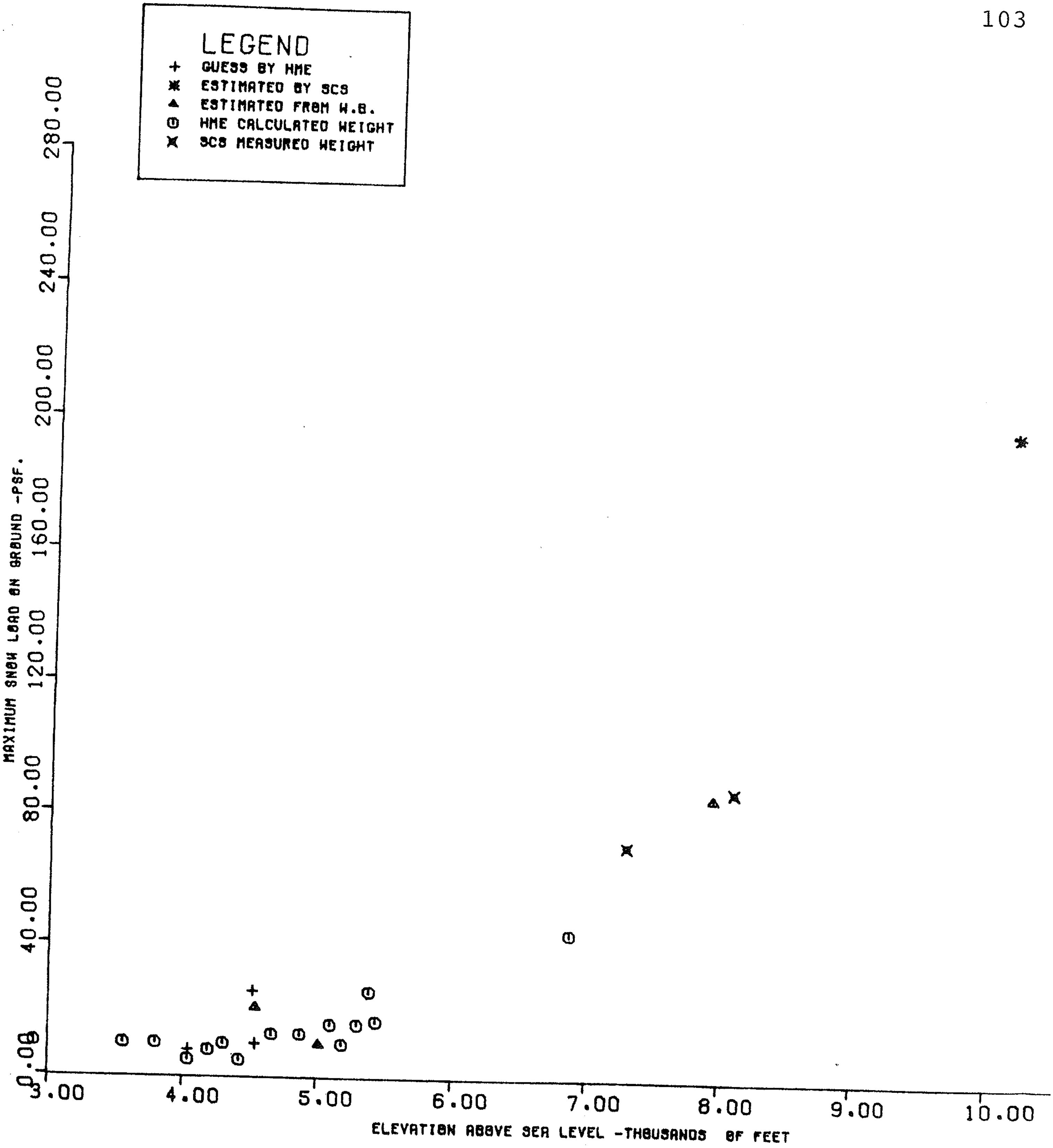
MAXIMUM GROUND SNOW LOADS VS ELEVATIONS-ZONE II
FIGURE 2



MAXIMUM GROUND SNOW LOADS VS ELEVATIONS-ZONE III
FIGURE 3

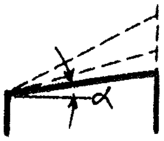


MAXIMUM GROUND SNOW LOADS VS ELEVATIONS-ZONE IV
FIGURE 4



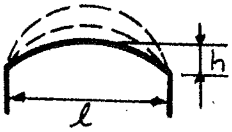
MAXIMUM GROUND SNOW LOADS VS ELEVATIONS-ZONE V
FIGURE 5

ROOF SHAPES



Simple flat & shed roofs

Simple gable & hip roofs



Simple arch & curved roofs.

SNOW LOAD DISTRIBUTIONS & COEFFICIENTS

Case I

C_s^*

$C_s^* = 1.0 - \frac{\alpha - 30}{50}$

Typical Values

α	C_s^*
0 to 30°	1.0
40°	0.8
50°	0.6
60°	0.4
70°	0.2
80 to 90°	0

Case I

C_s^*

Case II

C_s^*

for $\alpha \leq 20°$ Use Case I

for $\alpha > 20°$ use Case I & Case II

Case I

$C_s^* = 1.0 - \frac{\alpha - 30}{50}$

Case II

$C_s^* = 1.25(1.0 - \frac{\alpha - 30}{50})$

Case I

$C_s^* = 1.0$

Case II

$C = 2.0$

for $\frac{h}{\ell} \leq \frac{1}{10}$ use Case I

for $\frac{h}{\ell} > \frac{1}{10}$ use Case I & Case II

Fig C2-1
Flat & Shed Roofs

Fig C2-2
Gable or Hip Roofs

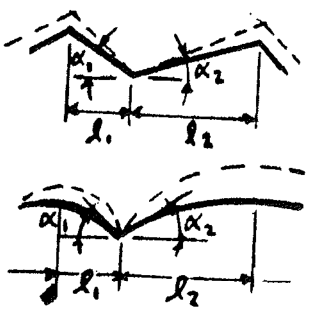
Fig C2-3
Arch Roofs

Notes:

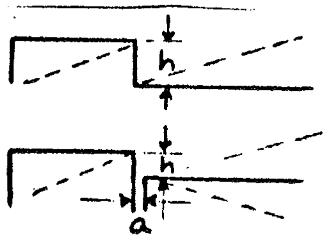
1. In Figs C2-1 & C2-2 the term $\frac{\alpha - 30}{50}$ is only valid for slopes greater than 30°.
2. C_s^* = coefficient to be applied to Basic Roof Snow Load.
3. C = coefficient to be applied to Basic Ground Snow Load.

MODIFICATIONS DUE TO ROOF SLOPES AND UNBALANCED LOADS

ROOF SHAPES



Valley Areas of 2-span & multi span sloped or curved roofs



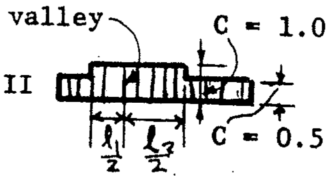
Lower level of multi-level roofs (where upper roof is part of the same building or on an adjacent building not more than 15 ft. away.)

SNOW LOAD DISTRIBUTIONS & COEFFICIENTS

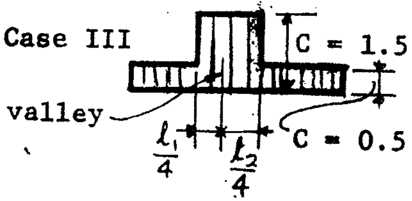
Case I  C_s^* (uniform load)

$$C_s^* = 1.0 - \frac{\alpha - 30}{50}$$

Case II

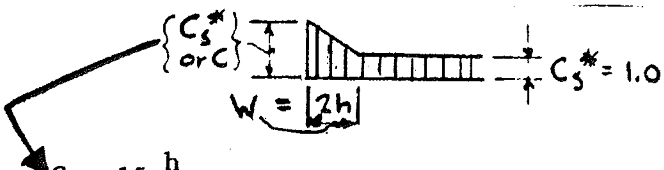


Case III



$$\beta = \frac{\alpha_1 + \alpha_2}{2}$$

for $\beta \leq 10°$ use Case I
for $10° < \beta < 20°$ Use Case I & II
for $\beta \geq 20°$ use Case I, II & III



$C = 15\,\frac{h}{g}$ except:

when $15\,\frac{h}{g} \leq 1.0$, use $C_s^* = 1.0$

when $15\,\frac{h}{g} > 3.0$, use C = 3.0

W = 2h except:

when h < 5ft use W = 10
when h > 15ft use W = 30

h = difference of roof heights in ft.
g = Basic Ground Snow Load in psf
w = width of drift from higher bldg. in ft.
a = distance between bldgs. < 15ft.

For loads on upper roof use Figs. C2-1 to C2-4.

Fig. C2-4
Valley Areas of 2-span & Multi Span Sloped or Curved Roofs.

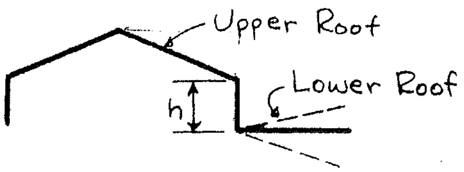
Fig C2-5
Lower Roof of Multi-Level Roofs.

Notes:

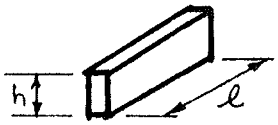
1. In Fig C2-4 the term $\frac{\alpha - 30}{50}$ is only valid for slopes greater tahn 30°.
2. C_s^* = coefficient to be applied to Basic Roof Snow Load.
3. C = coefficient to be applied to Basic Ground Snow Load.

MODIFICATIONS DUE TO ROOF VALLEYS AND MULTI LEVEL ROOFS.

ROOF SHAPES

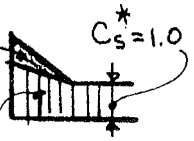


Lower of multi-level roofs with upper roof sloped towards lower roof.



Roof areas adjacent to projections & obstructions on roofs.

SNOW LOAD DISTRIBUTIONS & COEFFICIENTS



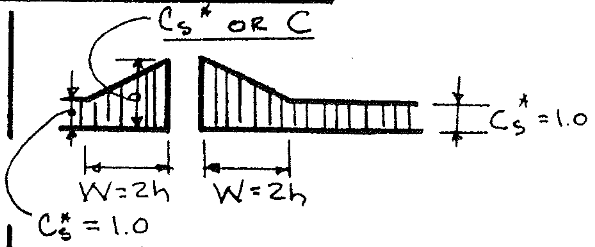
W_1 = Total load from sliding snow

Drift load per Fig C2-5

Design lower roof for loads according to Fig. C2-5, plus W_1.

(Designer must use judgement in estimating W_1, the maximum probable weight of snow melt or sliding snow from roof above. As a guide only, for average conditions, W_1 could equal 50% of the maximum total design load on the portion of the upper roof which slopes towards the lower roof.)

Design upper roof for loads according to Figs. C2-1 to C2-4.



$C = 10\frac{h}{g}$ except:

when $10\frac{h}{g} < 1.0$, use $C_s^* = 1.0$

when $10\frac{h}{g} > 2.0$, use $C = 2.0$

when $\ell < \frac{g}{6}$ use $C_s^* = 1.0$

W = 2h except:
when h < 5ft use W = 10
when h > 15ft use W = 30

h = height of projection in ft.
g = Basic Ground Snow Load in psf
w = width of snow drift in ft.
ℓ = length of projection in ft.

Fig C2-6
Lower Of Multi-Level Roofs With Upper Roof Sloped Towards Lower Roof.

Fig C2-7
Areas Adjacent To Roof Projections.

Notes

1. C_s^* = coefficient to be applied to Basic Roof Snow Load.
2. C = coefficient to be applied to Basic Ground Snow Load.

MODIFICATIONS DUE TO MULTI LEVEL ROOFS & ROOF PROJECTIONS.

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