Snow Trends Since 1950

Snowfall patterns across the United States have changed dramatically over the past seven decades. These changes are shaped by complex interactions among atmospheric circulation, ocean temperatures, urbanization, and changes observed within our climate system.

While some areas have seen increasing snowfall, others have experienced a clear decline; particularly in the timing, duration, and type of precipitation. Below we'll analyze a decade-by-decade look at how snowfall has evolved since 1950.

Average Winter's of the 1950s

The 1950s were characterized by relatively stable winters. Average global temperatures were cooler, and snowfall patterns in many parts of the northern U.S. were consistent with long-term historical norms. Cities like Chicago, Minneapolis, and Buffalo saw average to slightly above-average snowfall. Snow cover tended to persist longer into spring.

The Cold & Snowy Decade of 1960s & 1970s

The 1960s were among the snowiest decades on record for many northern states. Several severe winters occurred, with powerful Nor'easters affecting the Northeast and prolonged cold snaps across the Midwest. Snowfall totals increased in several regions, especially the Great Lakes and the interior Northeast, due to stronger polar jet stream activity.

The 1970s continued the trend of snowy winters, with colder-than-average conditions nationwide. A notable expansion in snow cover across the lower 48 states had occurred. This was confirmed and solidified with the introduction of satellite data as it revealed widespread snow cover during.

Highlights:

- Record snowstorms in the Northeast and Ohio Valley.
- Lake-effect snow events increased as colder air passed over unfrozen lakes.

- The winter of 1977–78 brought historic snowfall to the Ohio Valley and Northeast.
- Persistent blocking patterns led to long-duration snow events.

Mixed Events of the 1980s

By the 1980s, regional shifts in snowfall trends became more apparent. While snowfall remained heavy in the Great Lakes and interior Northeast, southern regions began to see less frequent snow. Warmer global temperatures contributed to more mixed-precipitation events, especially with observing a “super Nino” adding a surplus of energy into the southern jet stream and fueling warmer temperatures.

Trends:

- Declining snow totals in the Southeast and southern Plains.
- Snowfall increases continued in the Upper Midwest and Northeast.

Warmer & Less Snowy 1990s

The 1990s marked the beginning of a more noticeable warming trend. El Niño and La Niña events played a larger role in shaping seasonal snow totals. While some years featured major storms (like the Blizzard of 1993), average snowfall began to decline in coastal and southern states.

Changes Noted:

- Decreasing snowpack in the western U.S.
- Earlier snowmelt in the Rockies and Sierra Nevada.
- Reduced snow-to-liquid ratios in milder climates.

The Varying Snow & Temps of the 2000s

The early 2000s brought clearer signs of some climate-related impacts on snowfall. Although some areas such as parts of the Northeast saw several blockbuster snowstorms, the overall duration and extent of snow cover declined nationally. Average winter temperatures rose, having an influence on snow seasons and spatial placements of negative departures..

Key Highlights:

- Declining spring snowpack in the West, affecting water supplies.
- Heavy snowstorms became more concentrated during fewer events (a "feast or famine" pattern).

The Extreme's of the 2010s

The 2010s were marked by extremes; record-setting blizzards as well as record-low snowfall years, depending on location. Snowfall was increasingly shaped by rapid Arctic warming and shifting jet stream patterns. This is a result of notable stratospheric warming events that served as the catalyst to dislodging the polar jet stream hence arctic outbreaks and polar blocking.

Patterns Observed:

- Heavy lake-effect snow events due to warmer lake temperatures.
- Decreasing snow reliability for ski resorts in the Sierra Nevada and Pacific Northwest.
- Snowfall declines in urban areas due to the urban heat island effect.
- Elevated climate averages in heavily-populated metropolitan areas in the Northeast.

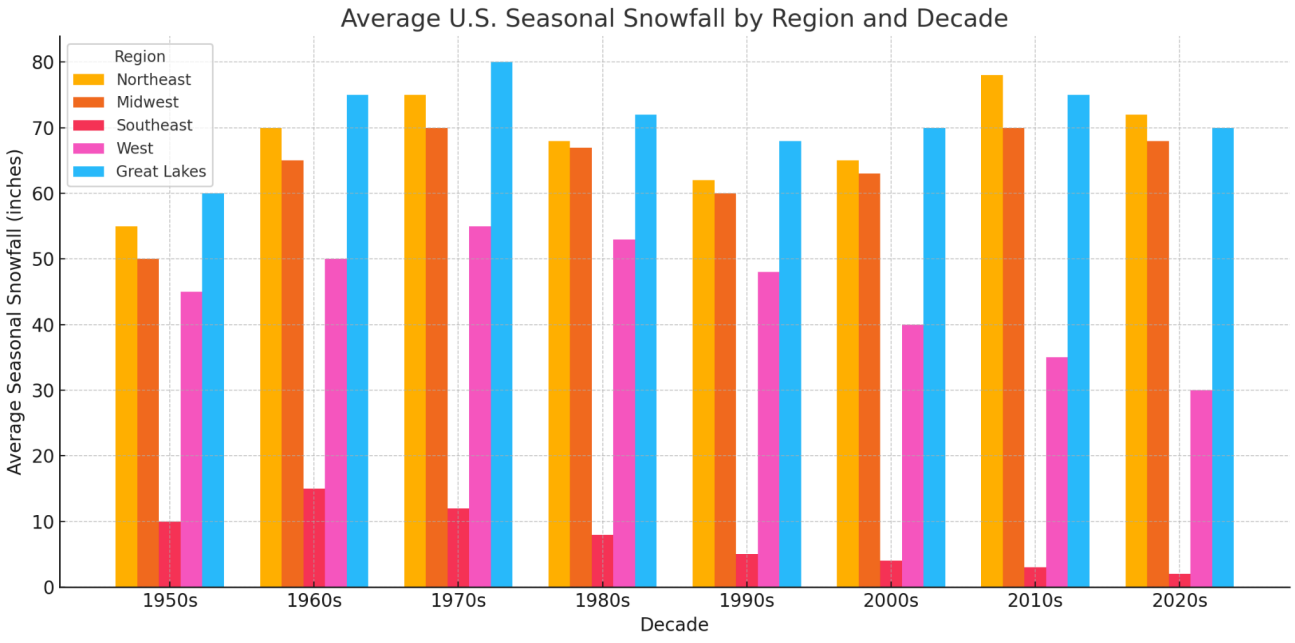
Mixed Trends of the 2020s

Up to this present data, data since 2020 continues to show a decline in snowpack in the western U.S. and shorter snow seasons in much of the South and East. However, some areas, like New England and the Upper Midwest, still occasionally experience major snow events due to enhanced atmospheric moisture.

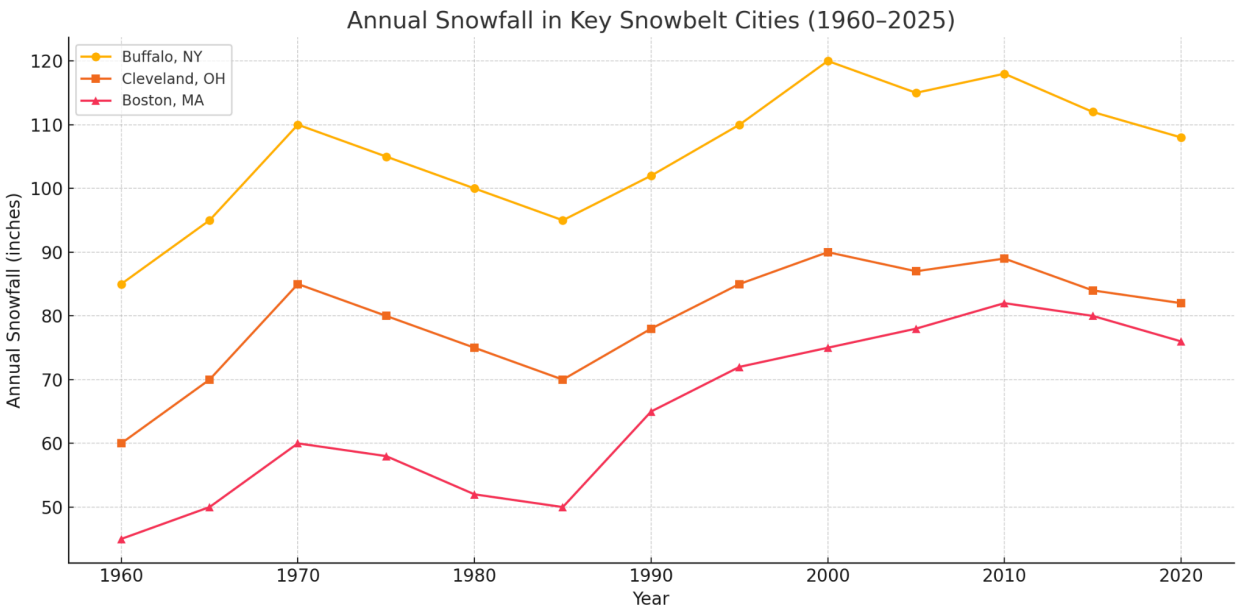
Recent Developments:

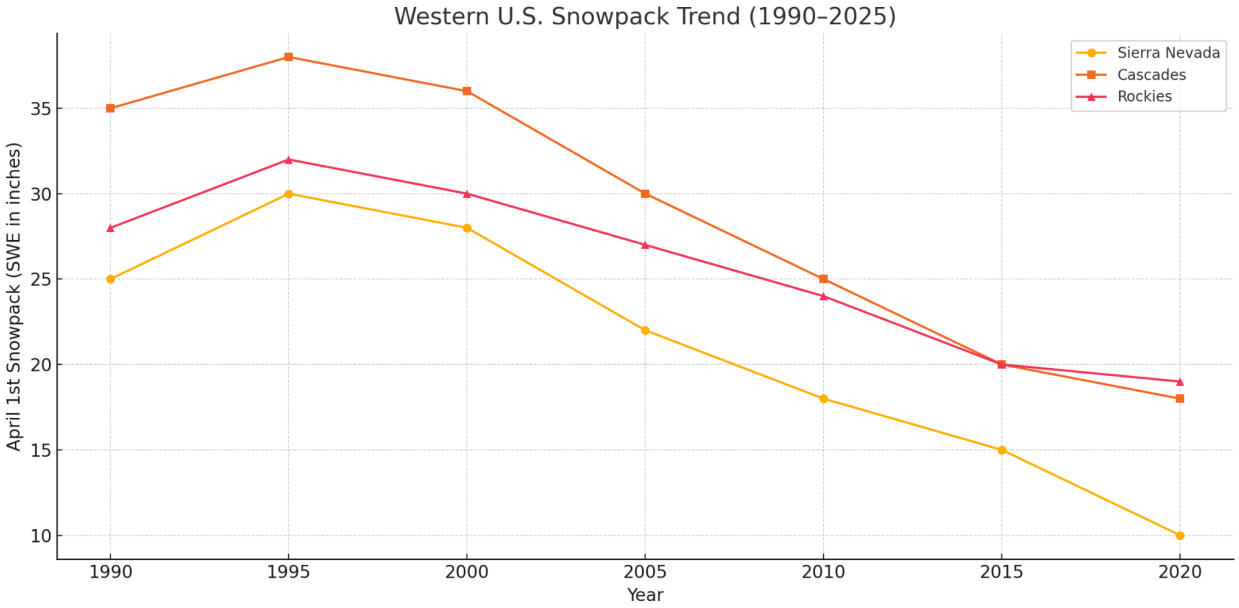
- Persistent drought and low snowfall in the Sierra Nevada.
- Rapid snowmelt contributing to spring flooding in northern states.
- Increasing reliance on artificial snow in winter recreation.

Below is a graphic us at The Weather Pros created to show how these changes have been reflected since the 1950s. It reveals regional changes observed over each decade described above. Analyzing the graphic closely reveals mostly one thing: there's nothing glaring or obvious that certain regions have seen notable or eye-popping declines or increases - rather, it's just varying and the sample size of just 1950-2020 is still relatively small in the grand scheme of the climate dating back centuries.

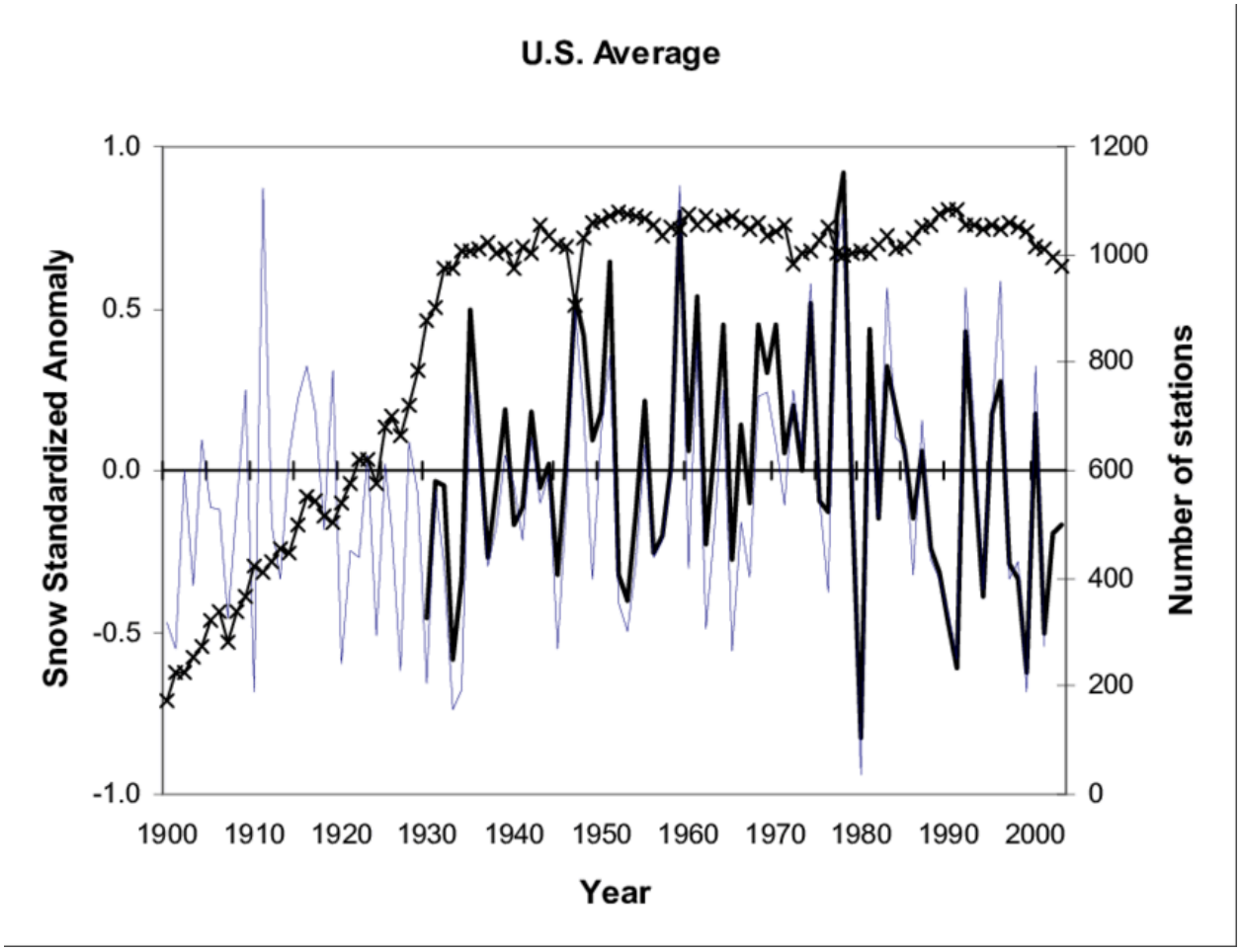


Below we've graphed snowfall visualizations of western snowpack and taking a few key snowy cities to show variance and trends. Interestingly enough (again due to complex global changes and patterns on a yearly basis), we see the decline in the western snowpack of places such as the Sierra Nevada and Rocky Mountains. On the contrary, we see a slight increase in average seasonal snow for snowy areas of Buffalo, Cleveland, and Boston.





Conclusion



Source: Researchgate

Since the 1950's utilizing the graphic above, it can be surmised that the U.S. has experienced both snowy decades and those marked by warming and reduction in snowfall. There's clearly variance between each decade with some ambiguity mixed in, which is reflective of a complex climate inherently. We've summarized that some trends include:

- Shorter winters

- Earlier snowmelt
- Greater regional disparities
- More precipitation falling as rain instead of snow

Understanding these changes is vital for water resource management, agriculture, transportation, and winter tourism industries to name a few. With complexities and constant underlying changes in our climate system, adaptive strategies will be essential to mitigate the impact of decreasing snow reliability in regional places such as parts of the West. However, as we progress to the next decade, it's likely we'll see more variance and learn as we go of what is in store for each subsequent winter.