

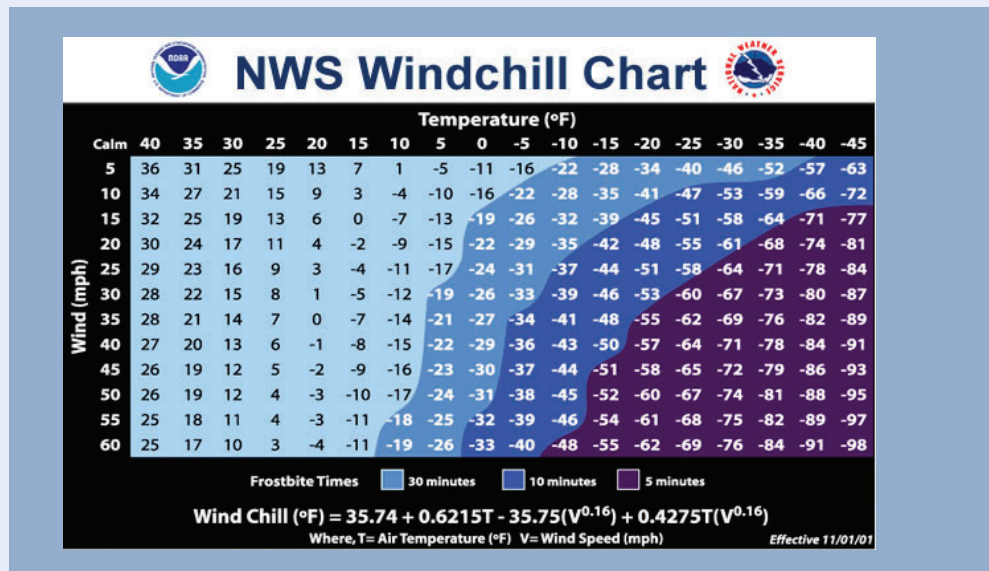
THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

CHILLING FACTS ABOUT THE WIND

By Mark D. Schneider

The wind blows so often in North Dakota that calm days almost seem unusual. According to the American Meteorological Society, *wind chill* is defined as the portion of the cooling of a human body caused by air motion. The rate of our bodies' heat transfer is accelerated by the wind, especially at temperatures below 45 degrees Fahrenheit (°F). The first wind chill index originated in Antarctica during the late 1930s and early 1940s from experiments conducted by Paul Allman Siple and Charles F. Passel. These two gentlemen compared the time it took water to freeze inside of a small plastic bottle that was suspended above their expedition hut at a height of approximately 30 feet. Their experiments revealed that as the wind speed increased, so did the rate at which water froze. This is due to the motion of the wind around an object working to remove the warm insulating layer of air which surrounds it. This explains why it feels warmer on a calm, cold North Dakota morning with an air temperature of 0°F verses a morning when the air temperature is 10°F, but with a ten mile per hour wind (see wind chill chart).

By only testing containers of freezing water, Siple and Passel couldn't predict with any accuracy what the cooling effects of wind on human skin were. That's why their perceived wind chill values were much colder than the ones we use today. Initially, wind chill values were only used in Canada and were reported in kilocalories/hour per square meter. Because these values weren't commonly expressed in terms of temperature, many different interpretations and scales were created, oftentimes causing confusion.



After years of using the original wind chill index, a collaboration of scientists and medical experts from the U.S., Canada, and the U.K. made a concerted effort in 2001 to revise it. The new experiments that were used to determine wind chill involved placing a group of test subjects inside of cold wind tunnels, attaching temperature sensors to their faces, and then making them walk on treadmills in order to more accurately measure heat loss. Besides factoring in the physiological effects of cooling skin, the 2001 wind chill index revision used a standard wind height of five feet above the ground or "face level" to more accurately represent true conditions.

So, if you ever come across a North Dakotan bragging about -60°F to -80°F wind chills that occurred before 2001, just smile with the knowledge that you've probably experienced the same degree of cold weather; only now its represented by a wind chill temperature closer to -40°F.