

Article Citations:

Benton, Leanne, *Winter Winds in Rocky Mountain National Park - Setting the Record Straight: Interviews with David Glidden*, Resources Rendezvous, Rocky Mountain National Park, National Park Service, Winter, 2004

Benton, Leanne, *Wind Research in Rocky Mountain National Park, Interviews with David Glidden*, Resources Rendezvous, Rocky Mountain National Park, National Park Service, December 2006

WINTER WINDS IN ROCKY MOUNTAIN NATIONAL PARK – Setting the Record Straight!

By Park Ranger Leanne Benton from email interviews with David Glidden, RMNP Wind Researcher; and Winter Wind Studies in Rocky Mountain National Park by D. E. Glidden.

We know that Rocky Mountain National Park is a windy place. But how windy is it? There are many stories floating around the park citing different maximum wind gusts and telling of anemometers blowing off their mounts. Which stories are true and which are “ranger folklore?” David Glidden, who conducted wind studies in the park during the winters of 1973-74 and 1980-81, clears up some of the haze around this topic.

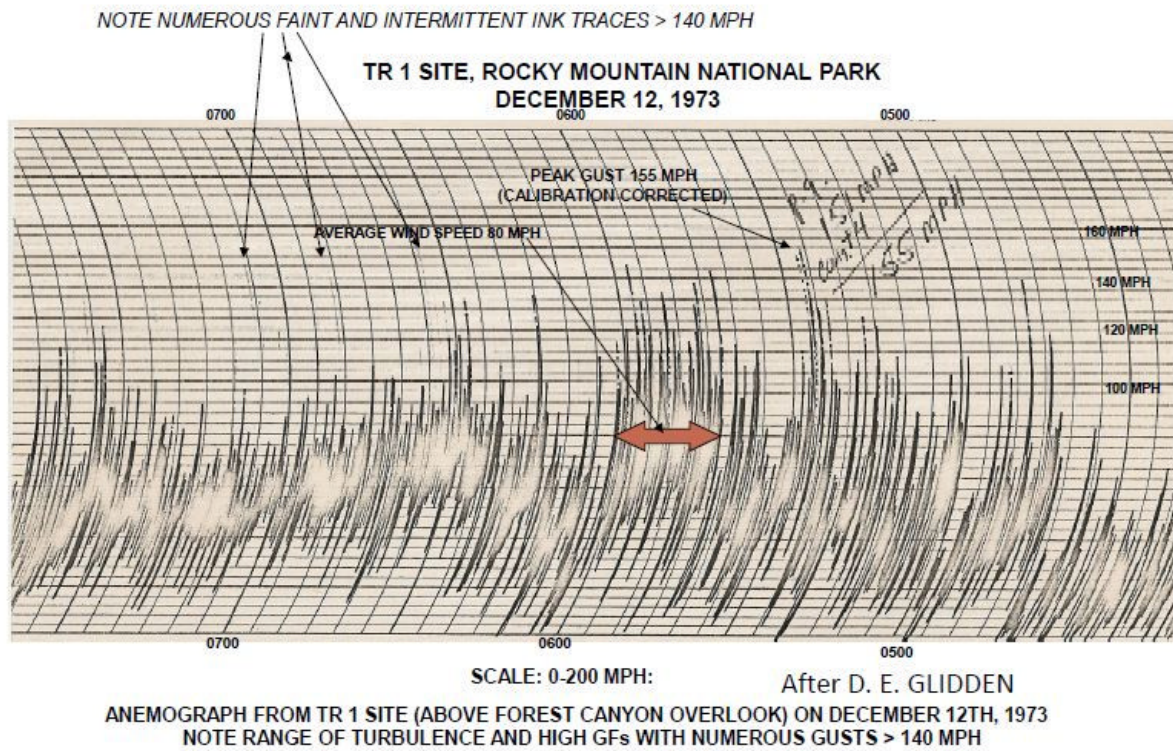
Following a May 1973 storm when wind flattened thousands of trees in Hidden Valley, information on the park’s wind became extremely important. David Glidden established several wind research sites in the fall of 1973 in Upper Hidden Valley and along Trail Ridge which were monitored throughout that winter. During the summer of 1980 he set up a wind research site on the summit on Longs Peak which was monitored that winter.

- ❖ **The maximum wind gust recorded on Trail Ridge was 155 mph** on December 12, 1973. This was at the Trail Ridge 1 site, located above Forest Canyon Overlook at 12,036'. This site only functioned from October 12 to December 15th, when it was decommissioned due to failure. Some time just after the December 12th gust another wind gust caused the 3-cup anemometer to separate from the generator assembly and blow away. There was no way to know the true maximum gust that caused this damage, but controlled tests done in a laboratory showed that anemometer separation tended to occur near 170 mph.

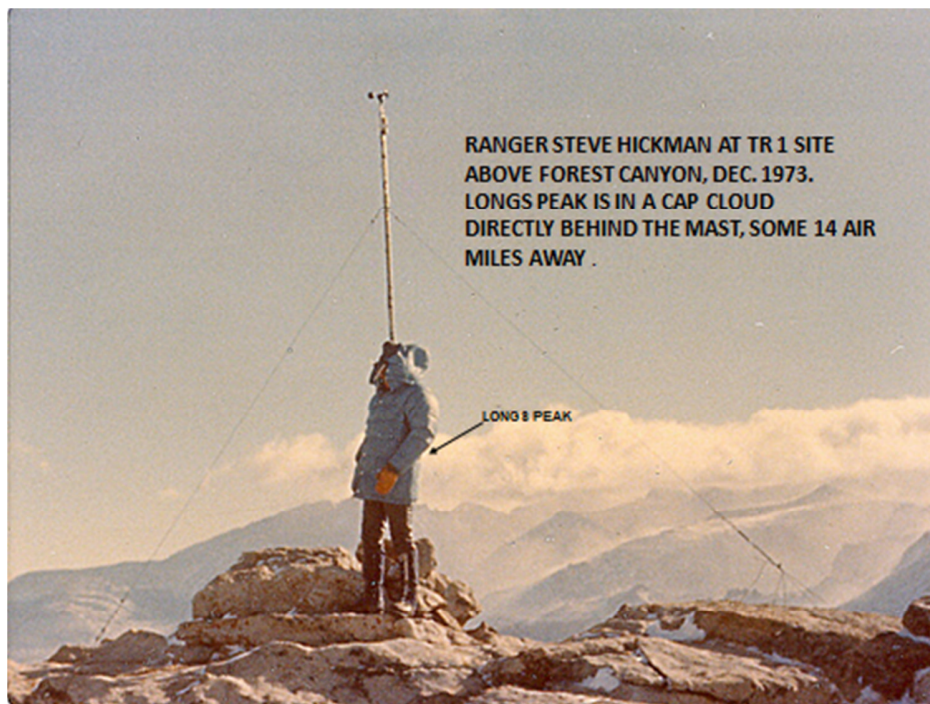
Other earlier sources have cited wind speeds on Trail Ridge as high as 174 mph but these can't be substantiated because no record of this data has been found. Earlier anemometers were not capable of recording or surviving wind speeds of that magnitude, which gives further doubt to this higher number. However, wind speeds of 170 mph on Trail Ridge are certainly possible. The 155 mph gust was recorded at a site that only functioned during a short two-month period.

- ❖ **The maximum wind gust recorded on Longs Peak was 201 mph** during the winter of 1981. For this study a specially designed and reinforced lexan hub unit was used which could withstand higher winds. The Longs Peak site also had backup equipment in case there was a failure with one system. Even with the improved anemometer there were problems with rime ice building up on the unheated rotating cups. Data was recorded for only 74 days. David stated that the average wind speeds at Longs Peak were unexpectedly low, which was likely due to the rime ice and a short anemometer height of 3.6 meters.
- ❖ **The world record surface wind gust is 231 mph, recorded at Mount Washington** in New Hampshire. This was recorded during over 60 years of data collecting. Other "windy" places include Thule, Greenland (207 mph) and Mount Fuji (162 mph).

Postscript Update



TR 1 SITE FROM SUNDANCE MOUNTAIN, OVERLOOKING FOREST CANYON



The Peak Gust at TR 1 for December 12, 1973 was 155 MPH (calibration-corrected,) with numerous gusts of the same order of magnitude and >140 MPH.

Two separate storm events on Longs Peak in December, 1980 produced gusts of 173 and 172 MPH, while the Peak Gust for winter 1980-81 was 201 MPH at LP 2.

<http://www.npshistory.com/publications/romo/wind-research/superhurricane-2016.pdf>

<http://npshistory.com/publications/romo/wind-research/winter-wind-studies.pdf>

PEAK GUST SUMMARY:

	MPH	M/S
RMNP, Colorado		
Longs Peak (4,345 m)		
1980	173	77.3
1981	201	89.8
TR 1 (3,669 m)		
1973	155	69.3

WIND RESEARCH IN ROCKY MOUNTAIN NATIONAL PARK

LEANNE BENTON, INTERPRETIVE PARK RANGER

ROCKY MOUNTAIN NATIONAL PARK

NATIONAL PARK SERVICE, *RESOURCES RENDEZVOUS*, December, 2006 pp. 8-10

WIND RESEARCH IN ROCKY MOUNTAIN NATIONAL PARK

From an interview with David Glidden, RMNP Wind Researcher

This past summer researcher David Glidden visited the park and shared memories of his 1970s and 1980s wind research in the park.

Hidden Valley and Trail Ridge Winds

Dave's research was triggered by a huge wind storm in May 1973, that toppled thousands of trees in Hidden Valley. The storm hit at night and the damage was discovered the next morning. Many trees had been crushed and snapped off about 60 feet up. Damage to the ski facilities was extensive, with several chairlift towers also being snapped off. Trail Ridge Road was closed for a long time until downed trees could be removed.

The park hired Dave to do wind studies because at the time not much was known about wind patterns in our area. Looking at the Hidden Valley damage, Dave estimated that the wind speeds may have been as high as 200 mph. He could tell from the blowdown pattern that the winds had come from the northwest. Aerial photographs revealed that there had been earlier blowdowns in the Fall River Corridor, perhaps in the 1920s or 1930s.

Dave set up a number of weather monitoring stations in Hidden Valley and along Trail Ridge during the following winter. To maintain the anemometers (wind meters), Dave often rode the ski lift to upper Hidden Valley and walked across slab ice to his stations. He serviced some of the farther stations with a helicopter by catching a ride with park biologist Dave Stevens during winter elk surveys. Dave Glidden usually stayed in the Rock Cabins at Ute Crossing (where biologist Kathryn Bell lived in previous winters while studying an alpine plant) for a week at a time in order to conduct field comparison studies and do all of the necessary maintenance. He found that maintaining the anemometers was difficult because of icing, because he had no power source to provide heat and prevent ice buildup.



Hidden Valley wind damage, 1973

The maximum wind gust was recorded at the Forest Canyon Overlook station - 155 mph. This station only operated for half of October, November, and two days in December because it kept freezing up with rime ice.

Dave's findings showed a lot of variability in wind speeds at various sites and that winds were sometimes stronger at the lower elevation sites. He was able to develop some early windstorm prediction criteria for potential use at Hidden Valley Ski Area.

Alpine Visitor Center Wind Studies

In 1980, in keeping with a national directive to reduce energy consumption, Park Superintendent Chester Brooks was interested in an alternative energy source for the diesel generators at Alpine Visitor Center (AVC).



Wind study meters at AVC, 1980

Dave conducted wind studies that summer to see if wind energy was feasible. The park engineer had already computed the size of the wind turbine needed to replace the diesel generators. The proposed site for the wind turbine was to the southwest of AVC on a rock outcrop.

Dave, with the help of three NPS research assistants, Kim Maher, Jan VanSyckle and Betsy Jewet, set up about 16 anemometer sites in the AVC and Trail Ridge area. The primary maintenance issue during the summer involved marmots who chewed through wires. Eventually Dave went to shielded cables to protect the wires leading to the wind sensors.

The wind turbine never happened. Alternative energy sources fell out of national favor, the visual intrusion on the tundra was a concern, and Dave found that strong wind turbulence at AVC could cause problems with wind turbines.

Longs Peak Wind Studies

During the winter of 1980/81 Dave set several specially-designed anemometers on the summit of Longs Peak. The anemometers should have been about 30' high, but due to servicing in a severe environment, Dave installed one 12' high. Except for a 10-foot meter mast at AVC, this height was consistent with the other wind sites in the park study. He used a helicopter to set up the station during the previous summer. Due to the gustiness and unpredictability of summit winds, the helicopter never shut down after landing, but quickly dropped off personnel and equipment and left.

He maintained this site once a month, often with the help of NPS rangers, including Bob Seibert, Larry VanSlyke, Chris Reveley, and Charlie Logan, among others. During some months, Dave and NPS rangers used a helicopter as a backup to reach his wind station. Dave remembers one trip in January: while they were taking off from the summit of Longs Peak, the wind sucked them down on the leeward side for about 1000 feet before the helicopter was able to get out of the wind.

Dave found that the average wind speeds on Longs Peak were not as high as those on



Researcher David Glidden and equipment shed on summit of Longs Peak

Mount Washington in New

Hampshire, which still holds the world record surface windspeed of 231 mph. The Longs Peak station did record a gust of 201mph during the limited data collection, however. He also noted that icing was a continuous problem at Longs Peak and that the Mount Washington anemometers had a power source for de-icing to help prevent freezing.

Dave's equipment shed, protected by boulders, saved the life of one of two climbers who were stranded by a severe storm on the summit. The climbers broke into the small shed and huddled inside overnight to keep warm. One climber was able to hike out the next morning to safety but the second climber collapsed and froze to death.

Over twenty years later, Dave's enthusiasm for his wind studies in the park is evident and shows how much he enjoyed this research project.
