

# Winter Weather



Out for a stroll in the White Mountains

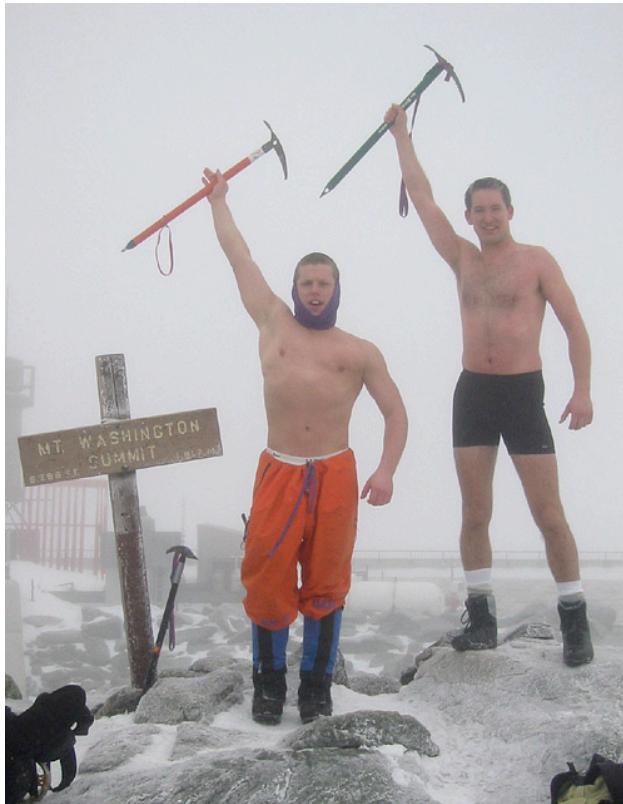
Photos and text mostly from MITOC archives, unless otherwise noted. Photo here: Jose Azel/NGS

Weather we all dream of...



Mt. Pierce  
...enjoy it for the moment that it lasts!

# This weather...



(note removal of layers to prevent moisture buildup in clothes-  
important to prevent hypothermia later on!)

...can change to THIS in an instant!



## A not-so-good day above treeline



Feb. 6, 2000, Mt. Washington

-12°F (-25°C),

plus a 102 mph wind gusting to 120!  
exposed skin freezes in seconds, and  
forget about being able to stay upright!

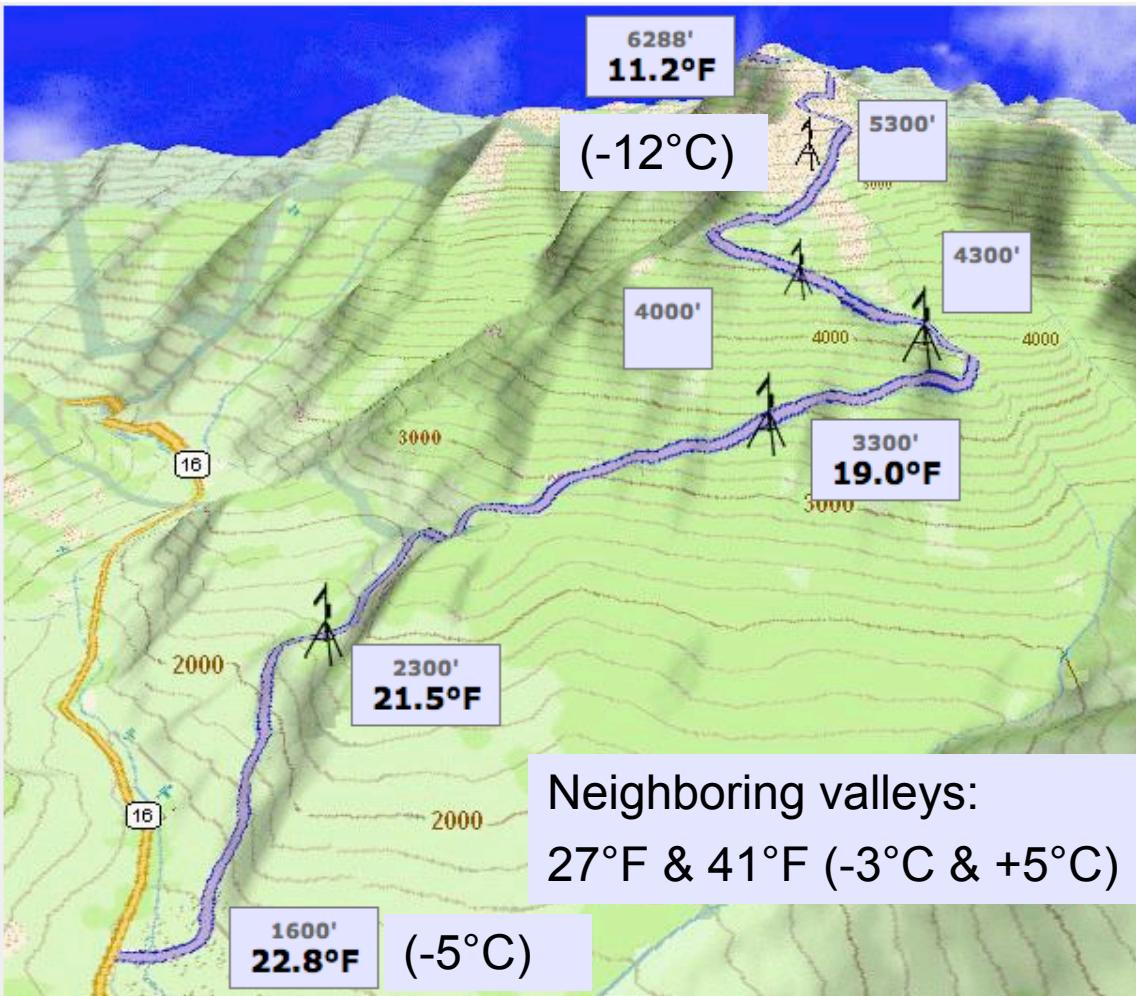


also Mt. Washington

The weather's nice up here, but what's happening below the clouds, at the trailhead?

Photo: Jose Azel/National Geographic

# Mt. Washington, yesterday 11 am



Mt. Washington in Jan  
Avg high: 14°F (-10°C)  
Avg low: -4°F (-20°C)  
Lows down to  
-47°F (-44°C) possible

Adiabatic lapse rate:  
~3°F/1000 ft elevation

$$c_p dT - \alpha dP = 0$$

$$\Gamma_d = -\frac{dT}{dz} = \frac{g}{c_p} = 9.8 \text{ °C/km}$$

Lincoln, NH in Jan:  
Avg high: 27°F (-3°C)  
Avg low: 4°F (-16°C)

-The Whites are usually **much colder** than Boston

-Mountains create their own weather, especially **storms**

# Windchill

increasing wind speed at same temperature (-10°F -23°C)

increasing rate of heat loss

3 mph



Skin freezes in  
30 minutes  
  
(happy frolicking  
in light clothes)

30 mph



Skin freezes in 5-10 minutes  
  
(happy frolicking if you cover  
every square millimeter of  
skin)

little margin for error at -10°F!

50 mph



Skin freezes in 2-5 min.  
  
Me: Only 100 yards to  
the summit! Let's go!  
  
Eric: Are you nuts?!  
Let's get back below  
treeline right now!

# Windchill happens at warmer temperatures too!

Mt. Madison Sept. 2004 (~32°F 0°C)



below...



...and above treeline

# Stronger winds cause additional, bigger problems!



Wind blows snow around:

visibility can be reduced  
to zero

trails disappear under  
snowdrifts

70 mph will knock you over  
into rocks, off cliffs etc.

40+ mph very exhausting to  
travel in due to gusts

Verbal communication hard:  
learn semaphore!

Average wind speed on Mt Washington in winter: 50 mph (80 km/h)!

Top photo: Jose Azel/National Geographic

# Precipitation

-hard to predict, and often very local

Snow and ice slow or even prevent travel for humans and cars

- Icy trails and roads
- Deep powder
- Breakable crust



Rain is extra scary

Precipitation obstructs visibility and increases avalanche danger



## **Catastrophic gear failure**

Materials shrink, get stiff, get brittle, or freeze in the cold, or can get jammed with ice!

### **Annoying:**

- camera

### **Potentially life-threatening:**

- batteries (for headlamps)

- stoves

- tent poles

- zippers

- buckles

- car

- brain

- fingers

**Can sneak up on you and spoil your whole day:**



**Hypothermia** = reduced core body temperature

- coordination and judgement lost early
- risk in any winter weather, but wet conditions (especially rain) are the most dangerous



**Frostbite** = tissues freeze

- skin goes numb before freezing, therefore hard to detect until too late
- risk whenever temperature  $< 32^{\circ}\text{F}$  ( $0^{\circ}\text{C}$ )

# What's the “worst” weather?

Warm with precipitation: 30 F (-1 C), heavy rain, windy  
= drop all plans & get to shelter

Wind: 60 mph (95 km/h) plus Cold: -10F (-23C)  
= travel exhausting, easy to get lost, no margin for error

Temp. drop after/during rain is the MOST DANGEROUS  
= high risk of hypothermia on trail,  
and treacherous/impassible highways

## Weather Forecasting?

-valuable tool if used intelligently (don't rely on it!)

-mountain weather is inherently very local & unpredictable:

forecasts are dead wrong >>25% of the time in the Whites



## **Before you set off from Boston:**

[www.weather.gov](http://www.weather.gov) (good for **storm warnings** & long-term forecasts)

[www.mountwashington.org](http://www.mountwashington.org) (good for short-term forecasts, and for trail conditions)

[www.tuckerman.org](http://www.tuckerman.org) (weekend updates & avalanche forecast)



**On the road and  
on the trail:**

Stay alert to  
weather changes

Clouds and winds  
provide big hints

**But:** lines of sight are  
obstructed in the  
Whites, and weather  
can come from any  
direction

## **Take-home message:**

Have multiple backup plans for every step of your trip

1. At home before setting off
2. On the road to the Whites
3. At the trailhead
4. On your way up the trail
5. At treeline
6. At the summit
7. On your way down
8. At the trailhead
9. On the road back

**~~“Summit or die”\*~~**

**Live to climb another day!**

**Oscar Wilde:  
“expect the unexpected”**

\*actual quote from K2 climber shortly before disappearing on K2

# Summary

- Weather changes quickly in the Whites
  - Wind + Cold = Bad, **Wet = Extremely Bad**
  - Be flexible about your plans!
    - always be ready to scale back your goals
    - if possible, turn back before things turn nasty!
    - always be ready with gear to camp out for a night
  - Check forecasts, check the skies often
  - Be alert for FROSTBITE & HYPOTHERMIA
  - COME PREPARED:**
    - Clothing**
    - Food**
    - Gear**
- Oscar Wilde:**  
**“expect the unexpected”**

Chances are the mountain will still be there next weekend...



Franconia Ridge on an extraordinarily good day

Don't be afraid to go home and come back another day!



