MWOBS®
MOUNT WASHINGTON OBSERVATORY

Fall/Winter 2025-26 | vol 66 no 3

WINDswept

The Bulletin of the Nonprofit Mount Washington Observatory

- An Observer Looks Back
- Introducing The White Mountains Almanac


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WINDswept

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Mount Washington Observatory® is a private, nonprofit, member-supported institution with a mission to advance understanding of the natural systems that create Earth's weather and climate. It serves this mission by maintaining a weather station on the summit of Mount Washington, performing weather and climate research, conducting innovative science education programs, and interpreting the heritage of the Mount Washington region.

Membership in the Observatory is open to all. Members who donate at least $60/year or $5/month receive: Tours of our famous mountaintop weather station (generally mid-May through mid-October); a one-year subscription to *Windswept™: The Bulletin of the Mount Washington Observatory*; meteorology and climate research news from the summit of Mount Washington, straight to your inbox; free admission to *Extreme Mount Washington*™ museum; advanced notice of special events; a 15% discount on all purchases in our museum and online shop; and free admission to more than 300 science centers through the ASTC Passport Program (restrictions apply, please see the ASTC website for details).

Members will receive the three issues of *Windswept* for the year following the quarter in which they join. Please make checks payable to the Mount Washington Observatory and send to: Mount Washington Observatory, PO Box 2310, North Conway, NH 03860-2310, or join at mountwashington.org.

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Cover Image: Observer Ryan Knapp on Goofer Point with undercast at sunset, December 27, 2020. (Photo by Ryan Knapp)

Milestones Marking the Future of Weather Science

Ellen Estabrook

BY **ELLEN ESTABROOK,** WINDSWEPT EDITOR

While snow was slow to arrive on the summit this season, weather observers on Mount Washington are in the midst of full-on winter while our North Conway office begins to experience first inklings of frost. The view of the mountain from downtown never gets old, but the juxtaposition of the white-capped summit atop layers of foliage this time of year is a particularly poignant reminder of the other-worldly weather station just 20 miles away.

This winter marks a few very meaningful milestones for this 93-year-old weather station. Not only is summit weather observer Ryan Knapp celebrating twenty years with the organization (pg. 25), but the summit team is also welcoming two (soon to be three) new weather observers to the crew (pg. 8). These team members will play an integral role in sharing Mount Washington's weather, story, and legacy as they maintain an over-93 year collection of data.

A landmark project with two non-profit partners also launched this season, setting the stage for a new legacy to unfold. ***The White Mountains Almanac***, available free to the public on our website, offers a unique look at the region's evolving climate, ecology, and natural beauty through comprehensive, data-driven insights and compelling illustrations. You'll not only learn more about the project in this edition, but you'll also see a chapter straight from the publication, presented and rigorously researched by former intern Frank Vazzano (pg . 31). On behalf of the project partners, we invite you to explore how science and creativity can help us better understand and appreciate the living landscape of the White Mountains.

Your support makes the study—and storytelling—of this beloved mountain and region possible, and our team is grateful to steward the Observatory's mission alongside you as we usher in the future of weather science together.

As always, please feel free to reach out to me (eestabrook@mountwashington.org) or any team member with feedback, insights, or story ideas for this publication as we head into a new year of exciting projects at the Observatory.

Happy holidays and happy reading!

Year-End Reflections on the Observatory's Higher Purpose

Drew Bush

BY **DREW BUSH,** EXECUTIVE DIRECTOR

I write these words at the end of my third year working to chart a successful future for our beloved Observatory. By December, I will have begun my fourth year. Year's end, for me, presents a time to reflect on my time here that passes ever so quickly.

A letter I received from one of our long-time supporters reminded me of this fact. Since 1975, his friends and family have hiked Mount Washington each winter. Countless generations have joined him over the past 50 years, and I found his words particularly moving. With his permission, I share them here:

> *"I have had, as other Dads have, all my children on these winter climbs. Now their kids, my grand-children, have climbed the mountain in winter as well…this stunning rockpile, a geological, extraordinary treasure has brought me, my five children, my 17 grand-children, and all those good people years of friendship, memories, joy, and peace."*

For me, this letter points to our greater purpose. Yes, we are a scientific institution that strives to serve as a hub for research and learning for our community, nation, and the world. And, yes, our summit team works every day to keep millions of people safe across not just the White Mountains but all of New England with timely weather information and forecasts. The data they collect, in turn, feeds weather models the National Weather Service relies upon to keep our entire country protected from weather.

We're in the business of building memories.

We help to build relationships in the hopes that all whom we touch find joy and peace.

But, as a nonprofit, the work we do

in weather services, education, and research means more. We're in the business of building memories. Our work requires that we lend a hand to the communities we serve, the partners with whom we collaborate, and the individuals who rely upon us. We help to build relationships in the hopes that all whom we touch find joy and peace.

This all important work happened this past July when almost 600 people gathered to hike and celebrate together for our 25th Anniversary Seek the Peak. It happened all year long when our education team brought a special kind of joy to young children throughout New England as they worked in schools, on the mountain, and as part of our just concluded Storm Scouts Summer Day Camp. And, in coming days, it will happen as we launch the first-ever White Mountains Almanac—made in partnership with the Appalachian Mountain Club and Hubbard Brook Research Foundation—that will document annual changes to the climatology and biology of this unique treasure we are charged with stewarding. (Read more on the almanac on page 31).

Each of you are the reason we can continue striving toward this higher purpose. I hope you will join, as you are able, in supporting our work at year-end. Your generosity means the world to us, enabling us to continue our work in so many incredible ways. Thank you. I hope you have wonderful holidays.

NEWS FROM NIMBUS

Celebrating the Cats of Mount Washington

TRANSLATED BY **OLIVIA DODGE**

Me-owdy, folks! It's Nimbus Kitty, the resident summit cat at the Mount Washington Observatory. I've been staying plenty busy with the chaos of the summer season on the mountain, y'know, napping on the observer's couches AND on their keyboards. It's exhausting being so famous! Apparently, the Observatory's education team created a brand-new "Cats of Mount Washington" t-shirt this fall. It was quite popular (purr-obably because I'm on it), so they're keeping it available online through the holidays (link below).

While I never met my fur-bears, I guess they were purr-etty cool… I mean, they had to have been if they were Observato-

ry cats, after all. Next to me on this new t-shirt will be Scamp, Marty, Strawberry, Nin, Inga, Jasper, Tikki/ (Tikky, Tickie), and Pushka. See below for art of these fellow "cool cats" and me!

As the weather picks up, you can expect to find me curled up on a cozy lap or hunting the rodents hiding in the warm summit building. The cold white stuff has returned, which is prrretty rude if you ask me. Oh well, more cuddles for me I suppose!

Stay cozy with kitty t-shirts (and sweatshirts!) and plan for that cold white stuff. It'll be here before you know it!

Nimbus Kitty
(*Resident 'Lil Guy, MWOBS)*

SHOP HERE

Observatory Welcomes Two New Weather Observers

This fall, Mount Washington Observatory welcomed two new staff members, Weather Observers Ryan Haas and Madelynn Smith, who joined the Observatory as interns this past summer.

Ryan holds a B.S. in Meteorology and just completed a M.S. in Applied Atmospheric Science at the University of Albany. He has experience delivering weather forecasts out of the University of Miami and also participated in Arctic cloud research at CU Boulder. Ryan is originally from northern Massachusetts, and enjoys hiking, swimming, and skiing. He is passionate about extreme weather and science communication and looks forward to deploying these passions as an observer.

Growing up in eastern North Carolina, Madelynn (Maddie) was accustomed to severe storms and land-falling tropical systems, and has been fascinated with all kinds of weather phenomena since she was a toddler. That childhood fascination has since transformed into a true passion for further understanding of our earth's atmosphere, which led her to earning her degrees in Meteorology and Environmental Sciences from the University of North Carolina at Charlotte in 2024. While finishing up school, she started her career as a weather observer at Charlotte-Douglas International Airport.

Her continued interest in extreme weather eventually led her to a summer internship position with the Observatory in the summer of 2025, where she supported summit weather operations, composed forecasts, conducted research, and much more. Maddie was very excited to join the summit team full-time at the conclusion of her internship as a weather observer and education specialist.

Quigley Motor Company Makes Summer Programs Possible

Thanks to two incredible donors and support from Quigley Motor Company (*https://www.quigley4x4.com/*) in Manchester, PA, our new 12 passenger Ford Econoline van arrived in time for our Storm Scouts Summer Day Camp this past August. It was immediately pressed into service, making the campers' travel around Mount Washington Valley possible.

This included travel up to the summit with our partner, the Mt. Washington Auto Road, thanks to the van's arrival from Quigley Motor Company with 4x4 capacity already installed. The camp proceeded very nicely with rave reviews from parents and students alike as of the writing of this news item.

In September, the van received its final treatment from Seventh Street Graphics in Berlin, NH when it was wrapped with a photo of the Northern Lights taken by Night Observer and Senior Meteorologist Ryan Knapp. The vehicle's original color was black.

SPRING/SUMMER 2025 WEATHER DATA

	APR	MAY	JUN	JUL
Temperature (°F)				
Average	26.5	37.7	47.1	52.3
Departure	+1.8	+1.4	+1.6	+2.4
Maximum	54	58	65	66
Date(s)	29th	16th	23rd	16th
Minimum	-3	20	26	34
Date(s)	9th	11th	1st	21st
Precipitation (inches)				
Monthly	5.23	13.97	6.34	5.80
Departure	-2.08	+6.29	-2.25	-3.13
24-hour Maximum	0.79	2.77	2.05	1.39
Date(s)	26th/27th	31st	6th/7th	20th/21st
Snowfall (inches)				
Monthly	21.5	13.9	1.3	0.0
Departure	-11.6	+1.0	0.0	0.0
24-hour Maximum	7.9	10.4	0.8	0.0
Date(s)	8th/9th	22nd/23rd	1st/2nd	N/A
Season Total	275.2	289.1	290.4	290.4
Departure	+7.6	+8.6	+8.6	+8.6
Wind (mph)				
Average	42.4	29.4	31.0	27.0
Departure	+6.8	-0.2	+4.2	+1.5
Peak Gust/Direction	122 N	98 NW	124 NW	97 W
Date(s)	27th	10th	20th	17th
Days 73+	21	8	8	6
Days 100+	6	0	1	0
Other				
% Sunshine	32	21	28	33
Clear Days	1	0	0	0
Partly Cloudy Days	3	5	4	4
Cloudy Days	26	26	26	27
Days with Fog	28	27	28	29
Days with Rain	8	18	19	17
Days with Snow	19	8	4	0

Spring/Summer 2025 Overview

BY **RYAN HAAS**

April 2025

A cold front brought a few hours of wintry mix early on the 1st, followed by fog and falling temperatures, which reached 0° F around midnight on the 2nd. Brief clearing under high pressure during the morning on the 2nd gave way to increasing clouds, fog, and snow in the evening as a warm front moved through. A rapid warm up commenced overnight, while a low-pressure system brought freezing rain, ice pellets, rain, and even thunderstorms early on the 3rd. A strong pressure gradient pushed wind gusts over 100 mph on the 3rd and into the 4th. High pressure caused clearing skies through midday on the 5th before another low delivered snow transitioning to freezing rain through the 6th. A coastal low produced 7.3" of snow on the 8th, followed by a significant late-season cold shot with below zero temperatures and periodic snowfall on the 9th. Building high pressure brought warming and weak winds over the next few days, though a coastal low dropped light wintry precipitation on the 12th. Precipitation transitioned to snow on the 13th, and hurricane force winds returned late due to high pressure moving in behind the low. Skies cleared on the 14th ahead of another system that dropped freezing rain and snow on the 15th.

Chilly northwesterly flow on the 17th caused upslope-induced snow and fog through midday, with temperatures in the single digits that morning. High pressure offshore brought fair weather and warming temperatures through the 19th before a strong low delivered afternoon rain as highs climbed into the upper 40s. A strong pressure gradient caused wind gusts to reach 110 mph early on the 20th, followed by a cold front that dropped temperatures into the teens in the morning. High pressure provided calm weather and mild temperatures on the 21st and 22nd. A cold front ushered in some rain and a return to seasonal temperatures on the 23rd. A weak shortwave brought afternoon showers and fog on the 24th, while a building ridge allowed temperatures to climb into the 40s on the 24th through the 26th. A strengthening low brought rain in the evening. As the low departed,

precipitation transitioned to snow, ice pellets, and freezing rain on the 27th as temperatures rapidly fell. Winds peaked at 122 mph in the morning due to a very tight pressure gradient. The final days of April featured continued strong winds, periodic showers, and springlike temperatures under a strengthening upper-level ridge off the east coast.

May 2025

A strong upper-level ridge yielded partly cloudy skies, weak winds, and mild high temperatures in the mid-40s on the 1st. Fog, rain, and stronger winds returned early on the 2nd as a weak disturbance moved through the Northeast. An incredibly stagnant weather pattern set up on the 3rd, which was caused by an upper-level trough that stalled over the Midwest, siphoning warmth and moisture into the region. This resulted in fog, periodic rain, and above normal temperatures that lasted through the 8th. The system finally moved out on the 8th, though it was followed by a strong nor'easter that moved up the east coast on the 9th and the 10th, bringing additional heavy rain to the region. The stagnant wet pattern produced nearly 5" of rain on Mount Washington during the first ten days of May. As the low departed late on the 10th, temperatures plummeted and winds ramped up, with gusts nearing 100 mph overnight. Temperatures bottomed out at 20F early on the 11th, with glaze and rime ice returning to the summit. A building ridge allowed the summit to remain fog- and precipitation-free with warming temperatures through the 14th, though winds stayed strong through the 12th.

Isolated rain showers and fog returned to the summit on the 15th and 16th due to another strong low slowly approaching from the west. Under a mild southerly flow, temperatures climbed into the upper 50s on the 16th. The low and its associated front finally moved through in the evening of the 17th, bringing heavy rain and thunderstorms to the summit. A cutoff low continued to produce precipitation through early on the 18th, while temperatures rapidly dropped behind the cold front. With temperatures bottoming out in the mid-20s early on the 18th, an inch of snow fell in the morning. Deep troughing brought a return to winter-like conditions, with temperatures staying below freezing from late on the 20th through the 25th. This allowed significant glaze and rime ice to accumulate given the persistent fog. With the cold air in place, a strong coastal low dropped over a foot of snow and ice from the 22nd through the 24th. Ridging finally returned on the 27th, bringing a return to seasonal temperatures and clear skies on the 27th and 28th. Another unseasonably strong low dropped nearly 3" of rain on the 31st, with rapidly falling temperatures, freezing fog, and light snow returning overnight.

June 2025

On the backside of a low, subfreezing temperatures, freezing fog, as well as periodic ice pellet showers and snow showers produced 1.3" of accumulation on the 1st and 2nd. The low also brought hurricane force wind gusts on the 1st. High pressure drifted north, leading to clearing skies and above freezing temperatures returning late on the 2nd. A building ridge brought seasonable temperatures on the 3rd and summer-like conditions on the 4th, with temperatures climbing into the 60s for the first time since September 2024. Haze from Canadian wildfires significantly hindered visibility and air quality on the 4th. Unseasonable warmth continued on the 5th and a cold front brought heavy rain and thunderstorms on the 6th, with several close strikes observed. The front stalled nearby on the 7th, bringing cooler temperatures and continued rainy conditions. High pressure brought sunny skies on the 8th, though fog and rain returned on the 9th and 10th due to another system moving through. A strong pressure gradient behind the low produced elevated winds on the 11th. A reinforcing cold front on the 12th brought fog, drizzle, and continued gusty winds. Temperatures dipped below freezing overnight, allowing rime and glaze ice to make a brief appearance on the morning of the 13th.

Upslope flow and a stalled front to the south produced intermittent fog and drizzle through the 15th, with continued below average temperatures. Temperatures returned to seasonable on the 16th and a weak surface trough produced some summit showers on the 17th. A warm front moved through with some showers on the 18th, allowing temperatures to rise into the upper 50s that day and the lower 60s on the 19th. An advancing cold front produced evening thunderstorms on the 19th. As the departing low intensified and high pressure moved in from the west, an incredibly tight pressure gradient developed, producing the fourth-highest June wind gust on record, which reached 124 mph on the afternoon of the 20th! Lingering showers also produced over an inch of rain on the 20th. High pressure overhead resulted in clearing skies and calmer winds on the 21st. A strong ridge and multiple disturbances moving along its periphery produced summer-like temperatures, daily precipitation chances, intermittent fog and continued gusty winds through the 24th. A cold front moved through on the 25th, bringing clearer skies and seasonable temperatures through the 27th. A system produced showers and fog on the 28th and 29th, before over 60 degree temperatures returned to close out the month.

July 2025

A warm front brought widespread rain and cloud cover keeping temperatures in the upper 50s to start off July. A weak cold front moved towards

New England overnight, keeping the summit in the clouds throughout the 2nd. A stronger upper-level trough and its associated cold front moved through on the 3rd, bringing morning thunderstorms, fog, and showers that lasted through the day. Behind the front, the summit experienced gusty winds, continued fog, and well below average temperatures for Independence Day, with lows falling into the mid-30s. High pressure built into New England on the 5th, clearing the fog and allowing temperatures to moderate substantially. A Bermuda High funneled warm, moist air into the region on the 6th and 7th, leading to scattered convective showers and highs well into the 60s. A weak cold front passed through on the 8th, producing a thunderstorm on the summit. Several weak shortwaves moved through on the 9th and 10th, bringing scattered showers while temperatures stayed slightly above normal. An approaching upper-level trough helped produce a brief but intense thunderstorm early on the 11th. Ridging re-established itself on the 12th, allowing temperatures to climb well into the 60s through the 17th. Most of this period remained dry with mostly cloudy skies and intermittent fog, though a weak cold front introduced some showers on the 14th. A strong low and cold front approached on the 17th producing heavy rain and thunderstorms in the evening. Behind the front, a strong pressure gradient contributed to near 100 mph wind gusts late on the 17th.

Upslope showers, fog, and lows in the 30s plagued the summit on the 18th. Building high pressure allowed for clearing and moderation on the 19th, however heavy rain returned on the 20th with another strong cold front. A deep upper level low settled in behind it, resulting in lows near freezing as well as fog and drizzle on the 21st. High pressure cleared skies on the 22nd, though unseasonably chilly conditions continued. A developing ridge brought warming temperatures and fog-free conditions on the 23rd and the 24th. A cold front provided rain and fog on the 25th, before skies cleared and temperatures cooled slightly on the 26th. Smoke from Canadian wildfires reduced visibility and air quality from the 26th through the end of the month. Showers returned on the 27th with a weak shortwave moving through, with clearing returning on the 28th and 29th. A strong cold front passed through on the 30th with showers and fog, leading to falling temperatures in the evening.

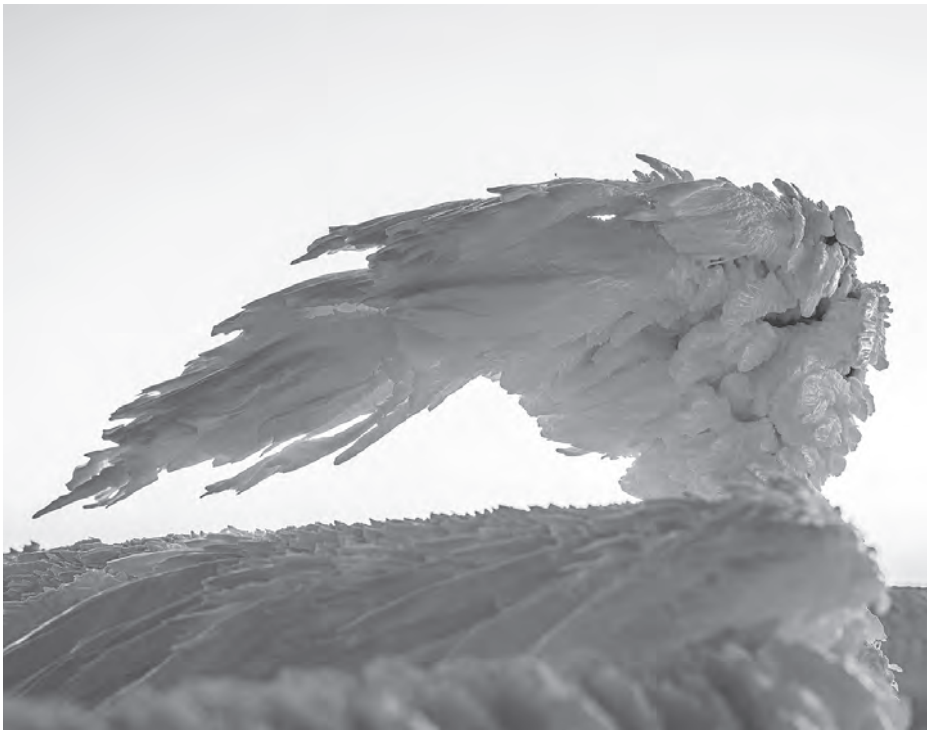
Weather 101: All About Fog

BY **ALEX BRANTON**

There are many types of weather that come to mind when one thinks about Mount Washington. We are known for high winds, rime ice, and snow. Perhaps the most classic Mount Washington weather commonly experienced on the mountain, however, is fog. The summit can go days on end obscured by fog, making even the most seasoned weather observers lose hope that the sun will ever shine on them again! The National Weather Service defines fog as, "water droplets suspended in the air at the Earth's surface." In other words, fog is simply a cloud that touches the ground. Compared to all other Mount Washington weather, fog seems boring, but I would argue that it is the most impactful to summit operations. Read on to learn why!

The most well-known types of fog are radiation fog and advection fog. These are both common in the Mount Washington Valley and in most areas across the globe. Mountains, however, do not experience these. The two most common fog types experienced on Mount Washington are upslope fog and freezing fog. Upslope fog forms when moist air is forced up and over the mountains. As air rises, it cools, and water vapor condenses into the water droplets that form fog. This is what happens when the rest of New England is experiencing sunshine and Mount Washington is obscured by a cloud. When any type of fog forms at below freezing temperatures, it is then called freezing fog. Freezing fog is made up of water droplets that are still in their liquid form despite their temperature being below freezing. When this happens, liquid water droplets freeze when they make contact with any surface, forming ice. This is how rime ice forms on Mount Washington. Mountains can also experience foggy conditions if cloud layers simply form at their level.

Something as unassuming as fog can often have major impacts to summit operations and mountain safety. Under foggy conditions, visibility is severely limited. This can make trail finding difficult and it can be very disorienting above tree line. This is especially true if winds are high and temperatures



A rime ice feather extending off of summit binoculars. Photo by Charlie Peachey

are below freezing, as is typical on Mount Washington. Low visibility and disorientation due to fog paired with snow on the ground and high winds (whiteout conditions) is the most common reason for failed snow tractor trips to the summit. Ice that forms with freezing fog is also the most difficult aspect of operating a weather station on Mount Washington. Ice that forms on meteorological instruments will interfere with their ability to acquire accurate readings. This is the primary reason that the Mount Washington Observatory requires human weather observers to manually operate the station – ice removal. Freezing fog can be helpful sometimes, though. There are theories that ice from freezing fog is what kept the original Observatory building intact during Big Wind Day in April 1934 when weather observers measured a record wind gust of 231 mph. Ice that forms on the building is also insulating, which can give us savings on heating costs. So, although fog is simply a cloud that touches the ground, this seemingly uninteresting meteorological phenomenon can have big impacts on MWOBS summit operations and safety.

The Observatory Welcomes a New Season and Staff Members

BY **MIKE CARMON**

Summer can feel like a haze on Mount Washington on several levels. After nearly a half year of wintertime conditions, and a long melt and thaw-out period, the warm embrace of summer feels particularly hard-earned for New Englanders. That's certainly the case for the summit, where the relatively milder days make winter's mountaintop brutality feel several years in the rear-view. But any seasoned weather observer will tell you that winter is never truly as distant as it might seem, even in the dog days of July and August when the summit mercury ekes near the elusive 70-degree mark. A cold snap is always a possibility and a stray snow shower could always surprise us, as the summit sits perched nearer to the locked-up supply of cold air ever-swirling about the upper atmosphere.

This summer, our peak ambient air temperature was 69 degrees F—only three degrees shy of our all-time record high.

Smoke from distant wildfires fosters another hazy lens for our weather

Interns have always been a vital part of summit operations and their support is more crucial than ever before. As they conduct their research projects, they are also trained in facilitating tours of our weather station, higher summits forecasting, and radio forecasting/broadcasting.

station. At 6,288 feet, the smoky skies took up a semi-permanent character space in our hourly weather observations. When smoke and/or haze produced by distant wildfires becomes thick enough to reduce horizontal visibility to less than 50 miles, our observers will note distant haze in the additional remarks section of observations. When it becomes thick enough to reduce visibility below 7 miles, it's noted in the main body of our hourly observations. In the height of wildfire smoke season this summer, we even reported 2 days of smoky haze reducing visibility to a murky 1 mile (in contrast to our maximum 130-mile visibility).

Operations at the summit continued with a warm fervor to match the more vigorous movements of air molecules at milder temperatures. We welcomed a new crop of summit interns as our winter interns wrapped up their research projects. Our summer interns hailed from all across the country—from California and Texas to Georgia and North Carolina. Interns have long been a vital part of summit operations, but with the exceptionally busy times at the summit, their support is more crucial than ever before. As they conduct their research projects, they are also trained in facilitating tours of our weather station, higher summits forecasting, and radio forecasting/broadcasting. And when observers inevitably move on to their next great job venture, summit interns tend to be where we look for replacement prospects.

As one of our longer tenured observers, Alexis George, departed the summit crew this summer, this left such a vacancy for the crew. We were excited to bring summer intern Ryan Haas onto the team in the night observer position. Just as Ryan was settling in, another of our dedicated observers, Amy Cotter, departed as well. In the coming weeks, summer intern Madelynn Smith will also be rejoining the crew as a weather observer. We're excited by the passion and skill set that both Maddie and Ryan bring to the team!

While the summit was busy with weather station tours and many visitor day trips, I worked with the summit team to make some much-needed upgrades to summit facilities. With life and work so intertwined at the summit, sometimes the perceived niceties make a world of difference for the summit crew. This included a repaired oven, new bunkroom windows, new standing desks, and accompanying chairs to match.

The busy schedule of the summit staff includes several new radio broadcasting contracts across neighboring New England states. This gave us an opportunity to network with several regional broadcast meteorologists in the spirit of adding to our collective knowledge base of New England weather patterns. The complex terrain of the region results in weather patterns that are just as intricate, and the professionals who supported our team in this regard have

Fall summit interns orient themselves in the Observatory tower's cold room, where instruments are stored and staged for installation on the tower's peak.

a wealth of invaluable knowledge and experience.

A new exciting addition to the summer schedule was the introduction of our Undergraduate/Graduate Adventure program. We welcomed undergraduate students from Plymouth State University, Fairfield University, and the University of Maine to participate in varied research projects endorsed by their respective colleges. We hope to grow this new program as another method to provide fieldwork-type experiences amidst the natural laboratory that is the summit of Mount Washington.

With another summer in the books, the leaves turning, and the ongoing New England drought intensifying, the cold embrace of winter will inevitably return. This means dusting off our brand-new Snow Cat, training our new staff on wintertime instrumentation maintenance, and reserving valuable space in our forecasts for snowfall accumulations.

Collaboration-fueled Discovery on Mount Washington

BY **JAY BROCCOLO**

This winter marks a season of innovation and collaboration at Mount Washington Observatory. With new technologies, strong partnerships, and expanding science initiatives, the Observatory is advancing its mission to connect summit weather with regional climate understanding.

The installation of the Vaisala WindCube 200S LiDAR behind the Omni Mount Washington Hotel will usher in a new era of high-resolution wind and boundary-layer analysis across complex terrain. The expanding regional mesonet, now stretching along the Cog Railway and at key sites throughout Coös County, improves situational awareness and supports ongoing atmospheric and environmental research. A new air-quality partnership with the New Hampshire Department of Environmental Services will soon add particulate and chemical monitoring at high elevation.

Collaborations also continue to strengthen MWOBS's reach. Work with the Cold Regions Research and Engineering Laboratory (CRREL) is advancing cold-region instrumentation, while the EPA-funded NENMO initiative with the University of Vermont enhances regional data sharing. The new White Mountains Almanac, developed with the Appalachian Mountain Club and Hubbard Brook Experimental Forest, connects long-term atmospheric and ecological change across the region.

Beyond research, MWOBS is growing experiential learning through its Undergraduate and Graduate Adventures program and launching a Broadcast Meteorology Internship in partnership with NHPR, RVG, and WMWV. Together, these initiatives strengthen both applied training and research with public engagement ensuring the Observatory remains a leader in weather and climate and, specifically, mountain meteorology across New England.

This Fall's Interns: Research at the Summit

This season's intern cohort reflects the Observatory's expanding operational and research scope through unique opportunities provided by our expanding internship program and partnerships.

Summit observers and interns work with Jay Broccolo, Director of Weather Operations, on learning the ins and outs of our RM Young alpine anemometer.

Antonio Ruiz – *Improving Forecasts with Mesonet Data*

Antonio is exploring how MWOBS's expanding regional mesonet can enhance model accuracy in complex terrain. Using the Weather Research and Forecasting (WRF) model, Antonio is simulating a recent mixed-precipitation event and comparing model runs that include and exclude MWOBS mesonet data. His research will help quantify whether incorporating high-elevation and mid-slope observations improves forecasts of precipitation type and amount.

Alyssa Belanger – *Drought, Foliage, and Color Change*

Alyssa is studying the timing and intensity of fall color across the White Mountains. Her work focuses on the Red Chromatic Coordinate (RCC), a spectral measure derived from canopy imagery. RCC serves as an indicator of canopy coloration and has been shown through leaf-level biochemical analysis to correlate closely with anthocyanin concentrations during senescence, the physiological aging process that drives autumn color change. By comparing RCC patterns with regional drought

metrics, Alyssa's research aims to determine whether water stress influences the vibrancy and timing of New England's foliage season, which will offer new insights into how climate variability may shape a defining feature of the region's ecology and tourism.

Cassie Farnsworth – *Wind Events and Leaf Drop*

Cassie's research examines how wind events influence leaf abscission, the process by which trees shed their leaves in autumn. By analyzing wind speed and gust data alongside RCC values, Cassie is investigating whether strong wind events accelerate leaf loss and shorten the duration of peak foliage. Her project merges meteorological and ecological datasets to reveal how physical weather processes shape the timing and progression of seasonal change in forest canopies.

Mitchel Tsokatos – *Winter Outlook and Climate Teleconnections*

Mitchel is working on a winter outlook project that investigates how large-scale atmospheric oscillations influence Mount Washington's winter season. Focusing on the El Niño–Southern Oscillation (ENSO) and the North Atlantic Oscillation (NAO), Mitchel is analyzing how these teleconnections affect seasonal temperature and precipitation at the summit. His work connects global circulation patterns and local weather outcomes, insight that supports both operational forecasting and long-term climate understanding.

Through these studies, the Observatory's internship program continues to provide applied research while generating insights that extend far beyond the summit. Each project draws from MWOBS's unparalleled long-term datasets and the strength of our partnerships in the region, such as the AMC. These projects are focused on transforming decades of weather and climate records into forward-looking science.

Looking Ahead

The winter season ahead brings both challenge and opportunity. As MWOBS transitions to full National Mesonet Program participation and deploys the WindCube LiDAR, the Observatory is positioning itself as the leading organization of New Hampshire's State Mesonet and a recognized hub for weather and climate data. Yet growth also brings logistical hurdles, chief among them housing for interns and staff, and balancing capacity across a rapidly expanding network of instruments and programs.

Despite these challenges, the Observatory's adaptability and spirit of collaboration remain its greatest strengths. From summit winds to valley research stations, from local partnerships to national collaborations, MWOBS continues to turn the "world's worst weather" into some of its most valuable data — which, in turn, fuels discovery, education, and resilience in the mountains we call home.

FEATURE

Twenty Years on the Rockpile

BY **RYAN KNAPP**

Twenty years ago (December 28, 2005), I started working at the Mount Washington Observatory. I started as an intern, but in February 2006, I was hired on as a "temporary-full-time" observer. What this title meant was I was hired as an Observer, but I had until what would have been the end of my internship (May 2006) for the Observatory and me to decide whether or not I should continue as a full-time observer. Well, since I am writing this comment now, I guess you could say we both agreed that a full-time position would be mutually beneficial.

When I reached my 5th anniversary, I reflected on the changes that had occurred since I started. I wrote similar reflections during my 10-year and 15-year anniversaries. As I round the corner to my 20th anniversary, I figured it was time once again to reflect on the changes I have experienced during my time on the summit of Mount Washington. So, here are some of what's changed in my twenty years here:

The Bombardier snow tractor went from an unheated, bench-seated, yellow "short bus" to the semi-heated, captain-seated, white "leopard" Bombardier. And starting this winter, we will be using a new red

[Ryan] Getting ready to photograph April 2024's total solar eclipse.

Piston Bully.

The blue and white 4x4 van that was in use when I started got a bump up to a newer-but-used black and white 4x4 van. That has since been updated to a new image-wrapped van. Additional funding has brought on a secondary black van that was wrapped this fall with one of my northern lights photographs.

The 4x4 two-seater truck with a flat blade in the front was here before I started working here. A generous donation allowed us to update to a new 4x4 truck with an extended cab and a V-shaped blade in the front.

When I started, a limited water storage capacity during the winter months meant the rule of "if it's yellow let it mellow; if it's brown flush in down" was etched in our minds. We were limited to one military shower per week, but most of us opted not to take one at all. In short, water in was fine, but water out was as limited as possible. There were times when buckets

were looked at as an option when the tanks were getting full near the end of the winter season. Today, New Hampshire State Parks (where we rent our space) has a year-round septic system installed. As a result, water restrictions are a complete mystery to all the new observers, volunteers, and interns since water out is typically no longer an issue.

Due to the limited water out rule, toilets were pressurized to assist the high volume to get to the tanks. So, our toilet was up on a platform with a bunch of pressurizing equipment. This system was eventually replaced when the septic system went in, but the elevated platform remained. However, a few years back, the bathroom was gutted, and now the toilet sits flush to the ground. Also gone - the tub (which I only recall one person ever using), which is now a shower stall.

Our bunks were once prison-cell-esque… that might be too harsh; dorm-room-esque. They were uncomfortable and hard to sleep in. But now they have been overhauled and I can now get a solid 6 hours (or sometimes more) of sleep and not the 3-4 I used to get sleeping during the day (as a night observer).

Looking around the Observatory space, there have been a ton of changes with not a single room looking like it did when I first started here; I could probably write an entire article just on them. But at least the sugar container remains; fun fact - it is one of the oldest items on the summit still in continuous use, spanning decades and multiple generations of Observers.

The hum and smell of the power generators was like a giant kerosene-powered white noise machine. The "switch over" between the two generators was a regular occurrence. And lights were on everywhere to make them run more efficiently. Now with a buried power line, nights are only noisy when winds are high and the air smells crisp. And all unnecessary lights are turned off to cut down on power costs.

Our logo went from a blue and magenta 80's/90's look to the red and white modernized one that plasters the very website you are on.

Our website is completely different. In fact, it is the seventh iteration since I got here. And the look and feel of the website that was in place when I started here can nowadays be outdone by most teenagers with a weeknight of coding. With each iteration things were sometimes added and other times removed to reflect the changing online demographics.

Weather models have improved as computer processing speeds have improved. Some weather models have been discontinued while others didn't even exist when I started. When I started, the Higher Summits Outlook only went out 36 hours and was only done in the morning. However, because of improvements in the various models along with internet speeds and connection reliability, our forecast now goes out to 48 hours and is updated twice a day.

Time sheets were due on Wednesday, then on Mondays, and now on Sundays.

Work weeks could mean just that, back to back weeks. There was one time I was up here three weeks in a row. The only ones with the guaranteed week on, week off scheduling back then were the interns. Nowadays, we all are on a steady week on week off schedule with little to no exceptions (except if we take vacation time).

Crews were two observers and (usually) one intern. With the staggering schedules, no two weeks would have the same crew. This meant there were no set crews and we got to work with and know everyone. Now, there are three observers and one to three interns on each shift, and we are on the same crew for long periods of time with few opportunities for interactions among members of opposite shifts (except on Wednesday and the occasional visits during off weeks).

Volunteers were hard to come by. I remember several weeks during my first few years when we couldn't find any volunteers for up here. Now there are waiting lists for particular dates.

Computer screens and the television were thick, heavy, hot, and deep CRT's with what the modern era would call "small" 3:4 ratio screen sizes. Now we have narrow, cool-running, light, and relatively thin LCD's which are 16:9 widescreen and most computers now have two to four monitors connected, with a few even allowing touch input.

Smartphones and tablets weren't around. Cell phones were and were either "clamshell" or "candy bar" shaped; service for any of them was non-existent across most of northern NH. So, when you came up, you were disconnected, which was kind of nice to be completely honest; kind of miss those days at times.

Social media - didn't exist!

Incandescent bulbs and neon bulbs used to light our workspace but now LED or halogen bulbs have more or less replaced them.

Where once VHS's and PlayStation 2 were the only things being watched on our TV, we eventually got a DVD collection. And now there is Video on Demand (Netflix, Hulu, etc.). To think: when I first started, major and/or live events like the Super Bowl or NASA missions had to be missed when up on the summit, and now we can typically stream it in real time.

The server room was spacious and was filled up as technology came about, but then shrank back down as technology improved, got smaller, and more efficient.

Distance learning didn't exist. When I started, the only distance learning equipment we had was a lone Polycom, which was used for a few connections with the Weather Discovery Center from time to time. And live connections with anyone else (schools, news, etc.) couldn't happen as the connection speeds were not able to handle them. As time progressed and internet speeds increased, we secured grants and donations to build an entire command center for the Educational Observers to allow for live video feeds with various schools and news stations around the world. But just like the server room, as technology and the ways we communicate evolved, so did our technology, and now we have high-resolution cameras and a touch screen, along with apps like Zoom that allow us to better communicate and interact with distant people, and all of it in a much smaller footprint.

The digital camera I started with was baked into my Palm Zire 71 which was 0.5 megapixels. Over the years, my cameras have evolved and I now primarily shoot with my Canon EOS R (mirrorless), which is 30.5 megapixels.

The Cog still was running all coal when I started and now it is powered by biodiesel

(with the exception of one {or two} coal train(s) a day in the summer).

Various structures and buildings have been torn down and removed; looking at historical pictures spanning decades, this is one of the lowest number of structures present on the summit.

Summit and valley crews are completely different from when I started. If I counted correctly, on the summit alone I have worked with 3 kitty cats, 7 summit managers, 20 Bombardier (aka snow tractor) operators, 27 museum attendants, 39 observers, 156 interns/externs (excluding a handful of temp-interns that only came up for a week or two for school), and 350+ volunteers (some of which have been coming up here as long as I have been working here).

Specific job titles and specific qualifications didn't exist. We were all just Weather Observers. Now we have a staff meteorologist/observer, education specialist/observer and research specialist/observer on each shift.

Partnerships with companies have come and gone. While I was disappointed to see those partnerships end, I have enjoyed each of them as we continue to pull some awesome companies and individuals on board.

The popularity of Seek the Peak has expanded. I remember a time when we had left over goodie bags, believe it or not. Now we have to put a cap on the number of participants.

"Automated" equipment we have owned and were testing is no longer around due to our destructive winds and ice. Even the equipment we use regularly has gone through replacement and repairs. And we are in the process of testing out a new version of our tried and true pitot system.

Research projects like Airmap and others either no longer exist or have had their requirements changed as technology improved.

The ARVP had started by the time I arrived but it expanded it into our White Mountain Mesonet and now we are expanding it even further to cover most of NH once it is completed.

Our Weather Discovery Center in North Conway closed and its exhibits loaned out to other museums in the state (like the McAuliffe-Shepard Discovery Center in Concord, NH).

I'm sure I could go on and on, but I think I have touched upon the big changes I have seen. Hopefully you can see how much has changed in twenty years. Since I am all about photography and history (it was my minor), I like to look at historical pictures from the 1930's and 1940's and really see how much has changed on the summit. And who knows how much more will change in the next year, five, or ten. However, while crews, living quarters, quality of life, job titles, technology, and more are continuously evolving and changing up here, one thing has remained and will remain constant up here even after me and this crew departs: the recording and reporting of the weather from the summit of Mount Washington, NH.

Editor's Note: On the following pages, you'll find a small collection of Ryan's awe-inspiring photography from the summit of Mount Washington over the years. To view more of Ryan's photography and to browse prints, visit https://mwo.smugmug.com/.

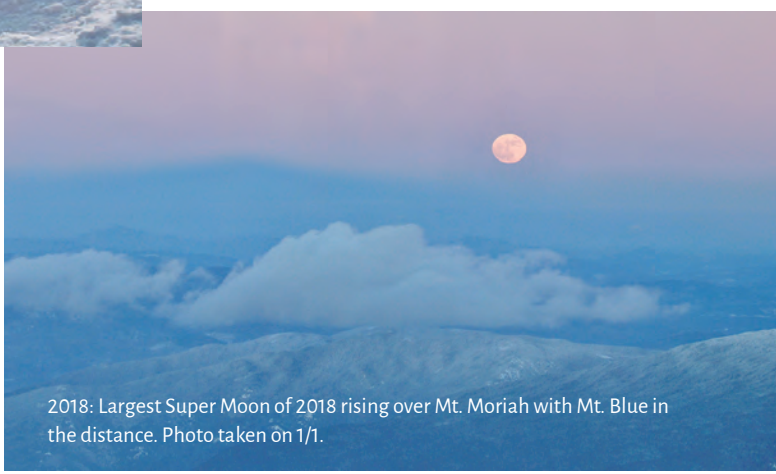
2016: "Mt. Monroe with undercast conditions at sunset on 10/31. For a holiday known for trick or treats, this view was certainly a treat."

2025: "Northern Lights just before sunrise on 9/29. This was the view from the summit of Mt Washington at around 5:30 EDT."

2017: Lunar fogbow over the summit taken on May 11, 2017. (Fogbows follow similar basic principles as rainbows. However, inside a fog bank where the water droplets are very fine or small, the light is no longer reflected and refracted within the drops, but diffracted by them instead to produce a grey to white bow.)

2023: "I snapped this image of Weather Observer Hayden Pearson on 1/14 as we were out viewing/photographing sunset above the sea of clouds that were surrounding the summit on that date. While the summit spends over 60% of the year in the clouds, on occasion, an inversion will set up and the clouds will sink below the summit. We like to call these clouds below us an "undercast" (like overcast skies but below us). Undercast conditions come in all sorts of varieties but the sea of clouds vista is always my favorite as it makes the summit feel like it is an island floating among the clouds."

2006: "When I was first working on the summit, there were three foxes that visited from below tree line. They bobbed up along the Cog tracks on fair-weather days, their red fur contrasting against the white. I haven't seen one up here in years, and only in the summer months. But I've recently seen their tracks so another sighting may be in my future."



2018: Largest Super Moon of 2018 rising over Mt. Moriah with Mt. Blue in the distance. Photo taken on 1/1.

FEATURE

The White Mountains Almanac Preview: Winter Temperatures (January)

BY **FRANK VAZZANO** INTRO BY **MWOBS STAFF**

Mount Washington Observatory is excited for the release of the 2025 White Mountains Almanac, a first-of-its-kind publication in partnership with the Appalachian Mountain Club and Hubbard Brook Research Foundation. With funding support from The Cabot Family Charitable Trust, The Nature Conservancy in New Hampshire, Stephen Walker and Diane DeLuca, and The Hartford Foundation for Public Giving, this richly-illustrated almanac offers a comprehensive, year-in-review exploration of ecological and climatological changes observed in the White Mountains region, serving as both a valuable resource for researchers and a compelling guide for nature enthusiasts, educators, and policymakers, as well as the general public.

With contributions from local scientists, naturalists, and community supporters, graduate student Frank Vazzano compiled the data and authored the work during his 5-month long internship with the three partner nonprofits. The text, he shares, will introduce the reader "to the climatological character of these wonderful mountains, how and where it is changing, and how these changes interact with spheres ranging from ecology to economy, and severe weather to outdoor recreation."

Key features of the 2025 edition include month-by-month overviews covering key environmental indicators, detailed seasonal summaries of temperature, precipitation, and extreme weather events, species spotlights and phenological changes, long-term data trends, and stunning accompanying illustrations capturing the beauty and biodiversity of the region by artist Sarah Kaizar.

The following page(s) is an excerpt from the almanac highlighting one chapter (January), which explores how **winter temperatures** in the White Mountains have changed through the decades. For a look at the full online version of this publication, visit mountwashington.org/**research**.

JANUARY

Winter Temperatures

Illustration by Sarah Kaizar

Winters in the White Mountains maintain a distinct balance between frigid conditions and picturesque scenery. The cold, short, and occasionally ferocious days of January contrast with beautiful scenes of snow-capped mountains and tranquil hinterland. Many living things retreat for the winter via hibernation, dormancy, or migration, potentially giving the mountains an eerie or lifeless atmosphere. This time of year is, however, critically important for the plant and animal residents of the White Mountains. These wild inhabitants are finely tuned to the clock of nature and rely on the cold as a reset to rest, ultimately to repair cells and produce sap.

Alongside the ecological importance of cold winter temperatures, the indirect

effects on recreation, water resources, and the economy make something as innocuous as the daily temperature on your weather app deeply consequential. Thus, in the face of shifting global weather patterns, this chapter will focus on how winter temperatures in the White Mountains have changed in comparison to adjacent regions, and what this change means for some of the life and activities previously mentioned that rely on cold winters. In ecology, locations that provide sanctuary for wildlife (especially during periods of environmental stress) are called 'refugia'. While the White Mountains are considered to be 'refugium' (and thus resistant to regional changes in weather patterns) this does not make them immune to changes in weather patterns. In this chapter and throughout the almanac, we will be investigating how resistant the White Mountains really are to environmental stress, and what this means for its refugium status.

For this almanac, we use meteorological data from four sites in the White Mountains of New Hampshire. These sites are the Mount Washington Observatory (MWOBS) on the summit of Mount Washington, the Appalachian Mountain Club's Pinkham Notch (AMC PN) visitor center, the Hubbard Brook Experimental Forest (HBEF) head-quarters, and North Conway (NCON), New Hampshire (see maps on pages 6-9). These sites represent a diverse range of elevations and climate types in the White Mountains, from the temperate foothills to the subarctic alpine mountaintops.

For the first month of the year, we investigate meteorological winter (December, January, and February) temperatures as a whole. We start with the daily maximum (T_{max}) and minimum (T_{min}) temperatures, which are the highest and lowest temperatures recorded each calendar day. This is illustrated by Figure 1.1, which shows how temperatures typically fluctuate daily, or 'diurnally', usually

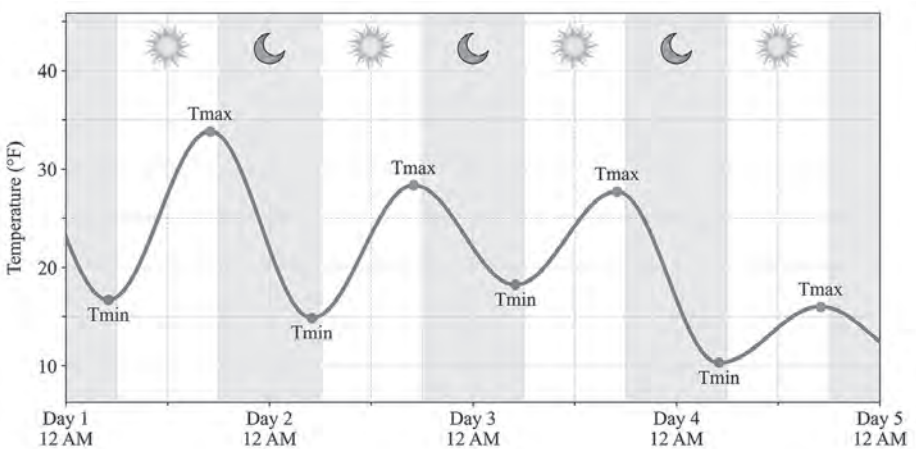
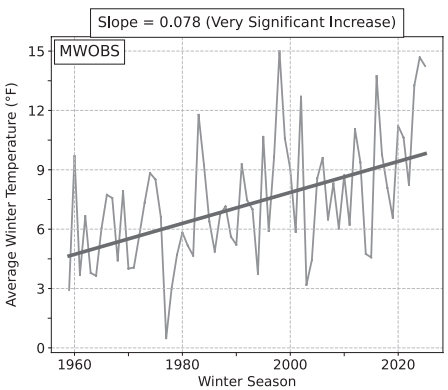


Figure 1.1. Graph of typical diurnal variations of temperature, where Tmax is an example of a daily maximum and Tmin is a daily minimum. Note that this general pattern can vary with geographic location and changing weather conditions.

peaking right before sunset, (shown as 'Tmax', short for 'maximum temperature') and bottoming out before sunrise (shown as 'Tmin', short for 'minimum temperature'). In reality, this pattern is much less cut-and-dry and depends on a lot more than just time of day, but this is the general pattern.

The daily average temperature (T_{mean}) is calculated by adding the daily maximum and minimum temperatures together and then dividing by 2. Then, we find the entire winter average ($T_{seasonal\ mean}$) for every year by adding each daily T_{mean} value and dividing by the number of days*. In our case, the total number of days in December, January, and February is 91 days, except during leap years when it is 92. We use the average temperature of the entire winter season because it is a good, condensed indicator of the coldness or warmth of the entire winter season. As a note for the figures below, the year associated with the 'winter season' refers to the year of January of that meteorological winter (e.g. 1980 refers to the winter season of December of 1979, January 1980, and February 1980).

We plot the $T_{seasonal\ mean}$ for each season, as shown in Figure 1.2. Since we're interested in the trend in winter seasonal temperatures over time, we overlay a linear fit to the data to make it easier to discern. The line provides an estimate of the rate of change over time, or the slope, with the units degrees Fahrenheit (°F) per winter season. Refer to Appendix A - *What is a Trend Line?* (pp. 92) for more information on how to interpret trend lines and significance. We complete a similar analysis in Figure 1.3, except instead of taking the seasonal average



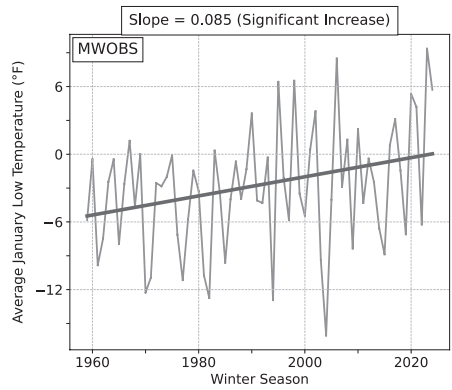
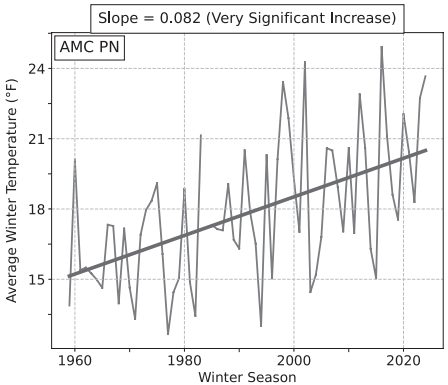
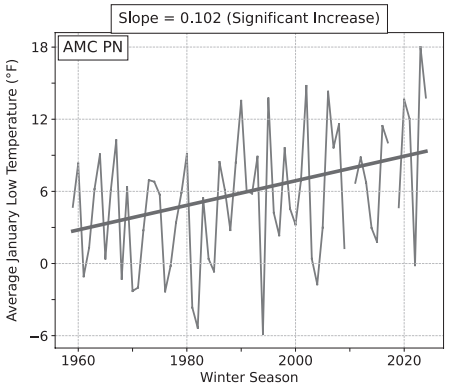


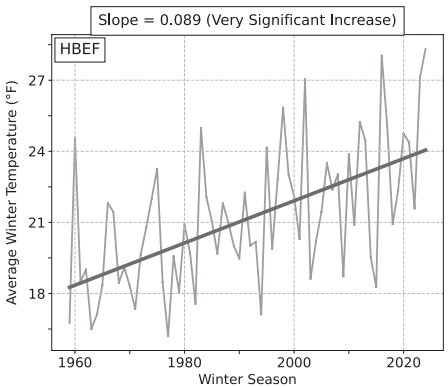
Figure 1.2 (left). Daily temperatures averaged across December, January, and February in °F for MWOBS (above) and AMC PN, HBEF, and NCON (next page).

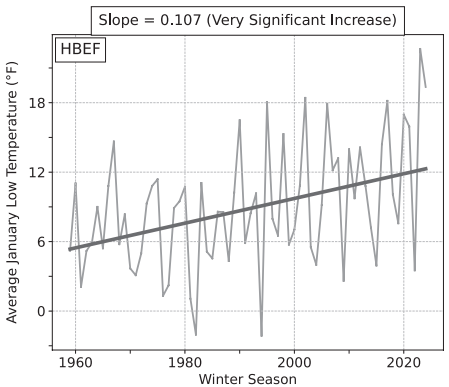
Figure 1.3 (right). Mean January daily low temperatures in °F for MWOBS, AMC PN, HBEF, and NCON.

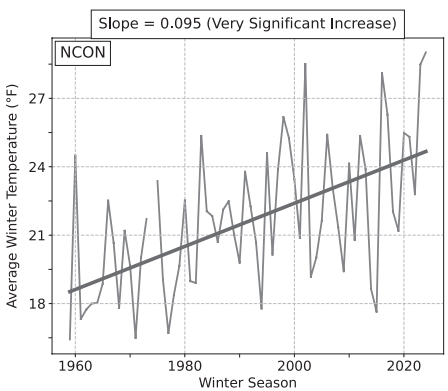
Figure continued on next page.

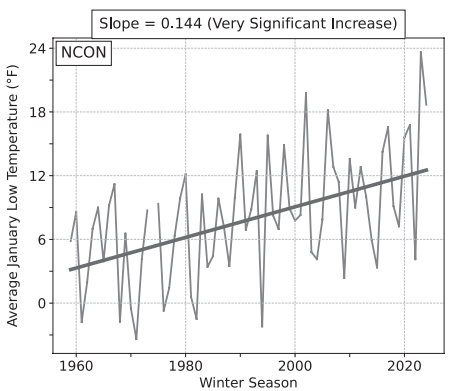

Slope = 0.082 (Very Significant Increase)
AMC PN
Average Winter Temperature (°F)
Winter Season


Slope = 0.102 (Significant Increase)
AMC PN
Average January Low Temperature (°F)
Winter Season


Slope = 0.089 (Very Significant Increase)
HBEF
Average Winter Temperature (°F)
Winter Season


Slope = 0.107 (Very Significant Increase)
HBEF
Average January Low Temperature (°F)
Winter Season


Slope = 0.095 (Very Significant Increase)
NCON
Average Winter Temperature (°F)
Winter Season


Slope = 0.144 (Very Significant Increase)
NCON
Average January Low Temperature (°F)
Winter Season

of daily means, we only take the daily lows for the month of January each winter season. This is to highlight how the coldest temperatures in the coldest month are changing.

These temperature trends mean that, although not warming as quickly as adjacent regions, winters in the White Mountains are changing, dampening its aforementioned refugium status. All four locations (MWOBS, Pink-ham Notch, Hubbard Brook, and North Conway) have experienced significant increases in average winter temperatures since the 1950s. In the Mount Washington Valley (represented by the site in North Conway) average winter temperatures are increasing by 0.95°F per decade and January daily lows are increasing by 1.44°F per decade. In the mid to lower elevations of the White Mountains, both Pinkham Notch and Hubbard Brook are seeing significant increasing trends in temperature. Average winter temperatures at Pinkham Notch and Hubbard Brook are increasing by 0.82°F and 0.89°F per decade respectively, while January daily lows are increasing by 1.02°F and 1.07°F per decade respectively. Even the highest, coldest reaches of the White Mountains are warming significantly, with winter temperatures at the summit of Mount Washington (represented by MWOBS) increasing by 0.78°F and January daily lows increasing by 0.85°F per decade. Overall, this means that at the lower elevations, winter temperatures have increased by about 6°F since the 1950s while the mid to higher elevations have seen winter temperatures rise by about 5°F.

Throughout the rest of this almanac, the data we share underscore the importance of temperature in the changes that are being identified in the White Mountains and elsewhere. We will also intro-duce other drivers of changes in high elevation systems such as precipitation, wind, and ice and their impacts on nature and humans. Weather and climate have the potential to ripple out and affect all facets of nature and life, starting with ecology and natural resources, but inevitably influencing infrastructure, the economy, public health, and beyond. In the next chapter, we explore rising winter temperature in relation to snowpack, and what this means for roads and avalanches.

View the full digital almanac at mountwashington.org/research/the-white-mountains-almanac/

Life as a Mesonet and Information Systems Technician

BY **COLBY MORRIS**

From a young age, I was always fascinated by storms and other weather phenomena like hail and ground fog. I knew I wanted to understand how the weather formed and shaped the world around us. It helped that my father is a pilot; I always sat in the front seat, peering out the big glass window watching clouds go in and out of view. I listened to him explain the types of clouds, how they form, and how that affects the plane as we cruised through the sky. That interest in weather never seemed to escape me as my passion for technology grew more as I got older.

Living in the White Mountains, it was only fitting for my first web application to be a weather widget. That weather dashboard, primitive at the time, made me want to explore a more local system to monitor weather at home. This naturally led me to get my first home weather station kit. It was fascinating seeing the station's anemometer move with the wind and for that data to be sent to my computer, where it was collected into a simple Excel file. As the rows grew with interesting data, I wanted to be able to use that information in a meaningful way.

At the time, we had a big greenhouse with roll up sides and exhaust vents, which are used to help moderate the temperature inside. I thought: *What if I made my own little weather station to roll up sides and open the exhaust vents based upon the current conditions inside the greenhouse*, as the home weather station kit couldn't report data fast enough. This led me to build my own Arduino powered system that had temperature and humidity sensors. I built the system with two sensors for redundancy, just to make sure the data it collected was as accurate as possible. This system was connected to a solenoid valve and controlled the roll up sides and exhaust vent. When the temperature or humidity hit a certain level, it would open the exhaust vent. Then, if the temperature continued to increase, it would open the roll up sides. It is these projects and problems that lead me to always have a love and interest in weather systems and how you can use data in meaningful ways.

Today, I work as a Mesonet and Information Systems Technician at Mount Washington Observatory (MWOBS), where I design, deploy, and maintain

Weather station AR53 is located at approximately 5,300 feet from sea level next to the Auto Road and was upgraded on October 1st.

advanced weather stations across the state. This role lets me bridge the physical and digital worlds— both being passions of mine. You can find me on the weekends going on hikes, taking photos of the mountains, and staying up way too late waiting for the clouds to clear trying to capture astrophotography.

Working for MWOBS has been nothing short of an adventure, from bringing me just a few miles from the Canadian border to fixing a wind battered station on the exposed mountain side of Mount Washington. Along with the amazing views of the 7.6-mile-long Mount Washington Auto Road, you can also find an array of six mesonet stations ranging from around 2,300 feet to 5,300 feet in elevation. These stations form the Auto Road Vertical Profile (ARVP), which were first deployed in 2003 and have given us a deeper understanding of local weather in the area. To ensure the data being collected is accurate and available, continuous maintenance is needed, and in the beginning of October 2025 all the stations were upgraded. These upgrades added new solar panels, soil sensors, and bigger batteries to help the stations stay online longer in harsh conditions and low light, as well as full replacement of all other components.

Along with building weather stations, I've also been tasked with building web applications that help make weather more accessible to everyone. One of those projects is the Northeast

Network of Mountaintop Observatories (NENMO) project that links the Mount Washington Observatory with other prominent Mountain Meteorology teams such as the Whiteface Mountain Observatory in New York's Adirondack Mountains and the University of Vermont Summit to Shore Environmental Observation Network. The challenge of bringing three separate mesonet networks together and displaying them for the use of hikers to professional applications is something I'm very excited about!

What drives me the most is the challenge of connecting data with purpose. Whether it's helping predict extreme weather events through the use of AI or streamlining our own weather station network with the use of an application programming interface (API). The idea that technology can solve real-world problems is important. I value resilience and curiosity, which comes in handy when troubleshooting sensors in a rainstorm or installing cameras on the top of the Observatory tower in 60mph winds.

At the heart of everything I do is a belief that technology isn't just about code or hardware; it's about the connection between people, systems, and the natural worlds we're trying to understand. Using the skills I have, I can make the weather more accessible for everyone, from Mount Washington hikers to farmers trying to protect their crops from frost.

Weather station AR23 is located at approximately 2,300 feet from sea level next to the Auto Road and was also updated on October 1st.

Winter Edutrips Launch, and a Look Back on a Busy Summer

BY **BRIAN FITZGERALD**

With a mix of new, expanded, and returning education initiatives, it's been an active summer of learning on the Rockpile. Adults and general programs saw the return of the popular medical overnight training for youth educators early this September with a new cohort receiving Wilderness First Aid certifications through our partnerships with Stonehearth Open Learning Opportunities (SOLO) and Maine Health's Memorial Hospital of North Conway. Instructors and participants alike were able to take full advantage of their mountain classroom to conduct first aid scenarios and learn about environmental hazards. The *Science in the Mountains* lecture series returned this August in a new in-person and virtual hybrid format. Summit research interns shared findings from new research investigations in our North Conway offices on topics such as fall foliage forecasting, extreme precipitation occurrences on Mount Washington, and summit thunderstorm trends. Stay tuned for more in-person and virtual presentations this fall, virtual presentations this winter, and in-person once again in spring of 2026.

Speaking of winter programs, we are excited to announce another lineup of overnight Edutrips with a mix of returning and new topics and instructors. Veteran climbing guide and search and rescue leader Joe Lentini returns once more to share introductory mountaineering skills and incredible stories from the mountains. Former Observatory intern and current Storm Team 10 Meteorologist at WJAR NBC in Providence, Rhode Island, A.J. Mastrangelo will share the behind-the-scenes world of weather broadcasting, with opportunities for participants to help produce a segment from the summit of Mount Washington. For a full list of topics and schedule, be sure to check out www.mountwashington.org/education.

Several exciting initiatives are now underway at the Observatory's seasonal *Extreme Mount Washington* museum with the launch of a pilot volunteer docent program taking place this past summer. A group of seven volunteers largely based in northern New Hampshire were supported by MWOBS educators to develop tabling activities, experiments, and visitor information

Lead STEM Programs Educator Misha Leyfer speaks with Senator Jeanne Shaheen during a visit to the summit with Storm Scout campers in August.

in the Observatory's exhibit space and out on Mt. Washington State Park's observation deck. Each volunteer committed to at least four days of service on the mountain, meaning this July and August saw docents supporting 32 different days where they averaged between 75-100 "meaningful engagements" with visitors, totaling an estimated 2,400 people engaged. Docents shared their enthusiasm for the mountains, provided a showcase and explanation of weather instruments, and answered a litany of questions about Mount Washington, and the Observatory's operations and mission. If you're interested in participating as a volunteer docent with us next summer, be sure to stay tuned for an online application coming in the new year.

In addition to the new docent program, MWOBS staff with summit partner support worked with undergraduate students from Worcester Polytechnic Institute (WPI) for a second consecutive year engaging in a summit visitor experience project. This fall saw the production of a first ever "virtual field trip" to the summit of Mount Washington meant for the average summit visitor. Using 360° cameras (similar to Google Streetview), the WPI project team captured still images, video, and live audio to help visitors explore the summit virtually with embedded interpretative information, media, quizzes, and information about the summit's history, unique environment, and summit partner operational information. MWOBS,

along with other summit partners, will be launching this resource across our web pages near the close of 2025.

One final bit of exciting museum news is that MWOBS has been awarded a three-year STEM Innovator Award as a part of the NASA Teams Engaging Affiliated Museums and Informal Institutions (TEAM II) program. MWOBS, along with partner Sciencenter of Ithaca, New York, proposes to reach over a million fifth-to-eighth grade students, younger students, and their families and caregivers about extreme weather phenomena, and scientists' ability to predict and prepare for life-altering events through on the ground and remotely gathered data. This project will leverage data from MWOBS and NASA programs such as GLOBE Observer, My NASA Data, and current NASA missions to create hands-on, learning experiences (i.e., table-top museum floor programs, school outreach programs, pop-up exhibits) about extreme weather that advance public understanding of the Earth system, its climate and weather, and the scientific processes used to understand them. MWOBS and Sciencenter will develop these learning experiences for iterative testing and evaluation within their museum spaces. Project partners will also leverage the existing Science and Technology Center (STC) Community of Practice (CoP) that convenes twelve small to medium-sized STCs within the NASA Science Activation-funded Learning Ecosystems Northeast (LENE) project for expanded outreach and evaluation in years two and three of our project.

Last, but certainly not least, MWOBS educators have had a full summer supporting and hosting youth camps, field trips, outreach events, and the Observatory's own Peak Perspectives overnight professional learning program for school educators as well as Storm Scouts: Extreme Weather Camp. Twenty-two youth from across the region participated in two sessions of the day camp hosted at the Observatory's administrative offices and classroom in North Conway Village. Campers traveled to the summit weather station on three out of their five camp days, and participated in activities such as weather data monitoring in hand-made journals, producing live-streamed weather forecasts, and STEM-based experiences with partners Tin Mountain Conservation Center, White Mountain Science Inc. (WMSI), and Pope Memorial Library in North Conway. A $3,000 grant from Zeb's Charitable Fund in North Conway also supported camper scholarships this year. Feedback from Storm Scouts' second year was powerful. One parent offered, "{My daughter} keeps sharing more and more facts, funny instances, and little snippets from her week and it's very obvious she had an amazing time. I feel so incredibly lucky to have stumbled across storm scouts for our little unofficial school meteorologist. It's the best thing ever as a parent when you can present your child with an opportunity to dig deeper into an area they are interested in."

The Cog Railway

www.thecog.com

In keeping with our 156-year-old credo– "ya snooze, ya lose"– we thought we'd devote this edition's 500 words to a sneak peek at what's been going on behind the scenes here at the Cog Railway. So we checked in with our resident mechanical engineer and all-around Boy Wonder, Caleb Gross. He's a former college marching band drummer who keeps the beat underneath all things technical around here. Caleb stays crazy busy working side-by-side every day with our indispensable shop crew, designing and building for the future. He's so busy that his trusty pocket slide rule spontaneously combusted the week before last– that's how busy he is. Even so, we took a chance and asked him to put out the fires long enough to share with us, and now all of you, some of what's on his to-do list. And boy oh boy, does this guy have A LOT to do:

The design and approval phase is well under way for a new extension to our (also new) 35,000sf maintenance shop. The additional wing should be up and running sometime after 2027, and will replace our original (c.1890's), decommissioned engine and coach shops. We'll gain nearly 20,000sf of additional floor space for storing, maintaining, and fabricating our ever-growing roster of rolling stock.

Speaking of rolling stock, our next biodiesel locomotive, M8, is starting to take shape down at the shop, as is our exciting, groundbreaking venture into the Railway's sustainable future. A new battery-electric Multi-Purpose Track Vehicle, a joint venture between The Cog and students/summer interns from UNH's School of Engineering, is scheduled to hum its way out of the shop sometime in 2026. In addition to providing rapid and reliable access to the mountain for maintenance-of-way, repair, and backcountry search and rescue crews, this new "speeder" will help Caleb and his team kick the tires on what a future electric locomotive might look like. Cue the nostalgia-laden rail fans 20 years from now yearning for the good old days of diesel!

On that note, our 2 vintage steam locomotives, MW2 (c.1875) and MW9 (c.1908) are being fitted with entirely new boilers over the 2025-26 hibernating season. The previous boilers were installed in the 1980's!

Caleb kept going, ticking off massive projects currently under way– grading and paving the Base Station parking lots, adjusting traffic patterns, improving drainage, regrading and laying new mainline and shuttle tracks, rewiring and reprogramming locomotive operating systems, swapping out locomotive cog gears, spitballing an innovative renewable energy infrastructure at the Base….

At this point we had to cut him off– *"Enough already! Ellen said to keep it to 500 words and we're already at 537!"* Tune in next time for more.

Shifting gears, here's a special shout out to the newest member of our train crew, and this one's a double-dipper! In her day job as the Observatory's coordinator for school field trips to the summit weather station via the Cog Railway, Jackie Bellefontaine is a name and face familiar to all of us, both at The Cog and in the wider MWOBS community. Now, as her schedule permits she's helping out at the Railway as a qualified brakeman! It's a distinct pleasure to welcome Jackie aboard the World's First Mountain-Climbing Cog Railway!

Mt. Washington Auto Road

2026 is an exciting year ahead for the Mt. Washington Auto Road. In addition to the milestone of celebrating 120 years of being family-owned and operated, the return of a crowd-favorite signature event–Climb to the Clouds–is slated for August 2026.

Climb to the Clouds promises plenty of action from start to finish. Spectators of this car race will enjoy thrilling action and views on the steep, curvy, and picturesque Mt. Washington Auto Road. For over a century, Climb to the Clouds has embodied automotive adventure and performance. Predating Pikes Peak and the Indy 500, this historic event

Photo from the 1954 Climb to the Clouds shows the continual evolution of automobile racing on Mount Washington. The Jaguar XK 120 Flat Head Coupe crossing the finish line was driven by Evelyn Mull in a time of 12 minutes, 44.6 seconds.

captivates racers and enthusiasts alike. From a daring ascent up a rugged dirt road to a tradition attracting top-tier drivers, Climb to the Clouds boasts a rich history in progressing automotive technology, and triumphing against the elements.

The first timed ascent of Mt. Washington was done in 1899 in a Stanley Steamer by F.O. Stanley. Over the next century, gasoline cars set record after record as automotive technology progressed. In 2014, the first pair of electric vehicles entered competition, one driven by 1990 record holder Tim O'Neil. Subsequent events have had increasing numbers of electric entries, and we expect the trend to continue. Unlike most forms of motor sport, Hill Climb racing offers a unique format that benefits electric cars. The short duration, and need for instantaneous torque not only levels the playing field, but gives EVs the edge in competition.

As of 2025, the record at Pikes Peak is currently held by an all-electric Volkswagen I.D set in 2018. We expect the next Mt. Washington record to fall to an electric vehicle. The current record is an astonishing 5 minutes and 28.67 seconds set in 2020 by Travis Pastrana in a 2020 Subaru WRX STI.

With past champions like Tim O'Neil, Carrol Shelby, and Travis Pastrana, the event will bring in talent from all racing disciplines. Held over the course of an adrenaline-fueled weekend, the event will attract thousands of spectators, hundreds of dedicated volunteers, and 100+ talented drivers, each competing for glory on the challenging course. Save the date for August 7, 8, and 9, 2026!

For more information, log on to: ***mt-washington.com/hillclimb*** or ***events@mt-washington.com***

The Enduring Legacy of the Hitchcock-Huntington Expedition

BY **PETER CRANE**

Did you know that there are several locations in the White Mountains that are named to honor the members of the Hitchcock-Huntington Expedition? The Expedition established a weather station atop Mount Washington in the winter of 1870-1871, and inspired the founders of our current Observatory to re-occupy the summit in 1932.

Members of the 1870-1871 Expedition. Left to Right: Sgt. Theodore Smith, Solomon Nelson, Howard Kimball, Amos Clough, and Joshua Huntington from a stereoview in the Observatory's collections.

Huntington Ravine on Mount Washington is named to honor Joshua Henry Huntington, a principal of the Expedition. Huntington was a member of the New Hampshire Geological Survey and Assistant to its head, Charles Hitchcock. Mount Huntington, north of the Kancamagus Highway and south of the Pemigewasset wilderness, is also named for Huntington.

Charles Hitchcock, Professor of Geology at Dartmouth College and head of the New Hampshire Geological

Survey from 1868 to 1878, helped organize the Expedition, visited at the summit, but spent most of the winter off the mountain, serving as lowland liaison. The Hitchcock Flume on Mount Willard (near the head of Crawford Notch) is named for him, as is Mount Hitchcock, a bit northwest of Mount Huntington.

Solomon Nelson was a farmer and Civil War veteran from Georgetown, Massachusetts. He was very active in raising funds to support the endeavor. Excerpts of his journal of time on the summit are featured in the Expedition's narrative. Nelson Crag on Mount Washington is named in his honor.

Amos Clough was a photographer from Warren, New Hampshire. He spent a few weeks atop Mount Moosilauke with Huntington in the winter of 1869-1870, which was a prelude to the occupation of Mount Washington. He was strong, generous, and enthusiastic about capturing views with his camera. Mount Clough, just west of Mount Moosilauke, is named for him.

Other members of the Expedition are regrettably not commemorated in the names of White Mountain landmarks. Sgt. Theodore Smith of the U.S. Army Signal Service, and Howard Kimball, a photographer from Concord, New Hampshire, lack such recognition.

Our Volunteer Community in Action

BY **WENDY ALMEIDA**

Monthly mailing and Seek the Peak volunteers helping with final preparations before event day. Pictured: Kim Henry, Lynda Rosa, Sandy Kurtz, Hank Dresch, Linda Dresch, Karen MacDonald, Gary MacDonald, Karen Franke, Linda Denis, Dennis Maiorino, Charlie Buterbaugh, Joan Kurtz, and Wendy Almeida.

Volunteers remain the foundation of the Observatory's community. Their commitment is visible in every part of our work—whether at our largest event of the year, welcoming guests on the summit, piloting a new museum docent program, sending handwritten notes to members, or keeping monthly mailings on track. This dedication not only strengthens the Observatory's programs but also ensures that members, visitors, and donors experience the best of what the Observatory has to offer. We are deeply grateful to all who give their time and energy to support our mission.

Seek the Peak volunteer Mark Lenard on pickle duty for early hiker arrivals at the Expo's snack and giveaway table.

Seek the Peak Volunteers

One of the clearest demonstrations of our volunteer community's commitment came during the **25th anniversary of Seek the Peak in July**. The event was a huge success, and we're so grateful to the 60+ volunteers who made it possible. From check-in and hiker prize pick-up to parking, set-up, sponsor support, and summit programs, volunteers brought flexibility, problem-solving, and friendliness with an enthusiastic spirit that set a positive, uplifting tone for the entire day.

With so many moving parts, there were bound to be moments of improvisation, but our volunteers handled each one with positivity and grace. That spirit of "we'll figure it out" is what makes this community so special. The event simply would not have been possible without them, and their dedication helped ensure the annual fundraiser was a milestone to remember for the Observatory.

The event magic-makers included: Mark Asaro, Mark Aston, Lourdes Aviles, Gaetana Almeida, Jan Basch, Marty Basch, Jenny Beaty, Michael Bergeron, Desiree Bolton, Erica Broman, Alexandra Breed, Teri Cosentino, Tom Cosentino, Peter Crane, Brenda Daly, Linda Denis, Hayley DeYoung, Hank Dresch, Linda Dresch, Peter Fisk, Adam Gill, Paul Goundrey, Chris Hawkins, Doug Hill, Kim Henry, Sandy Imbrogna, Deborah Kerr, Rob Kirsch, Sinead Koski, Marie Koski, Joan Kurtz, Sandy Kurtz, Gail Langer, Christine Lenard, Mark Lenard, Rose Lundy, Rich MacKeen, Elizabeth MacKeen, Gary MacDonald, Karen MacDonald, Logan MacDonald, Dennis Maiorino, Karen Moore, Beth Newhouse, Jeannie Oliver, Gail Paine, Kelly Pedersen, Shelby Peavey, Jill Powers, Joe Powers, Ken Rancourt, Marsha Rich, Erik Rider, Lynda Rosa, Edrol Sandy, Elizabeth Seabury, Francis Tarasiewicz, Karen Umburger, Victoria Vass, Laurel White, Skip White, Meg Woolverton, Holly Zschetzsche, and Kristina Zuidema.

Card Writing Crew

Our card-writing program is one more way volunteers extend the Observatory's reach. Over the summer and fall, more than a dozen volunteers sent thoughtful

notes, helping us connect personally with supporters and share our community's appreciation. A heartfelt thank-you to our card-writing volunteers for this meaningful work.

Monthly Membership Mailing Volunteers

Our monthly mailing crew helps get membership renewal notices out the door each month. It's steady, behind-the-scenes work that plays a crucial role in keeping members connected to the Observatory. We're grateful to those who gather at our North Conway office every month for these sessions, combining work with camaraderie (and jokes!) to help our membership program thrive.

Museum docent Karen Moore talks with U.S. Senator Jeanne Shaheen and Director of Weather Operations Jay Broccolo during the senator's Aug. 12 visit to learn about the Observatory's operations and education programs.

Summit Museum Docent Program Volunteers

This summer marked the pilot of a **new summit docent program**. Volunteers helped us test the logistics of single-day volunteer roles at the summit while engaging with visitors in the museum and sharing the Observatory's story with visitors.

We're deeply grateful to the volunteers who took part in this pilot season. The volunteers' feedback has been invaluable and given staff important insights that will shape how this program may grow in the future.

Summer on the Summit

From welcoming guests and helping in the museum gift shop to cooking meals, tackling clean-up, and creating a warm, welcoming space—volunteers provided warm hospitality and made the summit feel like home for staff and guests. The volunteers' generosity of time and energy kept daily life on the mountain running smoothly, which was especially important during a busy summer season —for staff, visitors, and overnight guests alike. Thank you to the many volunteers who helped make this summer season run smoothly at the summit!

Through events, programs, and behind-the-scenes efforts, volunteers help shape the Observatory's success. Their contributions sustain our programs, inspire engagement, and demonstrate the deep commitment that makes this community so remarkable.

Summer Season Volunteers By the Numbers:

- *22 new summit volunteers*
- *20 returning summit volunteers*
- *63 Seek the Peak event volunteers*
- *7 Museum docent pilot volunteers*
- *16 Card writing volunteers*
- *18 Active monthly mailing volunteers*

A Lifelong Forecast: AJ's Journey from Curious Kid to Meteorologist

BY **WENDY ALMEIDA**

AJ Mastrangelo's relationship with Mount Washington Observatory began long before his internship—or his current career as a meteorologist. It started with a childhood visit to the summit.

"My family had a seasonal place on Squam Lake in Holderness," he recalls. "We'd always make trips up to Bretton Woods and that area, so I knew of the Observatory since I was a kid. I think I was about eight or nine years old when we drove up the Auto Road and took a full tour of the Observatory. Rebecca Scholand gave us the tour—I still have pictures from that day."

Always interested in the weather and meteorology, that early visit to the Observatory stuck with AJ. Years later, as a high school junior, he returned to the Observatory for a two-week program with Director of Education, Brian Fitzgerald. "It was only two weeks to work on a small project as a high school student, but it gave me a better understanding of the Observatory's work. That's when I decided I'd love to intern

A young AJ on the summit with Rebecca Scholand.

AJ on NBC 10
(Photo Courtesy
AJ Mastrangelo)

here since I was going off to college to be a meteorology student." He did just that in the summer of 2021, working on the summit as a college intern during the pandemic.

After graduating from Penn State in 2022, AJ began working as a meteorologist in Erie, Pennsylvania. He now serves as the weekend morning meteorologist at NBC 10 in Providence, Rhode Island.

He still keeps in touch with fellow interns and Observatory staff—and checks the summit webcams regularly. "I was checking out the Observatory webcams 24/7 when I was a kid, and I still do that — so really, nothing's changed."

AJ also reflects on why support for the Observatory is important. "It's got a long-standing history of weather observation and data that's not only necessary but crucial… I also think the Observatory does a really good job at making sure people are understanding of the risks [on the mountain] in terms of the weather and just how extreme and special it is."

AJ's story—spanning from childhood visitor to summit intern to professional meteorologist—reflects the impact of the Observatory's commitment to education, offering young people meaningful opportunities to build skills, make connections, and pursue careers in science.

Thank you to all our members for your continued support. Like AJ, you understand the importance of long-term research and the value of advancing weather science for future generations. Your commitment helps ensure the Observatory's work continues—on the summit and beyond.

Preserving Heritage and Supporting Science: 50 Years of Membership

BY **WENDY ALMEIDA**

When Bryant F. Tolles, Jr. first joined Mount Washington Observatory in March 1975, his connection to the mountain was already strong. A dedicated hiker, he says his interest in the summit "came primarily as a historian and a hiker." His ties to the region grew deeper through summers spent at his family's home on Squam Lake, where hiking and research shaped his lifelong appreciation for the White Mountains. He achieved two of the region's notable hiking milestones, finishing the 4,000-footers of New England and completing the 4,000-footers of the White Mountains twice with his wife.

With a PhD in history and noted architectural historian, Bryant served as executive director of the Essex Institute in Salem, Massachusetts, before spending more than two decades at the University of Delaware as professor of history and director of its Museum Studies Program. His research and writing merged architectural history with the cultural history of tourism in New England. Through works such as "*The Grand Resort Hotels of the White Mountains: A Vanishing Architectural Legacy*" and "*Summer Cottages in the White Mountains: The Architecture of Leisure and Recreation, 1870 to 1930*," he documented how hotels, cottages, and other landmark buildings were built to support outdoor recreation in the White Mountains, helping to preserve and deepen understanding of a vital part of the region's history.

That dual love of history and the outdoors eventually led him to serve as a Life Trustee of the Observatory, an experience he describes as "a pleasure to serve on the board for many years."

Even now, while he admits he is "not terribly knowledgeable about the areas of science that the Observatory is focusing on," Bryant values the organization's role as both a scientific and historical institution. From maintaining a weather station on the summit to preserving and interpreting the history of forecasting and climate research on Mount Washington for the public, he sees its impact reaching well beyond the mountain itself.

After 50 years, Bryant's membership is a reminder of how history, hiking, and stewardship intersect on Mount Washington—and how the Observatory continues that work through research, education, and interpretation of the region's past.

~ 50 YEAR MILESTONE MEMBERS ~

William S. Barrett
Luke Brassard
Howard Edward Liebmann
Stephen Pittman
John P Sherry
Carol Swanson
Douglass Teschner
Bryant F. Tolles Jr.

PASSINGS

Paul Bouffard

Paul Elphege Bouffard, 92, passed away on Monday, June 23, 2025 at Havenwood Health Services Center in Concord, NH, with family by his side.

Paul's fascination with weather and astronomy brought him to Mount Washington Observatory, where he was a tireless volunteer for 32 years. This earned him the President's Medal.

Friend and fellow Observatory volunteer, Hank Dresch reflected on Paul's passing. "Paul and his wife, Claire, were so active everywhere in the [Mount Washington] Valley. They got other people involved, like my wife and I, as well as many, many others. You couldn't name an organization here in the Valley that they weren't supporting and doing something for." Fellow volunteer Linda Dresch added simply, "Paul was a very special person."

His obituary states, "He enjoyed many hobbies including biking, fishing, hunting, photography, Nordic Skiing, archery, woodworking, birding, and hiking. His love of the outdoors encompassed every season. His commitment to Jackson Ski Touring included Timing Team responsibilities in the 2007 NCAA Skiing Championships as well as the Junior Olympics."

Paul proudly served his country in the U.S. Navy, aboard the Essex-class aircraft carrier USS Leyte program. He was a graduate of Fitchburg State University, and later his career was with Raytheon Corporation as a Test Systems Engineer on multiple programs including the invaluable Patriot missile defense system utilized in the Gulf War theater.

After retirement, Paul and his wife, Claire Lydia Dube, traveled to each of the 50 United States and all Canadian Provinces. Many of his trips were associated with the Elderhostel Educational Adventures. His obituary also notes: "More than anything, Paul loved his wife, children, grandchildren and great-grandchildren. Spending time with his family was most important to him."

The Observatory staff and community offer our sympathy to Paul's wife, Claire, and his family, and heartfelt gratitude for his many years of service to both the Observatory and our country.

A Fatal Incident on Mount Washington

On Friday, July 18, searchers on Mount Washington located the body of William Davis, 79, of Jacksonville, Florida. The discovery ended a three-day search for the man, who had traveled to the summit of Mount Washington via the Cog Railway on Wednesday July 16, and had then walked away from his tour group, giving no indication of his plans.

According to information from the New Hampshire Fish and Game Department, Davis was last seen Wednesday afternoon at about 3:20. Davis' wife, concerned by his absence, contacted a State Park employee who then established communication with Davis via phone. From that contact, it was evident that Davis was lost, but it seemed he was not too far from the summit. A basic search followed, but to no avail, and Davis did not answer subsequent phone calls to him. A large scale search was begun employing State Park staffers, Conservation Officers, and volunteers from Androscoggin Valley Search and Rescue. Drone teams were also used. That search began Wednesday night and continued on Thursday and on Friday. Deteriorating weather with dense fog and increasing winds (peak gust on the 17th was 97 mph, and on the 18th was 91 mph) added to the difficulty of the search. Davis' body was found on Friday morning, about 400 feet off the Lion Head Trail between the Alpine Garden and Tuckerman Ravine Trails. An Army National Guard helicopter team completed the recovery.

It was evident that Davis had suffered a significant fall in the somewhat steep and very rocky terrain, but it is not known if the fall alone or if exposure to the elements resulted in his tragic death.

Our condolences go out to the family and friends of Mr. Davis.

Another Fatality on the Presidential Range

On Monday June 16, a fatal incident occurred on the Valley Way, the principal access trail to Mount Madison, a few miles north of Mount Washington in the Presidential Range. According to the New Hampshire Fish and Game Department, Richard Perrault, 70, of Clinton, Connecticut, suffered a medical emergency at a location about three miles up the trail. Bystanders assisted him immediately and provided CPR. Personnel from the Fish and Game Department, Appalachian Mountain Club, and New Hampshire Army National Guard responded to the incident, but unfortunately Mr. Perrault succumbed to the medical event. Our condolences go out to his family and friends.

IN-KIND GIFTS

Burgeon Outdoor
Cabot Creamery Cooperative
Conway Broadcasting
Cross New Hampshire Adventure Trail
David Raizen
Dripdrop Hydration
Edward Rolfe
Garmin International
Good To-Go
Grillo's Pickles
Guineafowl Adventure Company
Harvard Cabin
Helly Hansen
International Mountain Climbing School
Jack Middleton Jr.
Jack Middleton
Kismet Rock Foundation
LL Bean
Lost River Gorge & Boulder Caves
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NH Department of Business and Economic Affairs
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Upper Saco Valley Land Trust
Vail Resorts
Vertex Mountain Guides
White Mountain Milers
WMWV Conway Broadcasting
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Thank you for your support!

TRIBUTES & MEMORIAL GIFTS

Scott Austin ..... In Memory of 747
Carl Hedlund ..... In Honor of All the Volunteers
Peter Middleton ..... In Memory of Ann D. Middleton
Erica Fuller ..... In Memory of Beans, a top tier feline who spent much time in the White Mountains
Anthony Ho ..... In Memory of Benny N. Ho
Anne Atkins ..... In Memory of Bob Sgarzi
Cheryl Chartier ..... In Memory of Bruce Chartier
Jay and Keshi Dugan-Henriksen ..... In Memory of Charles and Gloria Dugan
Richard T. Gilbane Fund ..... In Honor of Chris Daly
Christopher Daly ..... In Honor of Chris Daly
Kim DeVries ..... In Honor of Diane and all who loved her!
Chris DeVries ..... In Memory of Diane DeVries
Donna Gamache ..... In Memory of Donald McGlauflin
Diane Asselin ..... In Memory of Father Pat Daley
Morgan Stanley ..... In Honor of Gary MacDonald
George Epstein ..... In Honor of Gary MacDonald
Torpey Charitable Foundation ..... In Honor of Gary MacDonald
John Broadfoot ..... In Honor of Gary MacDonald
Shannon Nichols ..... In Memory of Geoff
Alan & Yvonne Miner ..... In Memory of George A Levin
Michele Vandenberg ..... In Memory of George A. Levin
O'Connor Family & Errickson Family ..... In Memory of George Levin
Pam Neville ..... In Memory of Grampy B
Laurel White ..... In Memory of Harvey E Bergeron Sr
Helen Pettersen ..... In Memory of Her beloved Dad who would be so proud.
Rosemary Valente ..... In Memory of Hobbes and Casper Valente
Carol & Chris Dupuis ..... In Memory of our Sweet Diane
Sharon Kate Hirsch ..... In Memory of Inga, Jasper and NIN
Kathleen Maxwell ..... In Memory of Jackie Margerison
Carol Nugent ..... In Memory of Ken Hyman
Fran Donovan ..... In Memory of Loved ones lost too soon.
Reginald Strickland ..... In Honor of Madelynn Smith
Nina Knapp ..... In Memory of Mike S, who loved the Summit, and cats.
William B. Sargent ..... In Memory of Mr and Mrs Donald Sargent
Scott Toney ..... In Memory of Nancy Jackel
Ira Hodes Seskin ..... In Memory of Nin the Cat

TRIBUTES & MEMORIAL GIFTS (Con't)

Janet Rivard ..... In Honor of Norma Andrews in honor of her 100th Birthday
Frank Cosenza ..... In Memory of Pat Daly
James Gannon ..... In Memory of Pat Daly
Drew Marr ..... In Memory of Pat Daly
Linda Nuzzo ..... In Memory of Pat Daly
Richard Daly ..... In Memory of Pat Daly
Jan Kirby ..... In Memory of Pat Daly
James McLean ..... In Honor of Patrick Daly
Kevin Williams ..... In Memory of Raymond Williams
Arthur O. Poltrack ..... In Memory of Rob MacClay & Joe Eggleston
Mary O Smith ..... In Memory of Robert D. Sgarzi
Valerie Flores ..... In Memory of Robert Sgarzi
Adam Muhith ..... In Memory of Sam Gawel
Leah Gawel ..... In Memory of Sam Gawel
Joseph Bernstein ..... In Memory of Sam Gawel
Cathy Savery ..... In Memory of Sam Gawel
Norman Silverman ..... In Memory of Samuel Gawel
Leah Gawel ..... In Memory of Samuel Gawel
Jeanne Hopkins ..... In Memory of Sarah and Joseph Hopkins
Mary Trvalik ..... In Memory of Steven Trvalik
Holli Germain ..... In Memory of Summit Baker
Barbara McEvoy ..... In Honor of The Cuddle Crew: Cuddles, Froto, Little
Carol Edwards Hickins ..... In Honor of the future of our children
Melissa McHale ..... In Memory of Those who taught us to love the White Mountains.
Robert P. Kewer ..... In Honor of Ursula Kewer
Jane Jermac ..... In Memory of Val Gribkoff
Christopher Boissard ..... In Memory of Valentin "El Jefe" Gribkoff
Katerina Gribkoff ..... In Memory of Valentin Gribkoff
Elizabeth Seabury ..... In Honor of Wendy Almeida
Dennis Paul Marrotte ..... In Memory of Dennis & Anita Marenius

Are You Interested in Learning about Planned Giving?

By naming Mount Washington Observatory in your will or estate plan, you can continue supporting our mission for future generations. For more information, please email giving@mountwashington.org.

CORPORATE SUPPORT

GREEN FLASH

Weather Observers Karl Philippoff and Madelynn Smith in front of a fog bow on October 14.

CORPORATE SUPPORT (Con't)

MINUS 33 MERINO WOOL

MT. WASHINGTON AUTO ROAD

EMS EASTERN MOUNTAIN SPORTS EST. 1967

APPALACHIAN MOUNTAIN CLUB AMC

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