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The Mount Washington Observatory is a private, non-profit scientific and educational institution organized under the laws of the State of New Hampshire. Its mission is to advance understanding of the natural systems that create the Earth's weather and climate, by maintaining its mountaintop weather station, conducting research and educational programs and interpreting the heritage of the Mount Washington region.

Membership in the Observatory is open to all. Members receive: an annual subscription to *Windswept: The Bulletin of the Mount Washington Observatory*; a 20 percent purchase discount at Observatory shops; Observatory tours; free admission to more than 300 science centers through ASTC Passport Program; free admission to Extreme Mount Washington; exclusive content on MountWashington.org; and an opportunity to be an Observatory volunteer. Members are encouraged to help support the Observatory, attend its Annual Meetings and visit the Observatory, Extreme Mount Washington and Weather Discovery Center in North Conway.

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WINDSwept

Table of Contents

FEATURES

- 16 Seven Alternatives to Hiking Mount Washington During Seek the Peak 2020
By Will Broussard
- 20 Dedicated Bunch Takes Part in Every Seek the Peak
By Marty Basch
- 24 A Look Back in Photos of Seek the Peak
Compiled By Krissy Fraser

NEWS

- 6 Dunn Becomes Observatory
Interim Executive Director
- 7 DeCou Joins Staff as Weather Observer
- 7 Observatory Thanks Memorial Hospital in Video
- 8 'Keys to the Castle' Is Special Night for Nichols Clan
- 10 Open House Unveils New WDC Exhibit
- 11 MWO Welcomes NOAA
- 12 Observatory Offers Free Distance Learning During Pandemic
- 13 The Story Behind the Kelvin-Helmholtz Wave Photo
- 14 Forest Service Closes Tuckerman Ravine

EDUCATION

- 26 WeatherX Project Moves Ahead
By Brian Fitzgerald

WEATHER

- 28 Weather Summary
- 32 Sawdust from the Blog
- 36 Weather 101

DEPARTMENTS

- 4 In My View
- 5 Above the Clouds
- 15 Marty's Mewsings
- 38 Summit Operations
- 40 From the Mesonet Corner
- 41 Research Views
- 43 Valley Volunteers
- 44 Upcoming Events
- 45 In-Kind Donors & Event Sponsors
- 46 Membership Milestones
- 47 Corporate Support
- 47 Tribute & Memorial Gifts
- 48 The Green Flash



Mount Washington Observatory

2779 White Mountain Highway | PO Box 2310
North Conway, NH 03860-2310
603-356-2137 | email@mountwashington.org | MountWashington.org

Weather Discovery Center

2779 White Mountain Highway
North Conway, NH 03860-2310
603-356-2137 phone
603-356-0307 fax

Summit Facility

Mount Washington
603-356-2137 phone

WINDswept

Editor: Marty Basch

Graphic Design: Lori Dunn

Phone: 603-356-2137

Email: windswept@mountwashington.org

Contributors:

Marty Basch, Will Broussard, Peter Crane,
Krissey Fraser

Cover Credit:

Devon Clough of Devign Design

Staff

Ian Bailey *Weather Observer & Meteorologist/Education Specialist*

Samantha Brady *Retail Manager*

Jay Broccolo *Weather Observer & Meteorologist*

Will Broussard *Outreach Coordinator*

Dr. Peter Crane *Curator*

David DeCou *Weather Observer & Meteorologist*

Linda & Hank Dresch *Volunteer Coordinators*

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Keith Garrett *Information Systems Administrator*

AJ Grimes *Weather Observer & Meteorologist*

Craig Hill *Snowcat Operator*

Dr. Eric Kelsey *Lead Research Scientist*

Ryan Knapp *Weather Observer & Meteorologist*

Tom Padham *Weather Observer & Meteorologist/
Education Specialist*

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Seek the Peak Turns 20



*Windswept Editor
Marty Basch*

BY **MARTY BASCH,**
EDITOR

Seek the Peak got its start in 2001 and quickly turned into the Observatory's biggest fundraiser. Not only does it help in our

research, it gives us a chance to get to know our members, friends and supporters. Countless hours go into each one and each one wouldn't happen without our dedicated sea of volunteers, staff and trustees. Frankly it accounts for a sizable chunk of our annual budget and has raised more than \$2 million. As we look forward to the 20th annual Seek the Peak, we look back on this incredible journey we've taken together.

Did you know that there are a handful of people who have participated in each of the Seek the Peak hike-a-thons? They've brought family and friends over the years, and made new friends as well. One even came upon STP by accident and ended up becoming a board member. A couple began as hikers and morphed to volunteers. Another included STP in his alpine activity arsenal as part of his obsession with Mount Washington.

These pages also contain stories about other STP participants, a photo spread compiled by Brand Manager

Krissy Fraser and a piece by Outreach Coordinator Will Broussard about alternative White Mountain hikes other than Mount Washington as we also encourage participants to "Seek Your Peak" by trekking to other summits.

Though we planned to celebrate all that Seek the Peak is to the Observatory when we all get together in July, the coronavirus pandemic has impacted those good intentions. Because of the virus, we have modified the event. Given this was written mid-spring, it's best to check our website at mountwashington.org for the latest information about STP and other Observatory summer events.

The dedicated staff has met the cruel storm caused by COVID-19 head on with those on the summit doing their work with a social distancing skeleton crew and those in the valley working remotely from home amid a series of tough decisions designed to sustain the Observatory through and beyond the pandemic. With schools being closed, the Observatory launched a free distance learning initiative from the summit to connect with students. When a local hospital reached out to make a video supporting healthcare workers, we responded quickly.

We adapt. We move forward and now more than ever, we can't do it without you.

Observatory Needs People Like You



Interim Executive
Director
Donna Dunn

BY **DONNA DUNN**,
INTERIM EXECUTIVE DIRECTOR

Did you know that the Mount Washington Observatory was founded during the Great Depression? That's

right, our founding was in 1932. Imagine the challenges of being able to support the people, the equipment and the science during that time.

Observers were on the summit for months at a time. Supplies were pulled up on sleds in the winter and resupply was scarce. Instruments were, by today's standards, basic. Even the clothing they wore seem insufficient for Mount Washington winters.

Today, it takes a team to support the work of the Mount Washington Observatory. We have a team of Observers who work eight-day shifts. We have drivers to get those Observers to the summit and down every week. We have someone to keep our snowcat and other vehicles running. We have tech support for all the computer networks and technology that allows us to do Facebook Live and other distance education. Our tech folks also help with testing new instruments, keeping our webcams working and assuring all our instrumentation is supported. We have education coordina-

The team also includes you. The Mount Washington Observatory is, and always has been, a private, non-profit organization. We rely on our members, donors, and supporters to be able to continue our 87-year record of hourly weather observations.

tion from the valley office, along with a summit manager who makes all of these things work together. And we can't forget the basics of administration, HR, and facilities support.

The team also includes you. The Mount Washington Observatory is, and always has been, a private, non-profit organization. We rely on our members, donors, and supporters to be able to continue our 87-year record of hourly weather observations. This data set is invaluable. It is used by researchers, meteorologists and climatologists. It is unique in its scope. It is unique in its location. It is as

unique as Mount Washington.

We also produce the higher summits forecast, critical for search and rescue, for hikers, even for local aviation.

People depend on the Mount Washington Observatory.

And we depend on you.

We need your support now more than ever to continue our weather science mission. Non-profit organizations all over the country have the same needs. Ours are a little more challenging because so many people think we are part of the National Weather Service. Or that we get lots of government funding. Nothing could be further from reality. And our need is great. We need to continue our weather record. We

need to support our excellent Observers and the team that supports them. We need to provide the forecasts that so many groups rely on. We need you.

The Observatory relies on funding from people who know and respect our work. We don't put out big ad campaigns. We don't have sad puppies. We have data. Accurate, quality, research-grade data. Data that is impossible to gather without posting people on the summit of the mountain. And we need your help to continue our mission.

Please go to www.mountwashington.org and click on DONATE. Your continued support of this organization means we provide accurate data and accurate forecasts now and in the future.

Thank you.

NEWS

Dunn Becomes Observatory Interim Executive Director

The Mount Washington Observatory in February announced the resignation of Sharon Schilling as Executive Director. After three and one-half years at the helm, Schilling plans to pursue other interests.

"It has been a special time for me having the honor of sharing MWO with our members, supporters and event participants, all who have the same appreciation and love for the mountain, weather, MWO staff and the important work of the organization" said Schilling.

Observatory Board Chair Gary MacDonald announced Sharon's decision and relayed "our appreciation for Sharon's strong commitment and effort" on behalf of the Observatory's Board of Trustees.

MacDonald announced that Donna Dunn of Jackson would serve as Interim Executive Director, while the Trustees conduct a search for a permanent replacement. "We are fortunate to have Donna Dunn's expertise available to us as the Observatory moves forward" MacDonald said.

DeCou Joins Staff as Weather Observer

Weather Observer & Meteorologist David DeCou joined the Observatory this past winter on the night shift.

Born in Memphis, Tennessee and raised in Grand Rapids, Michigan, he had his eye to the sky at an early age with a fascination for extreme weather.

He obtained his Bachelor's Degree in Meteorology at Indiana's Valparaiso University in 2016, with a focus on operations and severe weather.

In 2018 he earned his Master's Degree in Atmospheric Science from the University of Hawaii at Manoa studying

upwind atmospheric conditions off the windward coast of Oahu using kite-borne meteorological instruments.



David DeCou

In November 2019 he moved to Antarctica as the Senior Meteorologist at the Amundsen-Scott South Pole Station during the 2019-2020 Austral Summer season. There he supported South Pole aircraft and science operations through hourly observations, daily weather briefings,

daily balloon launches, and daily, weekly, and monthly climatological reports. He enjoys writing and performing music, hiking, board games, video games and digital photography.

Observatory Thanks Memorial Hospital in Video



Mount Washington Observatory staff members produced a short video in April thanking the healthcare workers at North Conway's Memorial Hospital for their dedication, sacrifice and hard work during the COVID-19 pandemic. The hospital reached out to the Observatory and the response was immediate. The video included footage from the summit and valley with staff members holding "Thank you" signs. It also showed how the Observatory was maintaining social distancing through teleconferencing and staying six feet apart.

'Keys to the Castle' Is Special Night for Nichols Clan

The top fundraisers during last year's Seek the Peak received a special winter trip to the summit of Mount Washington on February 22 and turned it into a family affair in memory of the passing of a loved one.

Chris Nichols of Westford, Massachusetts raised more than \$11,000 for Seek the Peak. The 11-year STP veteran's family team brought in more than \$14,000 earning them "The Keys to the Castle." Nichols was also awarded the Brad Bradstreet Award which goes to the top fundraiser.

Longtime Observatory supporters, the Nichols family had hoped to participate with Chris' brother Geoff Nichols of North Conway, N.H. But Geoff, also a father, father-in-law, uncle and brother to another brother and sister, had an untimely death in September, 2018 at the age of 56. So in the early morning hours last summer during Seek the Peak the family gathered at the summit to celebrate his life.

"The Observatory staff went out of their way opening the Observatory before 5 a.m. for our family at the summit for STP 2019, providing transportation up the mountain for our 80 year-old mother, my wife and our special needs son Zachary," said Chris in an e-mail. "My mother even climbed to the top of the tower! We had a brief remembrance



From left to right, Rebecca, Chris, Tim, Rick, Phil, Yvonne, and Danyelle Nichols take a break along the Mt. Washington Auto Road.

for Geoff and sprinkled his ashes in the blowing wind on the Observatory deck."

The family returned to the summit in February with memories of Geoff in their hearts.

"Spending the night on the summit of Mount Washington in the Observatory was a memory we will all cherish forever!" Chris wrote. "Spending time as a family, with Geoff's spirit in tow, was a wonderful way to remember Geoff's legacy, spend time in a place he loved, honor his memory, and participate in something that would have been a highlight of his life."

Seven family members attended—Chris, Rick, Tim, Phil, Yvonne, Danyelle and Rebecca.

“Geoff, Phil, Danyelle and I participated in STP 2018 together and several others in the past,” said Chris. “STP 2018 was the last day I spent with my brother before he passed away.”

While on the summit, the Nichols’ interacted with Observatory staff while also experiencing the mountain’s extremes of 80 mph wind gusts, temps in the negative single digits and a wind chill in the minus 20s which Chris described as “a balmy day by Observatory standards.”

They enjoyed the sunset and saw constellations Orion and the Big Dipper

when the sun went down. When it rose, they were treated to a 100 mile view. They also walked down a portion of the Mt. Washington Auto Road and admired the majesty of a snow-cloaked Presidential Range.

Geoff was an avid outdoorsman who lived with his wife Shannon. According to Chris, he loved the White Mountains and especially loved Mount Washington and participating in STP. Geoff was a member of the Appalachian Mountain Club’s 4000 Footers club. He participated at least six times in STP.

“Seek the Peak has become a family affair for the Nichols clan,” said Chris.



The Nichols family, along with Observatory Brand Manager Krissy Fraser (seated center) pose at the summit.

Open House Unveils New WDC Exhibit



Making the cut during the opening of the “Discovering Life on the Alpine Tundra” exhibit are (l-r) Retail Manager Samantha Brady, Outreach Coordinator Will Broussard, Appalachian Mountain Club Program Manager Nancy Ritger, WMWV Radio Announcer Roy Prescott who narrated the exhibit’s audio track, Trustee Howie Wemyss and Director of Science & Education Brian Fitzgerald.

More than 75 Observatory members, supporters, trustees, staff and friends gathered at the Weather Discovery Center in North Conway on February 17 for an open house and ribbon cutting ceremony for the new “Discovering Life on the Alpine Tundra” exhibit.

The exhibit is a virtual educational adventure up the tallest peak in the Northeast, Mount Washington, via a snowcat ride traveling the Mt. Washington Auto Road. Visitors are invited to learn about the journey to the summit, the unique flora and

fauna found above treeline as well as the geology and climate around the mountain.

The honors for cutting the ribbon went to Retail Manager Samantha Brady, Outreach Coordinator Will Broussard, Appalachian Mountain Club Program Manager Nancy Ritger, WMWV Radio Announcer Roy Prescott, Trustee Howie Wemyss and Director of Science & Education Brian Fitzgerald.

Fitzgerald thanked the many supporters and staff members involved in making this project such a success.



Above: Weather Observer & Education Specialist Ian Bailey gave a special presentation about how Mount Washington's weather impacts the flora and fauna on the mountain.

Right: The presentation packed the Weather Discovery Center.



The well-attended event also featured a special presentation from Weather Observer & Education Specialist Ian Bailey discussing how Mount Washington's infamous weather and climate shape the living environment at and above treeline. The program contained a live connection to the Observatory's mountaintop weather station with stunning video and photography.

MWO Welcomes NOAA



Following the American Meteorological Society Annual Meeting in January, Observatory staff hosted a group of staff from the National Oceanic and Atmospheric Administration (NOAA) on a trip to the summit of Mount Washington where they visited the weather station and met the observers who provide data to NOAA in their hourly observations. Contract services that the Observatory provides to NOAA help improve forecasts and other weather products while acting like a fixed weather balloon at 6,288 feet.

Observatory Offers Free Distance Learning During Pandemic

In response to the COVID-19 pandemic that forced schools nationwide to go to virtual classrooms, the Mount Washington Observatory offered free distance learning programs three times a week to support educators in their efforts to provide remote learning opportunities.

Students and weather enthusiasts connected live to the highest peak in the Northeast as Weather Observers and Education Specialists presented Facebook Live (facebook/MWObs) sessions called “Home of the World’s Worst Weather Live.”

“Offering a free educational series was simply the right thing to do. For our staff both on the summit and working from home, it meant a lot to still be able to connect with our weather-loving audience while providing a robust educational resource for students and teachers learning remotely,” said Director of Science & Education, Brian Fitzgerald.

The thrice weekly programs targeted grades 3-8 and expanded on MWO’s well-established distance learning program that connects students across the country to the excitement and science taking place on the summit.

Program content varied with Mondays focused on a special topic starting with “How to Take a Weather Observation” which explored the basic components of

weather. Other topics included summit research, climate education, the 231 MPH record wind and what it’s like to live and work as a scientist in such a remarkable place. There was also be an opportunity for viewers and educators to suggest topics for discussion. On Tuesdays and Thursdays summit staff took about 15 minutes to share the latest weather conditions and forecasts from high above treeline, followed by a Q&A session in real-time.

On April 13, the Facebook subject was “wind” to pay tribute to the 86th anniversary of the record 231 mph wind that shook the summit on April 12, 1934.

Live programs were uploaded to MWO’s website at mountwashington.org/classroom for use outside the regularly scheduled time. Additionally, the site provides resources and activities related to the science of weather.



Weather Observer Ian Bailey takes part in the Observatory’s Facebook Live sessions.

“Mount Washington is such an important educational resource that sparks curiosity for those learning about weather and climate,” Fitzgerald said. “It was a privilege to be able to offer these programs so that we could continue to serve our

members and the public at large.”

For more information about this program visit mountwashington.org or follow us on social media at Facebook/MWObs.

The Story Behind the Kelvin-Helmholtz Wave Photo

A Kelvin-Helmholtz wave popped out from a lenticular cloud above Mount Washington in late February and was captured in a photo taken by Weather Observer Tom Padham that was distributed widely on social media.

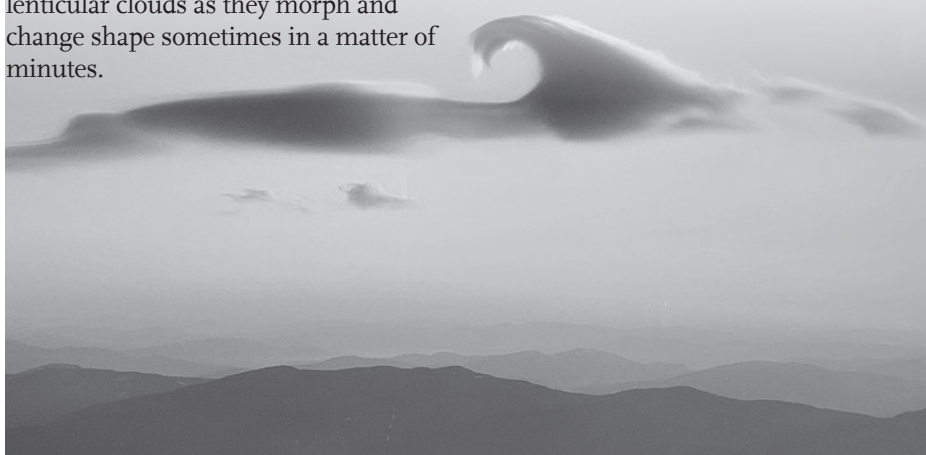
The rare event of the KH-lenticular forms when a large increase in wind occurs over a small vertical distance within the cloud.

When Padham first saw the cloud he shouted to his colleague AJ Grimes, “There’s an awesome KH cloud right now.”

Padham has been admiring the lenticular clouds as they morph and change shape sometimes in a matter of minutes.

“A small wave was just starting to form before running to grab my camera, and by the time I was back taking photos it was perfectly cresting and actually larger and more impressive than I imagined it would be,” he recalled. “One thing I really thought was unique about the photo also was the perspective; I was looking basically at the same level as the cloud. It wasn’t a distant object way above my head. This definitely takes the cake as my favorite cloud photo!”

The phenomenon caused a strong ripple effect through social media and traditional media with the picture picked up by newspapers like “The Washington Post” and “The Boston Globe.”



This KH-lenticular cloud formed over the Mount Washington summit.

Forest Service Closes Tuckerman Ravine

BY **PETER CRANE**

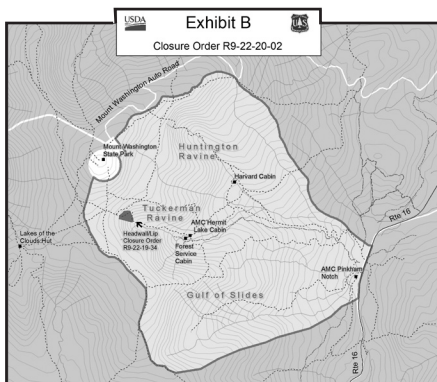
In an almost unprecedented move, the U.S. Forest Service this spring closed, to all use, Tuckerman Ravine and adjacent areas on the eastern side of Mount Washington.

The action was taken in response to the COVID-19 pandemic, and concern for public safety. According to Diane Taliaferro, Deputy Forest Supervisor of the White Mountain National Forest, “We are committed to the health and safety of our visitors, staff, and volunteer groups who offer their time to help search and rescue efforts. These actions were taken based on the best available medical advice to limit gatherings of large numbers of people and to promote social distancing.”

The closure, issued on April 2, prohibited entry to a large area on the eastern side of the mountain, including Tuckerman Ravine, Huntington Ravine, and the Gulf of Slides

The closure followed a weekend when several hundred people visited the Tuckerman area. Forest Service personnel noted that the practices of “social distancing” were quite obviously not being practiced by many of the visitors. There was concern that the congregating of visitors would lead to the spread of infection.

Additionally, given the history of the



The Tuckerman Ravine spring skiing season came to an abrupt halt in early April. U.S. Forest Service graphic.

Tuckerman area in the springtime, with many visitors and potentially dangerous terrain, the need for search and rescue activities in the area was practically certain. As a WMNF press release stated, “rescue efforts create the opportunity to further spread the virus through close contact among patients and rescuers.”

Historically there have been times when large areas of the National Forest have been closed to use. After the Hurricane of 1938, sections of the Forest were closed due to high fire danger among storm-felled timber. In 2011, concern about the danger associated with incoming Tropical Storm Irene led the Forest Service to close the National Forest briefly. And from time to time, in the past, the snow rangers of the WMNF have closed areas on Mount Washington due to avalanche danger, though nowadays their practice is to issue advisories, rather than closure.

The Top Can Get Lonely Without You

TRANSLATED BY JAY BROCCOLO

Fur-ends of the Observatory, paws fur a meow-ment! This litter-ate cat has some felines to write and share with mew'all. I am quite fur-tunate up here at the Observatory. Living on top of one of the most paw-some meowtains around is ameowzing, but there haven't been many purr-sons around to share the expurience with lately. I sure hope efuryone is okay and there isn't any purroblem.

I've been thinking of all of you, and I look fur-ward to seeing you back up here soon!

I need more cattention! It can get somewhat lonely up here, but the human observers and my state park fur-ends always cheer me up as I do fur them. I can be purrty purrsuasive by giving a little cattitude. I like to buff against their legs and hang out in their workspace. I'm very catful that they feed me so well. I'm always happy after

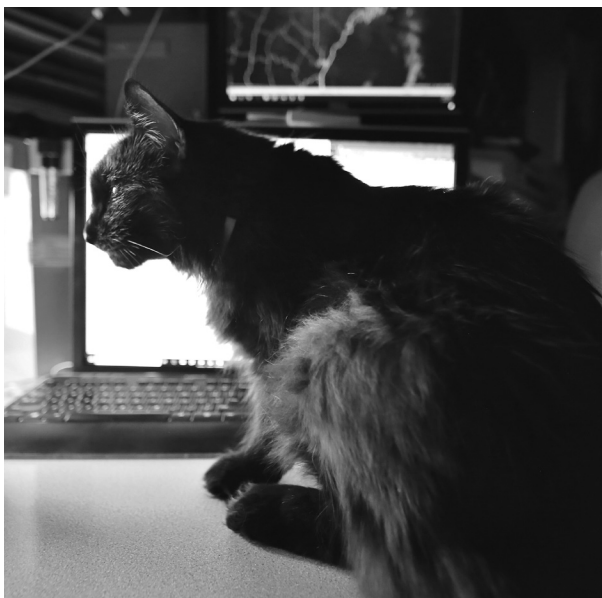
a meowvelous fish meal or some other type of gravy style deliciousness.

I've got it timed just right. I make my rounds between the human observers, go ofur to state park side, and then to the weather room. That's where all the

treats and my big water bowl are, in the weather room. I get to drink the freshest water around; the humans pour the recorded precipitation into it for me. In the morning, when the night human comes down, I'm

always there laying right in the middle of the floor so I can get his cattention to give me pets and food. Don't tell him though, I really just want the food. Anyway, that's it fur me. Hope to see mew'all soon.

Live long and paws-purr!



Seven Alternatives to Hiking Mount Washington During Seek the Peak 2020

BY WILL BROUSSARD



Mount Chocorua

Seek the Peak will turn 20 years old in July. We encourage all participants to “seek your peak” and take part in hikes around the region and not just Mount Washington. In this feature I highlight seven alternative hikes and include their length, level of difficulty, and what makes them unique. Remember to stay ahead of the weather by checking our Higher Summits Forecast at MountWashington.org.

Appearing as a sentinel at the southeastern corner of the White Mountains sits Mount Chocorua. This instantly recognizable peak is said to be one of the most photographed mountains in the world. At 3,478 feet it is not a true four-thousand footer but rivals its larger cousins with stunning, 360-degree views that include much

of the northern Lakes Region of New Hampshire. Several moderate-level hiking paths can be taken to this rugged summit but the most popular trails include Piper Trail (4.2 miles each way from Route 16), the Champney Falls Trail (7.6 miles from the Kancamagus Highway), and the Liberty Trail (7.8 miles round trip from Chocorua Lake Road in Tamworth). Chocorua is

a great beginners hike for those just getting started, and is an excellent alternative for “Seek Your Peak” hikers looking to get some exercise.

In July of 1858, while making his way north into what would later be called the Mount Washington Valley, Henry David Thoreau wrote that the experience was like “steadily advancing into an amphitheater of mountains.” The imposing 3,268-foot peak of Mount Kearsarge North, looming large over Intervale and North Conway, was one of those mountains. The Kearsarge North Trail is a 6.2-mile, moderately difficult round trip from Hurricane Mountain Road which gives way to a partially forested summit and the popular Pequawket Fire Tower. Built in 1913, this tower offers a grand 360-degree view of the eastern White Mountains



The fire tower atop Kearsarge North

and the southwestern lakes of Maine. Be mindful when hiking post rainfall as the ledges on the southern side of the mountain can be difficult to traverse when wet.

Speaking of ledges, one must be very careful when climbing them. The near vertical rock faces of the Baldface Loop in Evans Notch offer a rewarding ridge walk and stunning views from the 3,570-foot South Baldface and 3,610-foot North Baldface peaks to those who triumph over the unsettling yet temporary scramble. This 10-mile loop begins on Route 113 in North Chatham and is best traversed during dry weather. Hiking the loop in a clockwise fashion is encouraged, allowing hikers to climb up the ledges at the beginning of the hike rather than down them at the end. On the way out, enjoy a glimpse or even a dip in the famed but frigid Emerald Pool.

Waterfalls adorn the White Mountains with numerous cascades of various size and accessibility. Some are located right off the road, such as Glen Ellis Falls on Route 16 in Pinkham Notch and the Flume Gorge on Interstate 93

in Franconia Notch, but others are further afield. The most impressive of these is Arethusa Falls, a 160-foot spectacle located at the end of a moderate, 3-mile in-and-out trek from US Route 302 in Crawford Notch State Park. This is a great year-round hike and ideal for families. If you fancy yourself a waterfall connoisseur, three others are located nearby and

accessible from the Arethusa Falls trail, including Ripley Falls, Bemis Brook Falls and Coliseum Falls. Continue up the Arethusa Falls trail and ascend the famed rock and ice-climbing destination called the Frankenstein Cliffs for stunning views of Crawford Notch.



Red trillium

A few miles north of Arethusa Falls sits the 2,864-foot Mount Willard, a relatively short hike for an incredible vantage point east into Crawford Notch with views of the Webster Cliffs, Route 302, and the historic Willey Slide. Rated

as an easy to moderate hike along an old carriage road, this 3-mile round trip is perfect for beginners and families. In spring and early summer this is an excellent wildflower walk with red trillium, blue-bead lily and pink lady's slipper making appearances along the trail. The Mount Willard trail is located behind Crawford Depot, which is across the road from Saco Lake, the source of the Saco River, and just down US Route 302 from the Appalachian Mountain Club's Highland Center.

Our next featured hike is located in the Presidential Range just a couple miles southwest of Mount Washington. Mount Eisenhower might appear imposing with its broad, domed summit but this 4,780-foot mountain provides hikers with a moderate trek through dense spruce-fir forests and elfin subalpine krummholz. Formerly called Mount Pleasant, its' gently sloping summit is marked by a very tall pile of rocks, or cairn, which serves as an excellent spot to sit, have a snack, and take in the breathtaking, 360-degree views of Mount Washington to the northeast and Crawford Notch to the southwest. While access can be found via the Crawford Path from nearby Mounts Pierce and Monroe, many summertime visitors opt to take the 6.6-mile round-trip along the Edmand's Path whose

trailhead is located on the Mount Clinton Road in Crawford Notch.

Our final peak is found at the southwestern edge of the White Mountains. Mount Moosilauke takes its name from the Abenaki term for "bald place," and like Eisenhower, this peak features a broad, open summit. From the top, hikers are treated to excellent views of the White Mountains, the upper Connecticut River Valley, the Green Mountains of Vermont and occasionally



Mount Eisenhower

a glimpse into the Adirondacks of upstate New York. There are several routes to the summit, but the easiest is a moderate level, 8-mile loop beginning at the Ravine Lodge and up the Gorge Brook Trail to the summit and returning via the Carriage Road and Snapper Trail. We hope you enjoy these alternative hikes for Seek the Peak!

Outreach Coordinator Will Broussard enjoys leading informational hikes during Seek the Peak.



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Dedicated Bunch Takes Part in Every Seek the Peak

BY MARTY BASCH

Though Seek the Peak is the Observatory's largest fundraiser, it's also a grand get together of sorts. Relationships are made and many hikers look forward to it as a reunion.

Amazingly, there are a handful of dedicated participants who have taken part in all 19 of them!

I reached out to them to ask them why they keep coming back.

Washington Valley in a rented Madison cabin when the first STP was about to happen. Valerie went into town, picked up a local newspaper and told her husband about it.

"So, we get to hike Mount Washington and they feed us afterwards?" Brad said recalling hearing about the event.

"Former Trustee, you just have to make a donation," countered Valerie.



Brad and Valerie Griswold. Courtesy photos.

Former Trustee Brad Griswold of Lancaster, N.H. stumbled upon Seek the Peak which ultimately led to him becoming a member of the board. He and his wife Valerie are ardent hikers and happened to be in the Mount

"That's sounds like fun," said Brad.

Over the years, Brad's hiked with family, friends and people he's met along the trail.

"There isn't a lot of stability in my schedule and I decided this is something I'm going to put a stake in the ground and hike it every year," he said.

He wasn't a member. He isn't a weather geek. He even won a Subaru one year, a fortuitous prize as his daughter, 17 at the time, was driving to high school between Orford, N.H. and Quechee, Vt.

His involvement led to a phone call from Observatory officials to become a trustee.

“I do it to support the Observatory with its history and tradition,” he said. “I do it for the love of the mountain and appreciate the work the Observatory does on the summit.”

A managing partner of a wealth management company, Griswold started hiking in STP when he was 40. Then, he was hiking the mountain in under two hours. Now it’s two and a half hours.

“Over the years I’ve hiked in freezing rain and thunderstorms,” he said.

“There were days when I thought I was at the beach. I’ve been bundled up and in running shorts. The mountain is true to its name.”

It’s also majestic.

“When you get above treeline, the world drops away,” he said. “It’s just you and the mountain. That’s the magic of it. In a world where it’s hard to have consistency or routine, Seek the Peak has become one of those things for me. There is a stake in the ground around that date and I know I’m going to be above treeline and be with people I know and enjoy.”

Lee Eckhart, 71, admits to having a fascination, a love, of Mount Washington. He’s been hiking mountains in New Hampshire since around 1975 and figures he’s been up Mount Washington a good 40 to 50 times generally from the west or east. The avid hiker is a retired vice president of operations for Advanced Instruments, Inc. and lives south of Boston in Assonet, Massachusetts. He’s also run up the mountain during the Mount Washington Road



Lee Eckhart (r) and his daughter Amy (l).

Race in 1985 and has three times pedaled up during the Mount Washington Auto Road Bicycle Hillclimb. He made his first ascent in a van in 1974.

When it comes to Seek the Peak, Eckhart happened upon it as well.

“When I tripped over the STP MWO fundraiser it just seemed like a great way to support the MWO and feed my passion for the mountain as well as keep me in shape,” he wrote in an email.

Eckhart says he got “hooked” on STP for all the right reasons.

For the first five years or so, he hiked alone and met people along the way.

“Then my daughter (Amy) and future son-in-law (Andrew) asked to come along and that started a series of years where friends of friends of theirs started asking to join us and we had as many as 28 one year hiking together, many of whom had never really hiked anything like Mount Washington,” he commented.

Eckhart enjoys sharing the experience of hiking the mountain, seeing the faces of those on the hike as they take in the outstanding views and marvel at the ever-changing weather. For many, hiking the mountain is a bucket list item and he enjoys hearing stories of accomplishment.

His daughter Amy has accompanied him about eight to 10 times during his 19 years of STP hiking.

“I sincerely just enjoy my time on the mountain and being able to support the MWO at the same time,” he said. “At some point, hopefully many years from now, some of me will become a part of this magnificent wonder!”

Pat, 62, and Brenda, 63, Daly of Wallingford, Conn. have been with Seek the Peak since its inception.

The couple first climbed Mount Washington together in 1990. Brenda remembers a thunderstorm rolling in as they got to Lakes of the Clouds hut. They pressed on in the fog to the summit with hair standing on necks and Brenda crying in triumph.

The two started out as hikers and even won some prizes in the event’s early days like a summit overnight stay. They brought family and friends to hike with them over the years but when Brenda’s knee started to protest mountain descents, the two decided it was time to volunteer instead. They’ve been fixtures at both Weather Discovery Center registration and during set-up and take down under the big tent at the base of the Mt. Washington Auto Road.

“Being a volunteer still allows us to be a small part of a bigger team effort,” Brenda wrote. “It takes a village, and if we lived closer we would be more available to help.”

Some six years ago they started bringing their grandson Keagan to help too. He does, and will turn 12 during Seek the Peak weekend this year!

From staff to fellow participants, they’ve developed relationships over the years that have extended beyond the event. They enjoy seeing both familiar and new faces.

“The people we have met over the past years has been a blessing,” said Brenda. She said their time with Seek the Peak has been a very good one. Even though they no longer hike they are still involved with it.



Pat (l) and Brenda Daly (r).

Originally from Kalispell, Montana, the mountain is as close to home as Brenda gets. She's fascinated by the weather extremes, sunrises, sunsets, temperature shifts and precipitation.

As a teacher, being involved with the Observatory helps her in the classroom at home.

"I think seeing what the Observatory does as far as weather and how it effects the area, having classroom type information for the kids is great," she said. "I also learned about all the testing that goes on. How aircraft engines are affected by snow or rime ice, or how windows hold up in weather conditions. Tents and camping gear are tested, no better place, you get it all."

Though Seek the Peak brings everyone to the mountain, it also brings everyone together for one cause.

Said Brenda, "We have made friends with so many great people, and it feels like a family reunion every year. So many more to come."



Keagan Daly

Editor Marty Basch and his wife Jan routinely dispense refreshments during STP registration at the Weather Discovery Center to eager participants.

A Look Back in Photos of Seek the Peak

COMPILED BY KRISSY FRASER

Musing about Seek the Peak always makes me smile. There are twenty years of special memories, and countless stories of participants hiking for so many different reasons. Volunteers, staff and trustees have given amazing numbers of hours to share in the experience. There are summit tours, tasty cookies and delicious turkey dinners. With the 20th anniversary in our sights I am super excited knowing that amidst these challenging times we have an opportunity to create something special. As we look forward to STP, it's a good time to take a look back in photos with some of the faces and places we've seen on this incredible journey we've taken together. Thank you to all who have come along.!



You couldn't miss the Kilted Hikers, shown here during a March visit to the summit; their reward for being a top fundraiser.

Right: Seek the Peak is not only close to the hearts of many, but minds too.



Hikers make a beeline to the top.



Sometimes it's a tight squeeze to get to the summit.



The summit has been achieved by so many hikers—like Triple Crown participant Curly Perzel.



The Vendor Expo is always popular.



Registration at the Weather Discover Center has been a tasty affair.



Happy hikers never curb their enthusiasm for STP.



From turkey dinners to raffles, participants enjoy the festivities under the big tent at the base of the mountain.

Brand Manager Krissy Fraser spends many waking hours thinking about Seek the Peak.

WeatherX Project Moves Ahead

BY BRIAN FITZGERALD



A WeatherX lesson image developed to help students understand where just some of the weather data is collected on Mount Washington.

Before limiting the summit to only essential employees, five out of the six EduTrips, six out of seven Day Trips, four out of six Arctic Wednesdays, and five out of seven overnight climbing programs reached the summit this winter to learn about the weather and climate of Mount Washington. For the ever-popular overnight EduTrip program, the education team offered past favorites like “The Science of Winter Storms” and “Mountaineering Essential Skills” along with one of the highlight programs of the winter, “Stories from the Mountain:

Risk and Decisions in Wild Weather,” led by author and risk manager Ty Gagne.

Throughout the winter and spring, work on the National Science Foundation-funded “WeatherX” curriculum development project continued in earnest. The WeatherX project aims to develop innovative strategies to help rural middle school students learn data analysis and computational thinking skills by using extreme weather data and expertise from Mount Washington Observatory (MWO). Project partners

Education Development Center, the University of Maine, the University of Washington and the Concord Consortium came together with MWO to finalize and remotely test the first unit of the WeatherX curriculum that has students investigate, define and answer what, from a scientific, statistical and climatological standpoint, makes certain storms on Mount Washington “extreme.” With the use of a novel web-based data visualization and graphing tool from the Concord Consortium, the Common Online Data Analysis Platform (CODAP) will allow students to interact with and learn from MWO data in ways that were previously very difficult. Additionally, as students’ curiosity and lingering questions pop up in this project, classrooms will be able to “Chat with a Scientist” during their studies and videoconference with meteorologists on the summit. With the initial phase of testing and research underway with the first unit, the project’s curriculum team

will write the second unit meant for testing this fall that will focus on student investigations into extreme weather events in their own communities.

With the need to socially distance ourselves, summit staff have been able to make full use of the Observatory’s well-established distance learning program and videoconference systems to keep the public connected with what’s happening on the summit. MWO has been fortunate to be able to offer the free “Home of the World’s Worst Weather Live” program as an exciting and accessible educational resource in addition to regular programs with schools and universities. As we look ahead to developing our distance learning programs further, any and all feedback and ideas are welcome—just reach out to education@mountwashington.org and thank you for supporting MWO’s educational outreach!



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######

Weather Puts On Dramatic Show

BY RYAN KNAPP

The period saw dramatic swings of bitter cold, windy, and snowy conditions mixed with mild, windy, and rainy conditions. Towards the tail end of the period, the summits even saw a thunderstorm, reminding us that thunderstorm season is just around the corner.

December 2019

High pressure departed the region as an upper level trough swung in providing snow late on the first. Low pressure from the Ohio River Valley provided additional snowfall on the second followed by a coastal low providing additional snowfall for the third. The fourth experienced brief clearing prior to a cold front passing overnight into the fifth. Upslope snow showers lingered on the sixth then gave way to steadier snowfall as a clipper slid south of the region overnight into early on the seventh. High pressure provided a break for the eighth as low pressure passed to the west. This resulted in mild air surging in so when precipitation returned on the ninth/tenth, it fell as snow, freezing rain, and then rain prior to returning to snow as a cold front passed on the tenth/eleventh. A clipper provided snow showers and cold temperatures on the twelfth. High pressure provided a brief break on the thirteenth followed by a strong storm that tracked from the Carolinas through New York State. The passing low provided snow, sleet, freezing rain, and then rain by the fourteenth as

temperatures soared to 42°F, setting the date's new daily record high.

As the low departed on the fifteenth, temperatures plummeted resulting in a return of snow and triple digit gusts. The high gusts lingered into the sixteenth but gradually gave way to seasonal conditions as high pressure crested overhead. Low pressure passing to the south returned snow on the seventeenth/eighteenth with another low from the northwest bringing additional snowfall for the eighteenth/nineteenth. As this low departed, cold air flowed in dropping temperatures to 23°F below late on the nineteenth. High pressure provided fair weather conditions for the twentieth through the twenty-fourth. A weak cold front on the twenty-fifth provided a few flurries. Low pressure swung a warm front northward on the twenty-sixth providing a few light snow showers. As temperatures rose behind the front on the twenty-seventh, snow transitioned to rain for a few hours prior to a trailing cold front plummeting temperatures and transitioning lingering precipitation back to snow lingering into the twenty-eighth. A warm front stalled to the south on the twenty-ninth resulting in light snow and sleet. A coastal low dumped 10.5 inches of snow/sleet on the thirtieth followed by a weaker coastal low on the thirty-first providing a few additional inches of snowfall and a coating of ice from light freezing drizzle.

January 2020

A coastal low deepened and strengthened as it departed the region on the first resulting in additional snowfall and gusty conditions that would linger into the second. High pressure provided a break as a clipper passed to the north on the third. A trailing cold front along with a passing coastal low on the fourth provided light snowfall and cooler conditions. A low from the west provided additional light snowfall for the fifth/sixth along with colder conditions. High pressure provided some clearing late on the sixth into early on the seventh.

Low pressure moved up the coast late on the seventh spreading snow in overnight with snowfall lingering until early on the ninth. High pressure briefly provided clearing ahead of a warm front moving through on the tenth.

As temperatures rose with the passing front, snow transitioned to sleet, freezing rain, and eventually rain by the eleventh as temperatures soared to a new daily record high of 43°F and topped out at 45°F on the twelfth. A passing cold front dropped temperatures resulting in rain transitioning back to snow. Intermittent fog and upslope snow showers continued for the thirteenth to fifteenth as a zonal flow set up.

Low pressure from the west strengthened as it moved into the Gulf of Maine resulting in strong winds and heavy snowfall for the sixteenth/seventeenth. High pressure provided clearing late on the seventeenth and into early on the eighteenth. Another low from the west strengthened as it moved into the Gulf of Maine on the eighteenth/nineteenth delivering cold, snowy, and windy weather. Upslope fog/snow lingered into the twentieth prior to high pressure building for the twenty-first. A

weak front from a low over Hudson Bay brought some snow overnight. Then high pressure returned on the twenty-second remaining until the twenty-fifth with fair weather conditions. A pair of lows put a squeeze on the state overnight into the twenty-fifth providing snow and freezing rain. As the lows exited, they stalled resulting in continued snowfall for the twenty-seventh/twenty-eighth.

Fair weather returned with high pressure on the twenty-ninth and remained until the morning of the thirty-first. A coastal low late ended the month with fog and light snow.

February 2020

A coastal low exited the region providing light upslope snow showers in its wake for the first. Fair weather on the second quickly gave way to clouds and snow into the third as a weak low passed.

High pressure returned for the fourth/fifth followed by a low from the west that provided heavy mixed precipitation for the sixth/seventh as temperatures warmed to 35°F. A strong cold front on the seventh returned snow as temperatures fell, bottoming out at 17°F below by the eighth. A warm front on the ninth/tenth brought moderate snowfall as temperatures rebounded to seasonal readings. A low by Cape Cod brought continued snow showers for the eleventh and into the twelfth. After a brief break late on the twelfth, a low from the southwest returned clouds and snow showers on the thirteenth with an arctic cold front bringing continued snow showers and colder air for the fourteenth. Canadian high pressure provided fair weather on the fifteenth but a low passing to the north returned clouds overnight.

A coastal low provided snow on the sixteenth/seventeenth with a low from the Great Lakes provided additional snowfall for the eighteenth/nineteenth. The backside of the low brought high winds and blowing snow on the nineteenth, which resulted in a delayed shift change. Broad high pressure over the east coast provided fair weather from the twentieth through the morning of the twenty-fifth. Low pressure from over the Great Lakes strengthened the twenty-fifth through twenty-seventh resulting in snowfall and increasing winds which topped out at 132 mph on the twenty-seventh. As the low passed and moved into the Canadian Maritimes, upslope snow showers lingered. Blowing snow limited visibility through month's end.

March 2020

A broad upper level trough over the eastern half of the U.S. drove a series of lows over the summits from the first through the sixth. The passing lows brought daily snowfall. A strong low on the fourth brought gusts up to 133 mph making for a challenging shift change. High pressure provided some clearing on the sixth/seventh as a coastal low passed offshore providing clouds and elevated winds overnight on the seventh. Fair weather conditions returned on the eighth lingering into the ninth. Low pressure from the west swept a warm front northward on the tenth warming temperatures above freezing and resulting in mixed precipitation types. A cold front passed overnight allowing a transition back to snow by the eleventh prior to tapering as a weak ridge built overhead. An upper level low overnight provided fog and snow showers prior to clearing out on the twelfth. Low pressure from the west late on the twelfth

returned snow showers. Temperatures rose close to freezing with the passing low on the thirteenth resulting in a wintry day mix but returned to snow overnight into the fourteenth as the low exited. Canadian high pressure provided fair weather for the fifteenth/sixteenth.

A coastal low returned snow on the seventeenth prior to tapering on the eighteenth as high pressure built in midday. Another coastal low overnight swung a warm front northward resulting in snow transitioning to drizzle on the nineteenth and rain on the twentieth. As the low strengthened and exited strong high pressure built behind it resulting in winds boosting to 145 mph on the twentieth, the highest gust of the 2019/2020 season so far. Gusts remained in the triple digits into the twenty-first but gradually decreased as high pressure started to build overhead. Fair weather lingered into the twenty-second as high pressure crested and slowly slid east. Low pressure moved up from the south on the twenty-third delivering 9 inches of snow by the time it exited on the twenty-fourth. High pressure provided fair weather on the twenty-fifth, which lingered into the twenty-sixth. Low pressure passed well offshore on the twenty-sixth/twenty-seventh but a few snow showers retrograded over the region. High pressure returned on the twenty-eighth followed by a large low passing to the north on the twenty-ninth. The passing low resulted in a wintry mix and a thunderstorm on the twenty-ninth with freezing precipitation lingering into the thirtieth. Brief clearing late on the thirtieth gave way to light snow showers on the thirty-first prior to high pressure rebuilding to clear the skies out for the end of the month.



10:20 AM Tues. Dec 17, 2019

My time as an intern on the summit has flown by and I couldn't be more grateful to have had such an incredible opportunity to fulfill my dream. In addition to the wild weather, beautiful views, and wonderful people I got to work with, I was lucky to learn so much about forecasting and how the Observatory operates. It was exhilarating to be up on the summit to witness triple digit wind speeds, record breaking temperatures, shooting stars, and beautiful sunrises and sunsets that painted the sky a gorgeous array of colors.

Living and working up here with such extreme weather conditions brought new adventures every day. Whenever I got off the mountain at the end of my shift, I was always eagerly anticipating our next trip up, wondering what type of exciting weather I might get to experience next. Being in an environment with such dramatically changing weather patterns allowed me to witness some pretty remarkable events that this mountain is famous for.

I am fortunate to have gotten some

exciting weather for my last few days of my internship. This week coincided nicely with some strong storms that moved through the region, which brought sustained winds that gusted over 125 mph—a perfect sendoff!

When I wasn't outside soaking up the wonderfully crazy weather, I learned a lot from all that I got to do inside. Working on research allowed me to delve into analyzing how wintertime melting events are changing over time on the mountain, which gave me the chance to work with weather data from the summit. I also enjoyed starting my days by reading forecasts for the AMC Hut Call each morning. Creating and recording the Higher Summits forecast each day gave me experience learning about the nuances of mountain meteorology, especially with the frequent storms we receive!

As summer transitioned to winter, I became fully aware of just how truly powerful water and wind can be in an environment as extreme as Mount Washington. It was quite the thrill to be outside on the tower in winds that were gusting to 130 mph, causing my

ski goggles to vibrate from the sheer force as I stood into the wind. I enjoyed all the chances I got to head outside in hurricane force winds while attempting to stay upright enough to walk across the observation deck. From thunderstorms one night and seeing a fogbow another morning during my first week up here, to experiencing nor'easters that brought snow, rime ice and wind chills down to -50°F, I am lucky I got to be on the mountain during the fall to experience this incredible range of conditions. Watching the Observatory go from buzzing with activity from visitors during foliage season to witnessing the summit become encased in snow and rime ice after the building closed down to the public, I feel lucky that I got to be up here on the summit of Mount Washington during such a perfect time of year for an experience beyond what I could have ever imagined!

—Laura Kee, Summit Intern

9:12 AM Mon. Jan. 13, 2020

After seeing record-breaking warmth on the summit over the past weekend and a huge reduction in our snowpack, it looks as though the longer-term models are showing a turn for the snowy. We certainly could use the snow, with only 3" of mostly solid ice as an average for our current snow depth. This snow cover is deeper in more sheltered areas and in between the rocks, but in many other open areas we mostly have bare ground.

A pretty large pattern change is already underway in the upper levels, which will result in a return to at least near-normal temperatures while also

seeing frequent storm tracks. This is preferable for the summit to see an expedient replenishment to our snow, as very cold arctic air would likely mean we are under the influence of strong high pressure and not seeing frequent precipitation.

"Zonal flow" is the term meteorologists often use with this upper level, or jet stream pattern where the jet stream is mostly oriented due west-east with little in the way of dips. With this pattern for us in New England we're often directly under the jet stream, with weak, but quick moving and frequent storm systems. We'll see two weak clipper-like systems centered around Tuesday night and again Thursday with this pattern, resulting in around 3-6" or 4-8" of snow total for the summit.

After this there has consistently been a large storm system affecting the Northeast during the Saturday-Sunday timeframe. This storm is able to take advantage of the jet stream digging, or dipping much further south while also strengthening, resulting in more moisture and energy for the storm. For us on the summit and also the northern half of New England temperatures should remain cold enough for all snow, and much of the area may potentially see a solid 6-12" of snow from this storm. This storm also looks to be a pretty significant wind event for the summit, possibly reaching our highest readings so far in 2020, surpassing the 119 mph gust we observed Saturday the 11th. After surviving the dreaded "January thaw" that is fairly common this time of year it's a relief to see plenty of snow in our future!

—Thomas Padham, Weather Observer & Education Specialist



7:04 PM Sat. Feb. 29, 2020

It has been another week of crazy winter weather here on the summit with high winds, lots of snow, and low visibility. But outside the weather, it has been a very pleasant and exciting week as well. For the first time since the beginning of January, we have a full crew!

I'll let him speak for himself when he posts later this week, but it has been such a pleasure meeting and working with David DeCou. He came in to the Obs from Antarctica, and has been taking to the work up here like a fish to water. He's been training with us this week to get an idea what the day shift is like, and learning many of the tasks we are responsible for each day during the shift. Next week and going forward, he'll be training with Jay Broccolo to learn all of the night responsibilities, to inevitably take over as our Night Observer in a couple of months.

He's had some pretty exciting weather to deal with. We had a maximum 132 mph gust on Thursday, over a foot of snow accumulation so far, and more frigid temperatures below 0. It's safe

to say that things are much different than they were last year. We've even had some firsts for me as well. Friday morning, when we went to retrieve the precipitation can for the synoptic we were greeted at the door by a chin-high snow drift. David and I shoveled out a small path to climb over just so we could get the can for the Ob. But Patrick from State Park came over later in the day, and myself, David and Caleb Buchler went with him to check out the dig-out progress he had made. Both David and I could stand on top without sinking in, and it was almost as if Patrick was tunneling us out of the Sherman Adams Building. If the drifts are this high over here, I can only imagine what they are like over at Yankee Building.

Monday night we have another big low pressure coming in. It looks like an occluding Hudson Bay low at the time of this writing, which will bring a few more inches of snow and some more hurricane force winds for sure. We're also watching another low pressure headed our way for shift change day. Moderate precip and high winds never make things easy. So for certain we'll keep our eyes on the skies, and we'll see what the rest of this shift has in store for us.

—Ian Bailey, Weather Observer & Education Specialist

2:09 PM Mon. March 30, 2020

It's nothing new that the Mount Washington Observatory is committed to education. Part of our mission is to advance the understanding of the natural systems that create Earth's weather and climate. In response to the

COVID-19 pandemic forcing schools to close nationwide we hit the drawing board to create a virtual classroom. We are offering free distance learning programs three times a week to support educators in providing remote learning opportunities.

Utilizing Facebook Live, students can join “Home of the Worst Weather Live” three days a week. Weather Observers or staff members will present on a variety of topics every Monday, Tuesday and Thursday at 11:15 a.m. Monday’s we will focus on a special topic, while Tuesday’s and Thursday’s we will highlight the latest weather conditions and review the higher summits forecast. Each program will also include a Q&A session in real time. Concluding each live program, we will upload the sessions to our website at mountwashington.org/classroom so they can be viewed at any time. In addition to

the programs, the site will also provide resources and activities related to the science of weather for use by students to explore further on their own.

Weather Observer and Education Specialist Ian Bailey kicked off the program with a specialized focus on “An Introduction to Mount Washington and the Observatory”. We had quite a few tuning in with some great questions from our viewers. Over the next few weeks we are looking forward to bringing Mount Washington into your home. We’ll discuss many different topics, including how to take weather observations, the different measurements/parameters that are involved in that process, and so much more!

—Rebecca Scholand, Summit Operations Manager



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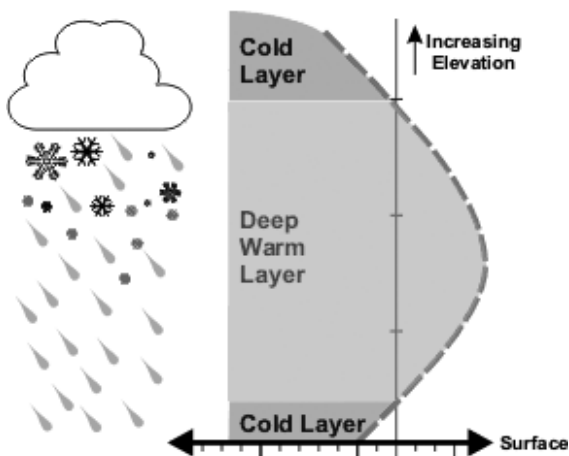
Glaze Ice

BY AJ GRIMES

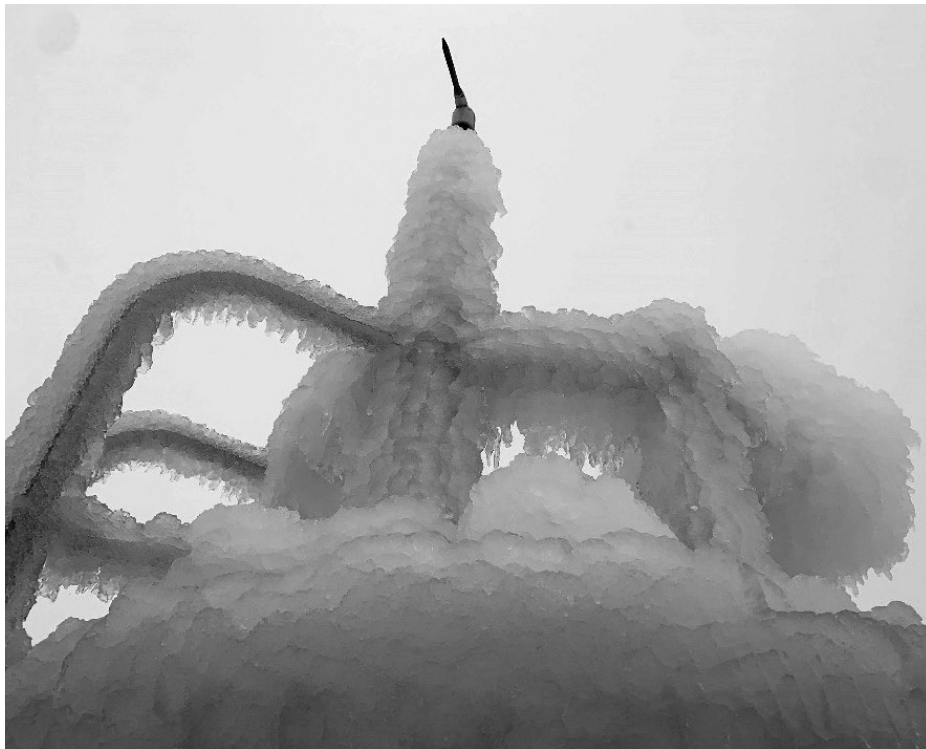
On April 3 the summit of Mount Washington was paralyzed by one of the worst icing events of the past winter season. If you're thinking about ice on the summit, you are probably imagining rime ice. One of Mount Washington's distinctive features, rime ice is the milky white formations of feathery ice that. However, the main culprit of this event was glaze ice. The clear, hard ice that encases whatever it touches. Typically, a fraction of an inch of glaze is enough to cause problems in the world below, creating treacherous travel conditions on roads and causing power outages as trees lose their limbs under the immense weight. On this day, the glaze on the summit was measured in feet, not fractions, creating an otherworldly and dangerous set of conditions that Weather Observers had to contend with. In this edition of Weather 101, we will explore what sort of conditions are necessary to cause glaze ice, then take a look at what happened to create such an extreme case on the summit that day in April.

Glaze ice is the end result when freezing rain or drizzle makes contact with the ground or any other hard surface. In order for freezing

rain to occur, there must be a layer of warm air aloft in the atmosphere and colder air close to the surface. Precipitation can begin as either rain or snow, but as it passes through the warm layer of air, it all becomes rain. The type of resulting precipitation on the ground depends largely on the thickness of the cold air at the surface. If the cold air is thick enough, rain drops will have time to freeze before striking the ground, resulting in ice pellets that bounce off the ground (better known as sleet). If the cold air at the surface is shallow, precipitation will not have time to freeze during its descent, resulting in supercooled droplets of water that freeze on contact when they hit the ground.



Atmospheric structure of freezing rain conditions.
Graphic weather.gov.



Glaze ice built up on the Observatory tower.

On April 3, everything was in place to allow for a severe freezing rain event on Mount Washington. A large area of low pressure over the Atlantic Ocean was slowly moving west towards New England, its cyclonic flow channeling warm, moist air into the region. With milder air in place, the snow that had been falling at the beginning of the storm transformed into freezing rain and sleet as it passed through the warmer layer aloft. With temperatures at the surface holding steady in the mid to upper 20s, the droplets falling on the summit froze on contact with whatever they touched, including our sensitive weather instruments.

Observers on duty had to go outside to remove ice from the instruments

every 15 to 30 minutes, a job that's done every hour or two under normal winter conditions. It was estimated that at one point in the day, about 8 inches of glaze had accumulated in just an hour. Some sections of the tower that were not being actively de-iced had 1 to 2 feet of glaze built up. It was an exhausting day for the summit crew to keep everything operational, and without their efforts, the Observatory's instrumentation would have certainly been damaged by the overwhelming amount of glaze ice that day. Glaze ice is beautiful yet dangerous at sea level, but Mount Washington takes everything to the extreme.

Summit Adapts to New Challenges

BY REBECCA SCHOLAND

I think it goes without saying that at the end of the winter season everyone was itching with spring fever. Thoughts of warmer temperatures, longer days, and the melt of snow giving way to new growth invigorates us. This year unlike any other the onset of spring was a welcomed one. Last year's winter provided the excitement of a top ten wind gust of 171 mph, delayed shift changes, and multiple cancelled or rescheduled summit educational trips. This winter shift changes ran on

schedule with the exception of one. EduTrips, Day Trips, Arctic Wednesdays, and partner-led Climbing Trips had a great success record. The summit also welcomed our newest Observer, David DeCou. Originally from Michigan and most recently working in Antarctica at the Amundsen-Scott South Pole Station as a Weather Observer, David joined us at the end of February. Overall operations in general were consistent and smooth by Mount Washington standards and we seemed



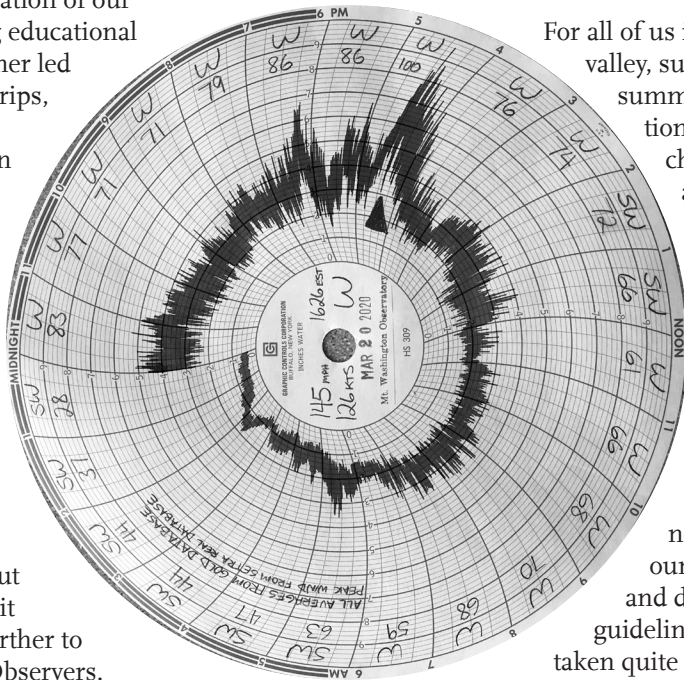
One of the most prolific glaze icing event experienced on the summit occurred in April.

to have come away unscathed by Mother Nature.

With the rest of the world, March is when things started to change as the COVID-19 pandemic precipitated unprecedented changes, the summit included. It started with the preemptive cancelation of our remaining educational trips, partner led climbing trips, and the suspension of the volunteer program. We occupied the summit with only our Observers and Interns. Soon we cut the summit staffing further to only our Observers. Interns Eve Cinquino and Caleb Buchler headed home for the remainder of the winter internship season. Luckily for us, they remained motivated and worked to finish documenting their research projects from home.

With every week we have been adjusting our protocols while staying as true as possible to our mission. The morning forecast is still broadcast and recorded, hourly observations are still occurring, and “Home of the Worst

Weather Live” debuted March 31. Ian Bailey, Tom Padham, and even myself have contributed in supplying online content for at home learning across the country. Observer responsibilities have needed to change and everyone is working to find a new balance in their shift duties.



Highest wind gust of 2020 so far was recorded March 20 at 145 mph.

For all of us in the valley, supporting summit operations hasn't changed as much as it has intensified.

Adjusting to the needs of our staff and distancing guidelines has taken quite a bit of work to ensure safety and precautions are at the forefront of

what we do on and off the summit now more than ever. Coordination is key and everyone is stepping up to help and cover when needed. The stress of the unknowns is met with unrelenting determination by all. While I don't know when things will return to normal or what the new normal will be, I am confident that as in the past, our dedicated staff will prevail. We will focus on moving forward, make adjustments as necessary, and remember that warmer weather is around the corner.

Recapping Winter, Updating Webcams

BY PETE GAGNE

This past winter was a busy one. Overall, shift changes went smoothly, and winter trip season was progressing nicely before being suspended by early March. Warm temperatures set in early on, and it appeared that winter was making an early exit before deciding to go out like a lion and bless the summit with twenty inches of snow on April 9-10.

As for the Mesonet, I am happy to report that the new batteries for the solar array on Wildcat kept the power flowing except for one brief period in the darkest days of January. Even with 960 Amp/Hours of reserve, when the solar panels are not producing power, we have only seven or eight days of reserve before the voltage gets too low. But we were happy with the results.

Some minor damage occurred to some of the sites, but webcams were the greatest casualties. These cameras were just not designed for the weather conditions they are asked to endure here. One of the most frequent requests we get from members is to keep the cameras free from ice blocking the view. We are very aware that many of our supporting members rely on the webcams and watch them every day. Unfortunately, solar-powered Mesonet sites do not have enough battery power to heat the cameras, and on the summit our ability to heat double-paned, bullet-proof windows is dwarfed by the icing power of Mount Washington in the winter.

You may have noticed different pictures coming from the North and Deck view cameras. The North-view ptz camera failed early in winter and the only replacement we had was a fixed-view panorama camera from Axis. This camera was moved to the next adjacent window which has better clarity than the previous one. We are working closely with New Hampshire State Park to improve the windows where our cameras mount.

The old observation Deck camera was a ptz camera showing only one fixed shot, so we decided to replace it with fixed-view camera from Axis. The ptz camera was cleaned, adapted to an outside-dome, and rewired for deployment on the Mesonet. As of the writing of this article in late April the camera had not been deployed due to the ski resorts being closed down. We were considering replacing the Bretton Woods Sony webcam, which is very old and with low resolution, by the time of this publishing it should have been deployed either there or at the old Tyrol ski area in Jackson.

Thank you to all our members for your continued support. Be assured that we are working diligently to provide you with the premium content you have come to expect. We face many challenges, as do you, and will continue to strive to keep our webcam views and data flowing, for you.

Winters Are Becoming More Like Swiss Cheese

BY DR. ERIC KELSEY

In the 2019-2020 winter issue of *Windswept*, I discussed the 2019 intern research projects. One of those projects examined how mid-winter thaws are changing at the summit. Ethan Rogers began this research by looking at how the frequency, magnitude, and number of above freezing events have changed since the 1930s. He focused simply on when temperature went above freezing. He found that since the 1930s the number of hours above freezing and magnitude of the warm temperatures during thaw events are increasing (both at a statistically significant rate of $p < 0.05$).

In the fall and winter of 2019-2020, another two MWO interns, Laura Kee and Eve Cinquino, respectively, continued this research by conducting the same analyses but with dewpoint. As alluded to in the aforementioned previous *Windswept* article, dewpoint is arguably a more important variable to track changing winter conditions that impact recreation and ecosystems because of its stronger impact on melting snow. Here is why: Air that is warmer than freezing can melt snow, however, snow will not always melt whenever the temperature is above freezing. If the air is very dry, then snow will sublimate into the air. The process of sublimation requires energy (i.e., heat) from the air. As snow sublimates, it cools the thin layer of air just above the snowpack. When the air is dry enough, sublimation can create a protective layer of near or below-freezing air on top of the snowpack that prevents melting.

Through this process, some snow is lost due to sublimation, but the snow loss is often not that much. The air temperature will cool to the wet-bulb temperature, which is one of the values measured every hour when Observers use the sling psychrometer to also measure the air temperature (a.k.a., dry-bulb temperature). The wet-bulb temperature is always in between the dry-bulb and dewpoint temperatures.

Now consider the situation where the air temperature is above freezing and there is a lot of moisture in the air (i.e., the dewpoint is above freezing). Some snow will sublimate or melt, both of which will cool a thin layer of air above the snow down to the wet-bulb temperature. However, the wet-bulb temperature is above freezing because there is a lot of moisture in the air to start. Therefore, the air temperature will remain above freezing, and heat from the air will melt the snow. But this is not the whole story. Since the dewpoint is above freezing and the snow itself is always at or below freezing, water vapor will condense onto the snow. Condensation in the snowpack does two things: 1) adds liquid water to the snowpack and 2) the process of condensation releases heat to the snowpack. This additional heat will either warm the snow towards freezing, or if the snowpack is already at the freezing point, the heat will melt the snow. The amount of heat released is 600 calories per gram of water (1 gram = 1 cm³). In summary, humid warm air is very effective at warming and melting a snowpack and dry warm air is not.

Returning to the intern research: Independent analyses by Laura and Eve using dewpoint temperature agree that

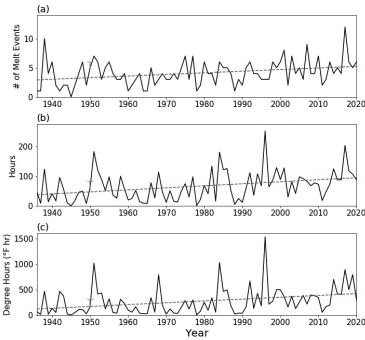


Fig. 1 Based on hourly temperature observations during December-February, (top) the number of thaw events, (middle) number of hours $T > 32^{\circ}\text{F}$, and (bottom) cumulative melting degree days.

thaw-events as defined by times when the dewpoint temperature is greater than 32°F are also changing. They analyzed three different metrics (which are the same as the metrics Ethan calculated for temperature): number of thaw events, total number of hours when dewpoint is above 32°F , and the cumulative seasonal total number of melting degree hours (MDH = number of degrees above freezing at each observation; e.g., a dewpoint of 40°F would equate to $40^{\circ}\text{F} - 32^{\circ}\text{F} = 8$ MDH). Furthermore, Eve discovered that all three metrics are increasing at a statistical significance of $p < 0.05$ over the 1939-2020 period. Eve also confirmed that all three metrics for temperature are increasing with a statistical significance of $p < 0.05$ over the 1939-2020 period. Here's another way to think about it: If you consider a slice of swiss cheese as a Mount Washington winter where the cheese is the cold conditions and the holes are the mid-winter thaws, the number and size of the holes is growing over time and eating away at the typical cold winter conditions that historically defined New Hampshire winters.

Figure 1 shows the three metrics based on air temperature and Figure 2 shows the same metrics based on dewpoint. The upward trends in each metric are evident and show that we are seeing more mid-winter thaw events and when they occur, they are increasingly likely to be warmer and last longer.

To confirm the well-known mechanism of condensation-melt having a bigger melt impact than just warm temperatures, Eve examined the average change in snow depth at the summit during thaw events based on temperature and dewpoint. Sure enough, the average snow depth loss during a dewpoint thaw-event is $0.16''/\text{hour}$, about two and a half times higher than all temperature thaw-events ($0.06''/\text{hour}$), and four times higher than temperature thaw-events when the dewpoint is below freezing ($0.04''/\text{hour}$). Therefore, as the local climate continues to warm, we can expect an increasing amount of thaw events and an increasing amount of melt during an average thaw event. This last point is understood by the fact that warmer air can hold an exponentially higher amount of water vapor. Therefore, as warmer and more humid air masses at the summit increase, thaw events will lead to more melt. Of course, this is not great news for people, businesses, and communities that rely upon good snow and a deep snowpack. And this work underscores the importance of rigorous scientific research to help individuals and communities prepare for the type of weather and snow conditions of the coming decades. A full description and documentation of this work is being prepared for submission to a peer-reviewed scientific journal by the summer. We will keep you, our members, informed of the completion of this work.

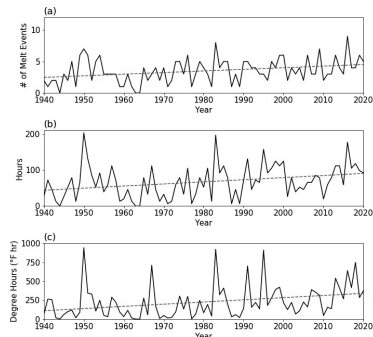


Fig. 2 Based on dewpoint (T_d) observations during December-February, (top) the number of thaw events, (middle) number of hours $T_d > 32^{\circ}\text{F}$, and (bottom) cumulative melting degree days.

Volunteer Services Are Always Appreciated

BY LINDA AND HANK DRESCH

Summer is finally here though parts of spring made us feel we were in the throes of winter. These are certainly interesting times which will be discussed for many years to come.

Our regularly scheduled Valley Volunteer membership mailings, that normally take place on the second Tuesday of the month, were suspended beginning with the one for April. These will resume at some point and all Observatory members are welcome to join us. If you're not on our email address list now, drop us a line and we'll gladly add you. Then you can expect to be advised when the mailings will resume as well as a date for clean-up around the Weather Discovery Center. Our thanks are extended to the Observatory staff who have taken on the mailings during this period of social distancing.

We'd also like to thank Kim Henry for filling in for us at the March mailing, while we were in Truckee, California watching our grandson compete as a U16 in the Junior National Nordic Ski Championships. Unfortunately, this event was terminated at the halfway point because of the coronavirus crisis. It was a major blow to all the competitors who had worked so hard over the season to qualify. We escaped by a few hours the four feet of snow that fell in Donner Pass as we fled to the lower altitude of Reno on our journey home.

Now is the time of year to focus on Seek the Peak, the Observatory's major fundraising event. It's startling to realize the 20th anniversary of the event will

occur in July. Brand Manager Krissy Fraser has been busy almost since last year's event with her planning and organizing. Although the current health situation has slowed down registrations, we hope these will resume at a good rate. As in previous years our volunteers will be involved in all aspects of the events preparation, registration and execution.

Over this past winter some of our Valley Volunteers have also aided other Mount Washington Valley organizations. These include the Bill Koch League Ski Festival at Great Glen Trails for over 500 youngsters, and the Bretton Woods Nordic Marathon at the Mount Washington Hotel. Special thanks are due to Linda Denis, Karen Franke, Kim Henry, Bob Santoro, plus Claire & Paul Bouffard for sharing their volunteer expertise.

Over the past few months our volunteers have included:

Peter Crane	Ava Honan
Floyd Corson	Bill Housum
Marietta & Bob	Marie Kaspar
Deegan	Gary MacDonald
Linda Denis	Jeann Perry
Linda & Hank	Jane & Ken
Dresch	Rancourt
Peter Fisk	Bob Santoro
Karen Franke	Jim Vanasse
Kim Henry	

*Valley Volunteer Coordinators
Linda and Hank Dresch can be reached
at hankandlinda@mountwashington.org
or by phone: 603-356-2137 ext. 208.*

20TH ANNUAL SEEK THE PEAK JULY 1-18

Seek the Peak is going virtual this year. As our largest annual fundraiser, the 20th anniversary of Seek the Peak will go on and, as always, there will be rewards and goals achieved, incredible stories shared and beautiful summits gained. But the reality is the COVID-19 pandemic has hit us financially and our ordinary hiking extravaganza will be a virtual experience this year. We are asking that you “Seek Your Peak” in whatever area allows you to stay safe and healthy.

Although we won’t hike together we will celebrate your hike and support. We need your help to create a celebratory Seek the Peak Prayer Flag in honor of this amazing event over the years. Participants can do their hike of choice between July 1-18 and send their information in on an 8.5x11 “commemorative flag” that they create of their hike (must be received by July 21, 2020). Past participants are also invited to share their name and favorite hike on a flag for inclusion. We will string one run of flags for each year reflecting participation of those years and on July 25 (weather permitting) we will fly all 20 STP prayer flags from the summit of Mount Washington in celebration of all of our participants who hiked near and far.

As you know the prize incentives and amazing gear giveaway is our way to thank you for your support and to encourage your efforts in helping us raise critically needed funds for MWO.

Each hiker is requested to raise at least \$200. In return, participants are rewarded with prizes and entry into drawings for a wealth of prizes. The first 500 hikers to raise the minimum receive a Seek the Peak backpack.

If you haven’t already, register at seekthepeak.org. Please note there may be modifications to Seek the Peak due to the coronavirus pandemic so check the website for the latest updates.

Please check the Observatory’s website mountwashington.org for the most recent information on other Observatory events this summer.



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The Local Grocer
The Metropolitan Coffee House
The Soaking Pot
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Walter & Christen Tipert
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White Mountain Oil & Propane
Wilderness Map Company
Zeb's General Store

...Thank you

10 Years

BY STEPHANIE TURNBULL FITZGERALD

Thank you to everyone who is celebrating 10 years of continuous membership with us! We are so grateful for your support over the last decade and look forward to another 10.

In April, I heard from Observatory member Robinson Brown from Minnesota. Rob had read the “Member Milestones” section in the spring 2020 issue of *Windswept* and noticed a name he recognized from growing up—25-year MWO member Jack Heffernan. Heffernan of Maine had gone to Camp Ropioa (now Camp Owatonna) in Harrison, Maine as teenagers about 65 years ago. Rob asked if I’d forward his contact information onto Jack in case he wanted to reconnect and I was happy to

help. The two were able to catch up over the phone with hopes of meeting up and sharing the views of Mount Washington from Jack’s home the next time Rob comes east.

The “Member Milestone” section has put me in contact with a number of members I don’t regularly speak to, but I never thought how it might put members in touch with each other. I put together this section to thank our long-term members, but it’s wonderful to know it’s also a chance for members to connect and come together in their appreciation for MWO. Questions about your membership? Let me know at sturnbull@mountwashington.org

10 Years...

David J. MacKenzie

Glenn Wrigley

Fernando Torti Jr.

Eric Fisher

Kathleen Letsky

Richard DeGruchy

Robert Mcleod

Edmond Talbot

Ronald N. Bailey

James Shuchman

Clif Mills

Paul A. Miller

Christine & Glenn Cordelli

Milton J. Camille

Donna E. Costa

John Novak &

Sue Ann Raring

Inge H. Judge

William Boynton

John Deuel & Bill Cruse

Gene McPherson

Rob Porter

Mike McMillen

Edward C. Dippold Jr.

Gregg Connary

David & Anne Van Wagoner

Robert Oakes

Larry Baker

Patricia Watson

Christopher & Valerie Wright

John Manouse

Mark Pinkham

Carolyn Marlowe

William D. Singleton

William J. Doherty

Eric and Barbara Pelton

Eleanor L. Blass

Bruce Childs

Jeffrey Swanson

G. M. Chamberlain

Linda & John Denis

Rodney N. Dyer

Margaret W. Taft

David Collinson

Malcolm C. Proctor

Susan S. Barnes

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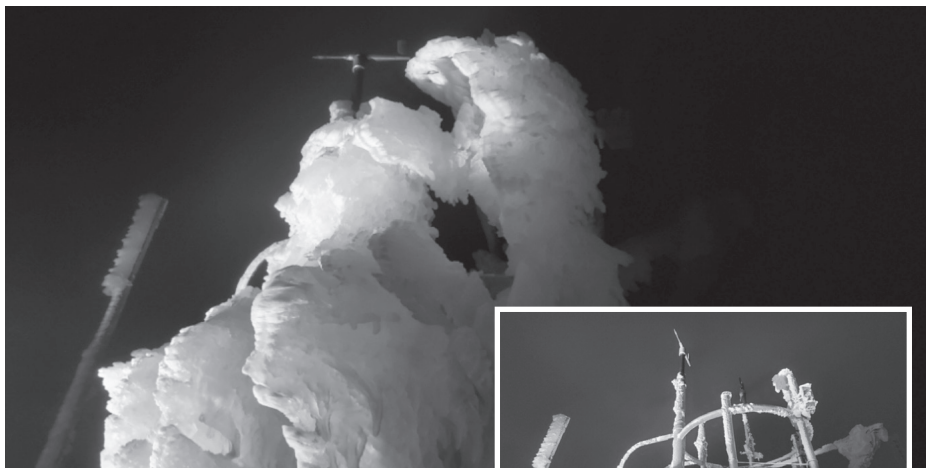
Tribute & Memorial Gifts

Mark Allen.....	In Memory of Robert Allen 10th Mtn. Div.
Charles & Susan Trenkle	In Memory of Stephen Allen
Meg Bennett	In Memory of Stephen Allen
Kathleen Curran	In Memory of Richard Curran
Jeffrey Leich.....	In Memory of John Howe
Jack Middleton.....	In Memory of John Howe
Guy Gosselin	In Memory of John Howe
Betty Rogers.....	In Memory of John Howe
Johanna Young.....	In Memory of John Howe
MaryAnne & Stephan Ulian	In Memory of John Howe
Joyce & Huntley Allan.....	In Memory of John Howe
Rebecca Verrill Smith.....	In Memory of John Howe
John Daniel	In Memory of John Howe
Tor Clark.....	In Memory of John Howe
Alex M. Burgess III	In Memory of John Howe
Jeff Lathrop	In Memory of Francis Lathrop
Anna Parker	In Honor of David Parker
Jessica Levesque.....	In Honor of Karl Wasner

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*which has a link to the online shop, SmugMug prints,
Washburn gallery and more*



Chip Shots

A prolonged ice storm battered the summit April 3 with surfaces getting coated in ice varying from a few inches to upwards of two feet. High winds, slick surfaces, and falling and flying ice chunks made deicing an exhausting task as staff spent a great deal of time into April 4 chipping, picking, scraping and hammering away. Weather Observer Ryan Knapp captured before and after photos of the tower during this memorable event. Even after all that work they still relied on sun and dry air to complete the deicing.

**"Alexa, ask
Mount Washington -
What is the forecast?"**

**"Alexa, ask
Mount Washington -
What was the
wind speed on
February 25th, 2019 ?"**

Now you can ask for current and
historical weather information or
even something about Marty the Cat.

See what Alexa has to say...

Photo: April 3, 2020

A vibrant rainbow arches across a lush green mountain valley. The rainbow's colors are bright and distinct, transitioning from red on the left to violet on the right. The valley below is covered in dense green forest, and the surrounding mountains are also green, though slightly hazy in the distance. The sky above is filled with soft, white clouds, suggesting a recent rain. The overall scene is peaceful and scenic.

***“And when it rains on your parade,
look up rather than down. Without
the rain, there would be no rainbow.”***

– Gilbert K. Chesterton

**The Trustees and Staff of the Mount Washington Observatory
would like to extend a special thank you for your continued
support during these challenging times.**

WINDswept

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