MWOBS®
MOUNT WASHINGTON OBSERVATORY

ANNUAL REPORT

FISCAL YEAR 2025

2024 Weather in Review

Average temperature: 31.3°F (-0.4°C)*

Coldest temperature: 17°F below (-17°F/ -27°C), which occurred on February 4th

Warmest temperature: 70°F (21°C), which occurred on June 19th

Total liquid precipitation: 94.94 inches

Total snowfall: 332.8 inches

Days with rain: 145

Days with snow: 137

Average wind speed: 33.0 mph

Highest wind gust: 147 mph, which occurred on February 29th

Days with gusts ≥73 mph: 143

Days with gusts ≥100 mph: 31

2024 was a leap year, and out of the 366 days:

Days noted as clear or mostly clear: 17

Days noted as partly sunny: 68

Days noted as mostly cloudy, cloudy, or obscured (fog): 281

24-hour periods where at least some amount of fog was reported: 330

*This would make the annual average temperature of 2024 the highest average annual temperature in our dataset (1932-present). The previous highest annual average temperature was 30.4F (-0.9°C) which occurred in 2012 and 2023. All data above has been verified by Weather Observer & Meteorologist Ryan Knapp.

Dear Friends,

As we look back over the previous year, it's clear 2024 was an incredible turning point that broadened our impact on weather research and learning. Our forecasts now keep millions of recreational enthusiasts and more communities safe across the White Mountains, New England, and beyond. We've also contributed solutions to systemic environmental problems in partnership with many other nonprofit, private, and governmental institutions.

Thank you for your commitment to our work. ***You*** make the difference in sustaining our efforts to inspire thousands of young students and adults with our educational programs, undertake groundbreaking research, and provide weather forecasts and data that fuel the national conversation.

Our educational programs and outreach events served thousands of young students, families, and adults. You can read more in the pages of this report, but here are a few highlights:

- Students from kindergarten to 12th grade take part in our growing membership program, inspired by our educators during year-round instruction in the classroom, virtually, in the field, and on Mount Washington.
- We started a first-of-its-kind Storm Scouts Summer Day Camp in partnership with the Conway School District, and it has received rave reviews.
- We continue to make the Northeast's highest peak more accessible for students all over New England with field trips for both our member and non-member schools, with an emphasis on citizen science snow observation in the wintertime.
- We continue to expand our offerings for youth educators, with opportunities for leaders to earn certifications in wilderness medicine on the summit each fall, along with winter and summer teacher professional development programs.
- Our Overnight EduTrips, Partner Led Climbing Trips, and Science in the Mountains programs provide inspiration and meaningful learning for adults throughout the year.

Our research has led to cutting-edge insights in weather and the environmental sciences. Read more in this report, including how:

- We've launched a brand new Undergraduate and Graduate Adventures (in meteorology) program for university students to undertake hands-on research with us while learning new skills.
- Our internship program continues to grow and offer both high school and university students new opportunities, including joint experiences with the Appalachian Mountain Club, Hubbard Brook Ecosystem Study, the United States Forest Service's Mount Washington Avalanche Center, and the National Weather Service's Forecast Office in Gray, ME.
- We're modernizing and expanding our Mount Washington Regional Mesonet, our network of automated weather stations, to more than 50 locations with new capabilities including ground-based doppler LiDAR located at Bretton Woods Ski Area. This infrastructure represents the future of weather science.
- We're developing new wind instrumentation for use around the world and forming lasting partnerships with the United States Air Force, United States Army Corps of Engineers, University of Maine, Eversource Energy, and Northeastern University's Roux Institute to test technology and investigate topics such as AI in weather forecasting.

We've expanded our forecasting beyond the recreational community to keep people across New England safe. A few highlights in this report include how:

- We're now providing daily and seasonal forecasts with partners at New Hampshire Public Radio and the Vermont Radio Group in addition to our Higher Summits Forecast broadcast to partners in the region.
- Later this summer, we'll produce the first annual White Mountains Almanac that examines the climatology and biology of our region for visitors, educators, and researchers.
- This year, we will begin developing new media content for online and television audiences and a weekend recreational forecast for viewers in New England's metropolitan areas.

The year ahead holds so much promise for us even as our nation undergoes a time of a transition. We continue to monitor impacts to our work, including the loss of funding for Americorps Service Members who help to teach in our educational programs. **You remain the reason we are optimistic.**

We are grateful for all that your support has enabled us to accomplish. Our work simply can't be achieved without you and the partnership of many organizations including the Mount Washington Cog Railway, Mt. Washington Auto Road, and New Hampshire State Parks. We thank them, and you, for an incredible year of growth. And we look forward to much more in the year ahead.

Sincerely,

Drew Bush, Ph.D.
Executive Director

Erica Broman, Ed.D.
President, Board of Trustees

A year of new partnerships and educational program growth

School memberships grew from seven to **22 member schools.**

Field trip programs grew from **12 to 32 trips** annually, including **five winter trips**. In total, we hosted **830 students** on field trips to our summit weather station.

Our team delivered **174 school day** programs and **53 after school programs.**

Forty-six virtual programs engaged **over 1,600 students** across the U.S. and Canada.

Six EduTrips welcomed 46 guests to the summit for overnight trips last winter, featuring programs like storm science and mountaineering essentials.

Our science educators introduced **Storm Scouts: Extreme Weather Camp**, a new weather science summer camp for fourth through eighth grade students in partnership with the Conway School District, with "base camp" learning and summit excursions.

For the first time, **weather station tours** were offered to the general public, increasing tours from 120 in 2023 to **260 in 2024**. Our team gave tours to **more than 1,700 people** last year.

We provided **professional development to 55 K-12 educators** through six Arctic Wednesdays (winter), two overnight Peak Perspectives (summer), and three workshop programs.

Students take in the views of the northern Presidential Mountains during an end-of-year field trip.

YOUR IMPACT: Helping more kids discover weather science

Your support made it possible for us to partner with TRIO Upward Bound to bring six students from across Maine to our summit weather station, where they learned about meteorology, weather instrumentation, and the use of LiDAR to generate 3D models. **TRIO Upward Bound** provides students from low-income communities and/or first-generation college households with college preparation assistance, mentoring programs, and exposure to a wide variety of career paths at no cost to students.

Upward Bound students explore our remote weather station at 4,000 feet in elevation on their way to our summit weather station. Photo courtesy of Erin Towns.

> **"The sense of accomplishment and pride gained from experiences like this is invaluable, often sparking transformative, life-changing moments."**
>
> **— Erin Towns, Upward Bound Trip Facilitator**

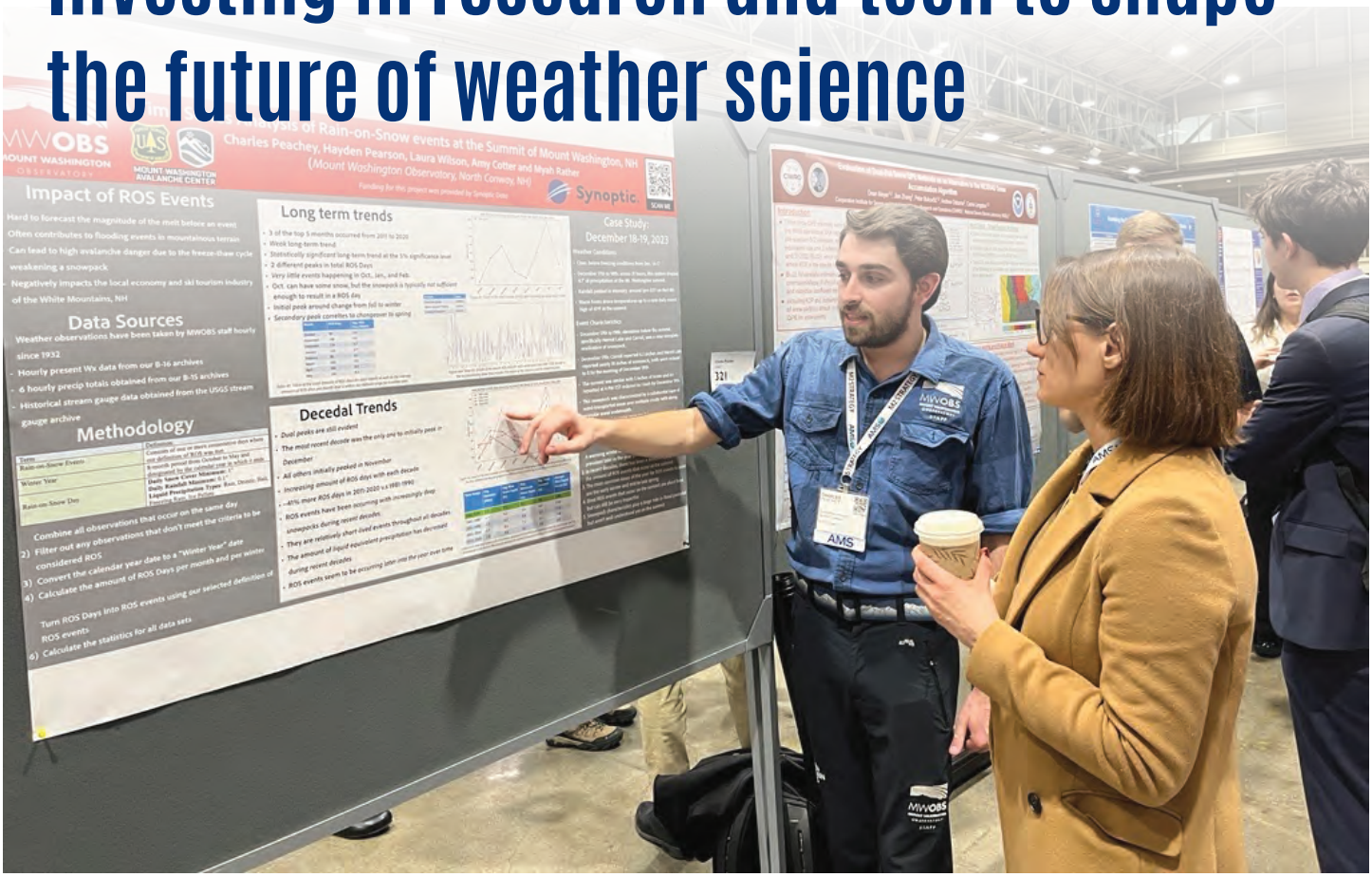
More than 2,600 viewers attended our monthly *Science in the Mountains* virtual program. The program saw **2,900 YouTube views.**

Our education team completed year two as an anchor institution in the NASA-funded **Learning Ecosystems Northeast** network, building data literacy resources for youth educators.

We collaborated with the **Mount Washington Valley Youth STEM Expo** and regional nonprofits to offer the first **Climate Exploration Track Award**, helping students to take on climate-related science projects.

Students from Worcester Polytechnic Institute worked with our team on a **Mount Washington Summit Visitor Experience Project**, evaluating accessibility, engagement, and future exhibits for our summit museum.

Investing in research and tech to shape the future of weather science



Charlie Peachey, MWOBS Weather Observer and Research Specialist, presents rain on snow research findings at the 2025 American Meteorological Society's Annual Meeting.

Our new educational research initiative, **the Undergraduate and Graduate Adventures program**, offers hands-on learning in atmospheric science, mountain meteorology, instrumentation, IT, broadcasting, and science outreach.

We **expanded our internship programs** to include six interns per summer term, and four interns per fall and winter terms, significantly **increasing our research capacity** and regional collaboration.

Two of our interns **completed joint research projects** with the Mount Washington Avalanche Center, Appalachian Mountain Club, and Hubbard Brook Experimental Forest, strengthening our collaboration **across environmental science disciplines**.

Last winter, our **interns contributed hands-on, original research** to our snow-to-liquid ratio trend analysis, rain on snow study, upslope snow classification, and the composition of the first **White Mountains Almanac**.

Our new yearly almanac, planned for fall 2025 publication, connects our atmospheric data with ecological and phenological records from the Appalachian Mountain Club and Hubbard Brook Experimental Forest. The project **documents climatological and biological shifts**, thanks to a joint internship funded by The Cabot Family Charitable Trust.

New intern research pages at mountwashington.org enhanced our science communications. Co-developed by interns and staff to highlight active investigations, field methods, and data visualizations, this content **showcases the real-world impact of our funded research**.

An expedition team installed one of MWOBS's custom-designed pitot-static tube **anemometers on Mount Aconcagua** (22,769 ft) in Argentina last winter, supporting high-altitude wind research and **extending our observational reach into the Andes**. Dr. Baker Perry, a National Geographic Explorer, co-led the expedition to better understand water availability in the Andes Centrales, a region critically impacted by a 15-year mega-drought.

YOUR IMPACT: Instrument innovation across continents

Tom Matthews, left, Baker Perry, Pierre Pitte, and Mariano Castro celebrate after installing the new weather station on the summit of Aconcagua. Photo courtesy of Pablo Betancourt.

"We really have not had observations from these elevations in the Andes, and this is a huge opportunity to expand our knowledge, our observational networks, into this critical part of the world."

— Dr. Baker Perry, professor of climatology at the University of Nevada, Reno

Our new **WindCube Doppler LiDAR** unit will soon be installed near Bretton Woods Ski Area, enabling 3D wind profiling across the Presidential Range. Funded by a federal appropriation (with support from U.S. Senator Jean Shaheen), the WindCube **will advance our research of wind dynamics** and prepare us to join national data buy programs.

Working with the U.S. Air Force and Mesotech International, our team **tested field-deployable weather instrumentation** under extreme alpine conditions. We are actively building this partnership **to expand our role as a strategic testbed** for military and Arctic-focused research initiatives.

We also **reestablished our long-standing partnerships** with the U.S. Army's Cold Regions Research and Engineering Laboratory (CRREL) and Engineer Research and Development Center's Environmental Laboratory, developing proposals to serve as a **strategic testbed for national defense and research priorities**.

Our role in regional and national research networks is expanding through new collaborations with the University of Vermont, Roux Institute, and Howard University. These partnerships entail interdisciplinary work across **atmospheric science, data infrastructure, and environmental sensing**.

New instrumentation will soon be deployed across our growing network of remote weather stations (mesonet) **to monitor air quality and precipitation**, including ozone and particulate matter. This will enhance our environmental monitoring portfolio and support research into air quality, storm dynamics, and long-term atmospheric trends.

Expanding our forecasts to keep New Englanders safe

Weather Observer Alexis George checks our RM Young wind sensor.

Over the course of the year, **we reported 8,760 hourly observations, published 1,460 specialized forecasts**, and performed all data quality checks (2/day, 1/week, and 1/month).

Weather station facility improvements made possible by your generous support included installation of new ceiling tiles, storm windows, observer bunk room windows, desks, light fixtures, thermostats, painting, tower drainage, and new equipment in our administrative office for **historical collections preservation**.

Thanks to funds approved by U.S. Congress, we purchased a **new PistenBully snow cat**, which will replace our aging machine to ensure **safe wintertime passage** to and from the summit for our staff and guests.

We started **daily statewide forecasting** for New Hampshire and Vermont, providing audio and text forecasts to **New Hampshire Public Radio** and **Radio Vermont Group**.

Numerous media outlets visited our summit weather station and produced original stories about our weather forecasting and data for the recreation community, including regional coverage on NH PBS and WMUR, national coverage on FOX Weather, and international coverage on German Public TV.

Hundreds of community members attended Observatory events, including our **Fall Gathering** at Tin Mountain Conservation Center, **joint environmental science presentation** with Seacoast Science Center and the Forest Society in Portsmouth, and **public talk by author Ty Gagne** in collaboration with Blue Hill Observatory near Boston.

YOUR IMPACT: Increasing real-time data in the mountains and beyond

Five new remote weather monitoring stations went live last fall along the Mount Washington Cog Railway, on the western side of New England's highest peak. The expansion of the Mount Washington Regional Mesonet commenced our broader project to **enhance weather monitoring in the White Mountains and across New Hampshire**. During the next four years, 11 original stations will be modernized, and the network will be expanded to more than 50 stations, with plans to broaden the mesonet into a statewide monitoring network. The stations collect critical data to enhance forecasting, research, and regional operations.

Keith Garrett, MWOBS Director of Technology, installs a new remote weather station at 4500' in elevation on Mount Washington.

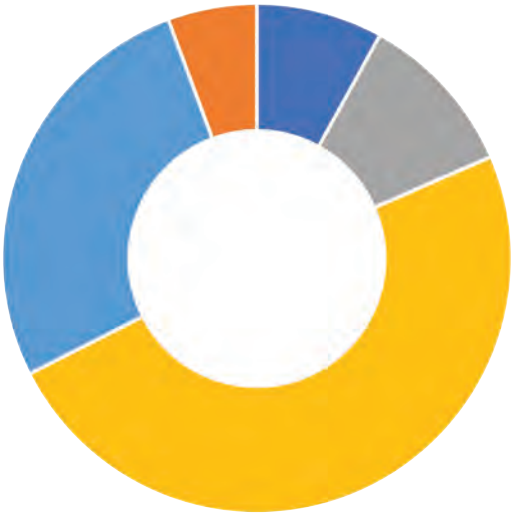
> **"The expansion of the Mount Washington Regional Mesonet system is a significant step forward in monitoring and understanding the complex weather patterns of the White Mountains and their impact on the broader New England region."**
>
> **— Janel Lawton, Director of Outdoor Recreation Industry Development**

A group of trail runners make their way across the rocky terrain at dusk. Photo courtesy of Joe Klementovich.

Fiscal Year 2025 Reporting

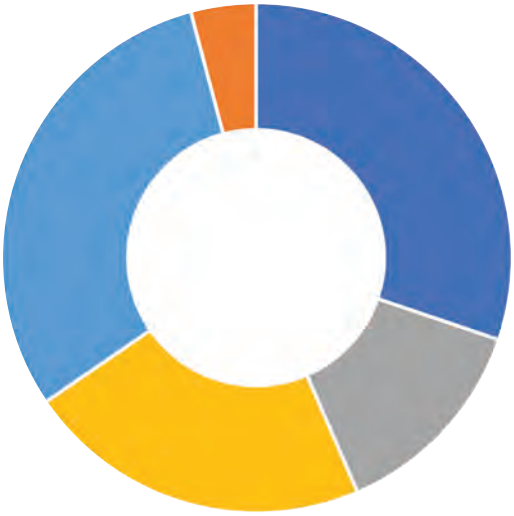
April 2024 through March 2025

Revenue



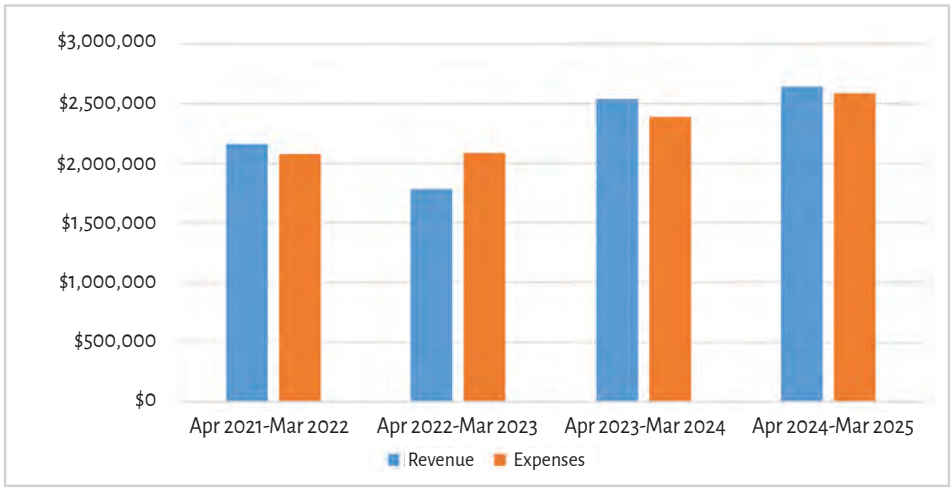
Weather Station	$707,459	27%
Retail	$148,957	6%
Facilities	$211,447	8%
Education	$275,666	10%
Advancement	$1,293,612	49%
Total Operating Revenue	$2,637,140	

Expenses

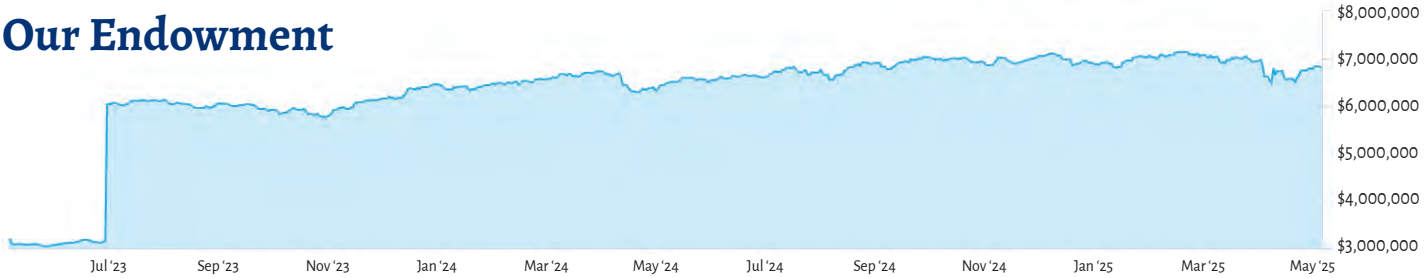


Weather Station	$787,986	30%
Retail	$106,542	4%
Facilities/Administration	$781,144	30%
Education	$344,239	13%
Advancement	$565,604	22%
Total Operating Expenses	$2,585,514	

Annual Trend



Our Endowment



Note: In July 2023, we invested a large portion of the bequest received from the Sheldon Family Estate into our endowment.

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Jackie Bellefontaine *School Programs Coordinator*
Alexandra Branton *Weather Observer & Education Specialist*
Jay Broccolo *Director of Weather Operations*
Drew Fulton Bush, Ph.D. *Executive Director*
Charlie Buterbaugh *Director of External Affairs*
Mike Carmon *Summit Weather Operations Manager*
Amy Cotter *Weather Observer and Education Specialist*
Peter Crane, Ph.D. *Curator*
Olivia Dodge *School Programs Educator*
Ellen Estabrook *Communications Manager*
Greg Fitch *Facilities Manager*
Brian Fitzgerald *Director of Education*
Keith Garrett *Director of Technology*
Alexis George *Weather Observer & Meteorologist*
Ryan Knapp *Weather Observer & Meteorologist*
Misha Leyfer *Lead School Programs Educator*
Katie Marsh *Administrative Assistant*
Carissa Milliman *Development Coordinator*
Nimbus Resident *Summit Cat*
Charlie Peachey *Weather Observer & Research/IT Specialist*
Karl Philippoff *Weather Observer & Research/IT Specialist*
Jon Powers *Transportation Manager*
Brenda Sullivan *Director of Finance & Administration*
Alexander Templeton *School Programs Educator*
Katherine Turnbull *Library Cataloger*
Brandi Webb *Museum and Retail Manager*

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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.

Thank You, Members

We are deeply grateful for the generous support that we receive from each of our members. This year, to help reduce administrative time and save paper, **we've published our full list of members online.** The list also includes our volunteers, partners, sponsors, and grants. To view the list, please visit **mountwashington.org/annualreport**, or scan the QR code to the right.

Thank You, Volunteers

Volunteers play an important role in ensuring critical work continues effectively each year. This includes summit operations, outreach, events, and serving as stewards and advocates for Mount Washington Observatory. From April 2024 to March 2025, **our volunteers contributed a total of 3,959 hours of support**. We are incredibly thankful to have their help.

> It's about the people. The crews have become friends over the years, and we still stay in touch with many of them. It's the friendships, the personal connections, and the opportunity to just be part of it…
>
> **— Mike and Sue Zlogar, 20-year volunteers from Amherst, Massachusetts**

> The Observatory is a very vital resource for the whole Northeast community because of the weather observations and reports they provide to people utilizing the mountains. The mission is just so very important that it's a pleasure to be a volunteer.
>
> **— Hank Dresch, 20+ year volunteer from Jackson, New Hampshire**

MWOBS®

MOUNT WASHINGTON OBSERVATORY

MISSION

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.

PURPOSE

We exist to gather, disseminate, and analyze daily weather data; to contribute to the critical, long-term weather and climate record essential to scientific understanding of weather and climate in a unique, extreme environment.

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