



**December 2023**

Promoting the understanding and stewardship of forest ecosystems through scientific research and monitoring, policy outreach, and education

## **'Tis the Season for Year-End Giving!** **Your Generosity Keeps Science & Outreach Strong at Hubbard Brook**



*Photo of Hubbard Brook headquarters by Amey Bailey*

For more than six decades, long-term ecosystem monitoring at Hubbard Brook has painted a vivid picture of our changing natural world. In combination with innovative experiments designed by academic collaborators, the atmosphere is crackling with scientific curiosity, hope, and possibility.

The Hubbard Brook Research Foundation (HBRF) supports and amplifies the science by providing research housing, lab space, communications training for undergraduate and graduate students, media and policy outreach, activities for K-12 teachers and students, and community programs that connect the science to our economy and culture.

In 2023, HBRF linked Hubbard Brook to emerging social and environmental issues by conducting:

- air and water policy briefings in a time of fire and flood,
- forest-based outreach to New Americans in a time of political migration,
- communication workshops for environmental students in a time of youth action.

**Thanks to you, Hubbard Brook is meeting the moment.  
We are putting science to work, and your investment is a key ingredient!**



Click the Santa Salamander to make a year-end gift today!

Your investment will power our progress!

*Illustration by Raisa Kochmaruk*

## UNH Study Leads to Arthropod Photo ID Guides



Research on ground active arthropod communities at the Hubbard Brook Experimental Forest, conducted by UNH Master's student Christopher Ziadeh, inspired two new arthropod identification guides for species in the summer soil and under winter snowpack.

Arthropods belong to a phylum of invertebrate animals that includes insects, arachnids, and crustaceans. As illustrated in the panel above, ground active arthropods found in the

*subnivium* layer (just beneath the snowpack) include centipedes, spiders, beetle larvae, rove beetles, and wingless flies. In the summer, rove beetles, carrion beetles, crickets, flies, and ground beetles inhabit the soil.

Christopher's field guides complement his new paper, *Distinct Communities Under the Snow: Describing Characteristics of Subnivium Arthropod Communities*, in review.

To access the guides, click [here](#).

Click the image below for a video featuring Christopher's winter collection protocol.



Top: A selection of photos from the ID guides

Illustration: seasonal arthropod habitats by artist Naiade Caparelli

Bottom: Screenshot from "The Importance of Snowpack" video

## CASTNET is Back Online!



After eighteen months on pause, Hubbard Brook's CASTNET site is coming online, thanks to a coordinated effort from the Hubbard Brook Ecosystem Study, the U.S. Forest Service, and the Hubbard Brook Research Foundation. EPA funding for this long-term air quality monitoring program was suspended at Hubbard Brook in May 2022, causing a lapse in our 35-year record of atmospheric pollution.

**CASTNET** (Clean Air Status and Trends Network) is a system for monitoring air pollution across 99 sites in the U.S. and

Canada. The CASTNET site at Hubbard Brook was installed in 1989 and records hourly ozone and weekly dry nitrogen and sulfur deposition. Following the Clean Air Act Amendments of 1990, CASTNET has chronicled declining concentrations of these pollutants during acid rain recovery at Hubbard Brook. CASTNET remains essential for widespread air quality monitoring and for pinpointing urban and rural pollution hotspots. Recent wildfires underscore the urgent need for enhanced surveillance.

Working together to raise awareness, U.S. Forest Research Ecologist John Campbell, Syracuse University Professor of Environmental Systems Charles Driscoll, Hubbard Brook Research Foundation Executive Director Anthea Lavalley, and U.S. Forest Service Eastern Region Air Quality Specialist Ralph Perron, conducted a series of science-to-policy briefings and other air quality outreach. We are delighted that funding for this

essential monitoring program has been restored! Measurements of ozone began in October 2023, and dry deposition measurements will resume in January 2024.

*Above: John Campbell speaks with staff from the office of U.S. Senator Shaheen at the CASTNET site in October 2023. Photo by Anthea Lavallee*

## Outreach Highlight

### ***Third Welcome to the Woods Trip a Success***



The Hubbard Brook Research Foundation led its third *Welcome to the Woods* forest field trip on October 21st in Franconia State Park for 49 Ukrainian refugees. In partnership with [Building Community in NH](#), this initiative welcomes refugee families from Afghanistan, Bhutan, Burundi, the Congo, Rwanda, and Ukraine to our Northern Forest landscape. The trip was organized by HBRF Education Manager Brendan Leonardi and U.S. Forest Service Technician Amey Bailey, with support from HBRF Communications Specialist Raisa Kochmaruk and Chris O'Rourke from the U.S. Forest Service Campton Office. Despite the foggy mountaintop views, spirits were high, and the day was filled with hikes, waterfalls, good cheer, and new connections. *Welcome to the Woods* is designed to help New Americans and their families learn more about and enjoy NH forests.

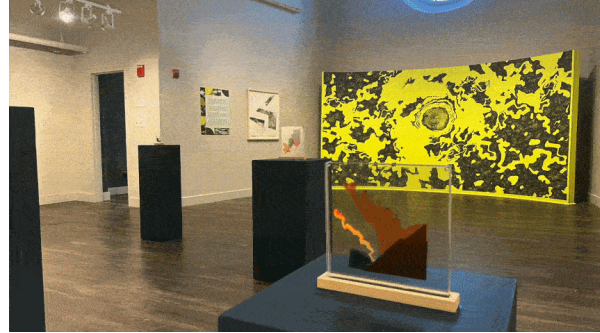
*Above: A mother and daughter from Ukraine begin their ascent to Artist's Bluff viewpoint in Franconia State Park. Photo by Raisa Kochmaruk*

## Artwork from the Field

### ***Extending Ecology Exhibit at the Museum of the White Mountains***

*"The exhibition underlines how deep, intimate engagement with the natural science and creativity of a place can offer and extend insights into more ecological ways of being in the world."*

*--Dr. Rich Blundell*



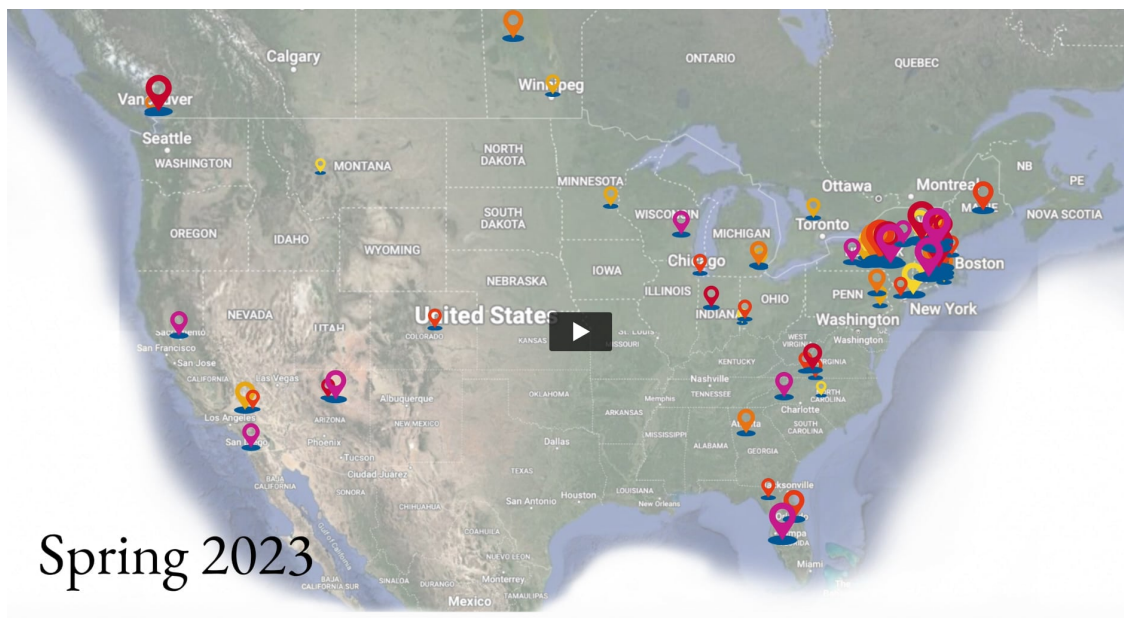
The Museum of the White Mountains, located in Plymouth, NH, is featuring Hubbard Brook Experimental Forest-inspired artwork and writing by environmental artist Rita Leduc and ecologist and cultural communicator Dr. Rich Blundell.

The Extending Ecology exhibition is a culmination of a two-year collaboration between Leduc, Blundell, and the forest.

Click [here](#) to learn more about the project.

*Above: Detail from Extending Ecology Exhibit. Photos by Raisa Kochmaruk*

## Young Voices of Science Update



**KEY:** Yellow markers represent participant home institutions from the inaugural 2020 cohort. Markers get darker over the course of YVoS' 4-year arc. Larger markers represent schools with two or more students.

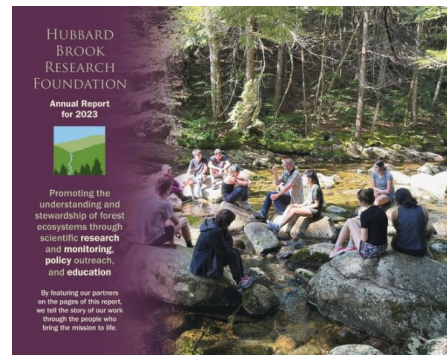
Hubbard Brook's *Young Voices of Science* (YVoS) initiative received a record number of applications for the fall 2023 cohort, thanks to the outreach work of HBRF's YVoS Specialist Dayna De La Cruz. The YVoS team has been working hard to accommodate the increased interest by growing our program capacity and adding value for participants. Watch the animation above to see participation across and beyond the United States since Fall 2020! If you or someone you know is interested in participating in YVoS, apply for the Spring 2024 cohort in early February or contact YVoS Specialist [Dayna De La Cruz](#). [Click here](#) to learn more about the program and its participants.

# Parting Shots: Hubbard Brook in Autumn



*Above: A collage of autumn photos by Joe Klementovich*

HBRF's Annual Report for 2023 is hot off the presses! [Click here](#) to request a printed copy, or click the cover photo on the right to page through the digital version.



As always, thanks for your interest in Hubbard Brook. Please feel free to contact us with any questions, ideas, or suggestions, and help us to spread the word by forwarding this email to a friend.

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U.S. Forest Service

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Anthea C. Lavallee  
HBRF Executive Director

The Hubbard Brook Research Foundation is a nonprofit organization dedicated to supporting the Hubbard Brook Ecosystem Study.



Hubbard Brook Research Foundation | 30 Pleasant St., Woodstock, VT 05091

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