



**ADVENTURE SCIENTISTS**

EXPLORE. COLLECT. PROTECT.

# TREE TRACKING

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**TULIP POPLAR REPORT**

JUNE 2024



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# SUMMARY

In 2023, Adventure Scientists sampled tulip poplar (*Liriodendron tulipifera*) trees across 21 states in the eastern United States. This project marked the sixth year of the Tree Tracking (formerly Timber Tracking) project, which is an ongoing, multi-year effort to mobilize, train, and equip volunteers to collect samples from trees for scientific partners to create vital databases on tree species that will help protect forests, promote sustainable harvest, and conserve biodiversity.

From May through December 2023, Adventure Scientists' volunteers collected 1,134 leaves and 126 twig samples from tulip poplar trees across the eastern United States. The samples are being analyzed by scientists in the United States Forest Service Research and Development to create a genetic and chemical reference library that will play a pivotal role in verifying the legality of harvested tulip poplar and addressing issues of illegal logging in other regions. Because legal harvesting occurs across its range and is a significant contribution to timber exports, conserving tulip poplar is vital to ensure sustainable practices and prevent illegal harvesting.



# PROJECT CONTEXT

Tulip poplar, also known as tulip tree or tulipwood, is a towering hardwood native to the eastern United States, with a range that extends from Vermont, west to southern Ontario and Michigan, and south to central Louisiana and northern Florida. Due to its distinctive yellowish color, straight grain, and fine texture, tulip poplar timber is prized for its versatility in woodworking.

Lightweight and easy to work with, tulip poplar is a desirable choice for furniture, cabinetry, and other woodworking projects. Legal harvesting of tulip poplar occurs across the species range, with the majority of commercial activity occurring in western Virginia and North Carolina (AHEC, 2024).



# PROJECT CONTEXT

In 2020, tulip poplar was the third most exported species of hardwood from the United States, accounting for nearly 15% of total timber exports. Widely used domestically, tulip poplar is gaining popularity in the global timber market as a replacement for light tropical hardwoods that are often destructively or illegally harvested.

To support the shift toward sustainable and legally sourced tulip poplar, it is essential to verify that the timber being brought to market is the correct tree species and was harvested in a legal location.

In 2023, the Tree Tracking project mobilized volunteers to collect tulip poplar samples across the species' range. These samples produce a genetic and chemical reference library that can be used to rapidly identify the tree species and locate the harvest source within tens of kilometers. This reference library supplies data critical for addressing the sale of illegally harvested tropical hardwoods.

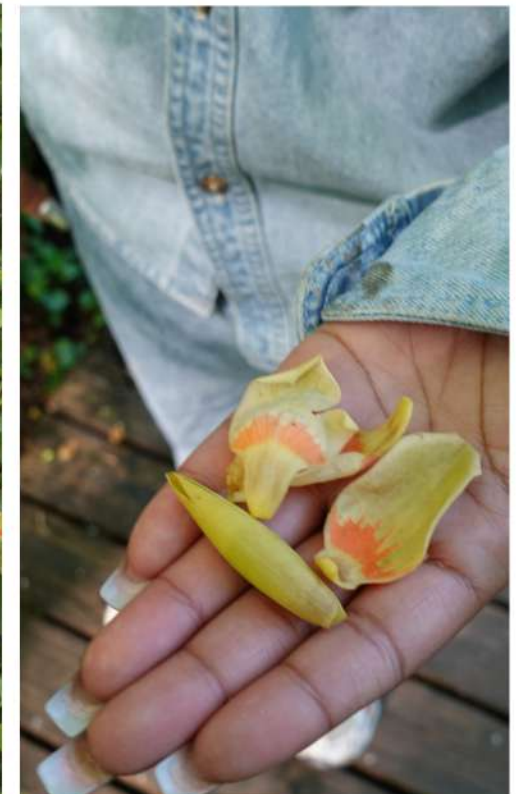


# SPOTLIGHT ON ECOSYSTEM SERVICES

Tulip poplar provides a variety of benefits, referred to as ecosystem services. These services are grouped into four categories: provisioning; regulating; supporting; and cultural (MEA 2003).

Flowers are attractive to pollinators, including bees and butterflies, and can yield high quantities of nectar.

Birds and small mammals, such as squirrels, feed on tulip tree seeds, and deer browse on saplings or low branches. Because tulip poplar is fast-growing, relatively free of pests, aesthetically pleasing, and a valuable nectar producer, it is commonly used as an ornamental and has a long cultivation history.



# PROJECT DESIGN

## Where were tulip poplar trees sampled?

Tulip poplar trees were sampled in 21 states throughout the eastern United States. Samples covering a broad geographic range were collected to obtain a genetically diverse tulip poplar dataset. Adventure Scientists obtained necessary permits to sample trees in national forests, state forests, state parks, and wildlife management areas.

## How were volunteers trained?

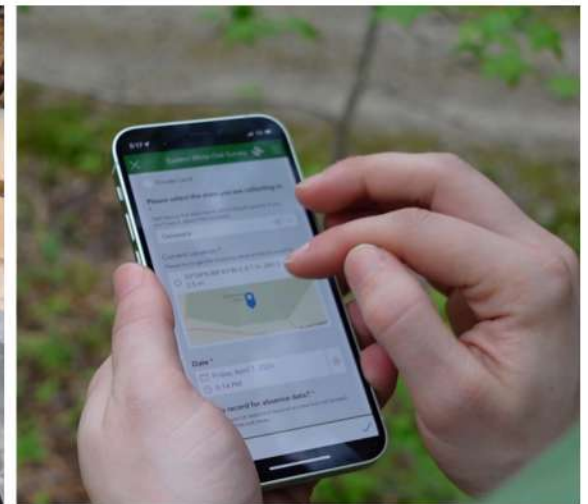
After volunteers applied and were approved for the project, they were required to complete a comprehensive online training prior to data collection. The training included background on the project's conservation impact, tulip poplar identification, project technology and permits, and a step-by-step guide to data collection procedures. As a new initiative this year, volunteers also had the option to participate in live virtual training sessions conducted by Adventure Scientists staff. These sessions focused on teaching volunteers the project protocols and provided opportunities for them to ask questions.



# PROJECT DESIGN

## What samples were collected?

Throughout the tulip poplar growing season, from May to September 2023, volunteers collected two leaves from each tree. Then, during the dormant season from October to December, they collected two leaves and a twig from each tree sampled. Select volunteers across the species' range were provided with an increment borer to extract a tree core for genetic sampling. Using the ArcGIS Survey123 mobile app, volunteers recorded accurate GPS coordinates of each tree, diameter at breast height, and captured photos of every tulip poplar tree they sampled.







Photos: Left to right

Tubes with samples of ground wood awaiting DNA extraction. Dr. Laura Hauck, genetics laboratory manager at the USFS Pacific NW Research Station transferring tree DNA for final analysis. Dr. Cronn working on the DNA extraction process.

# DATA ANALYSIS

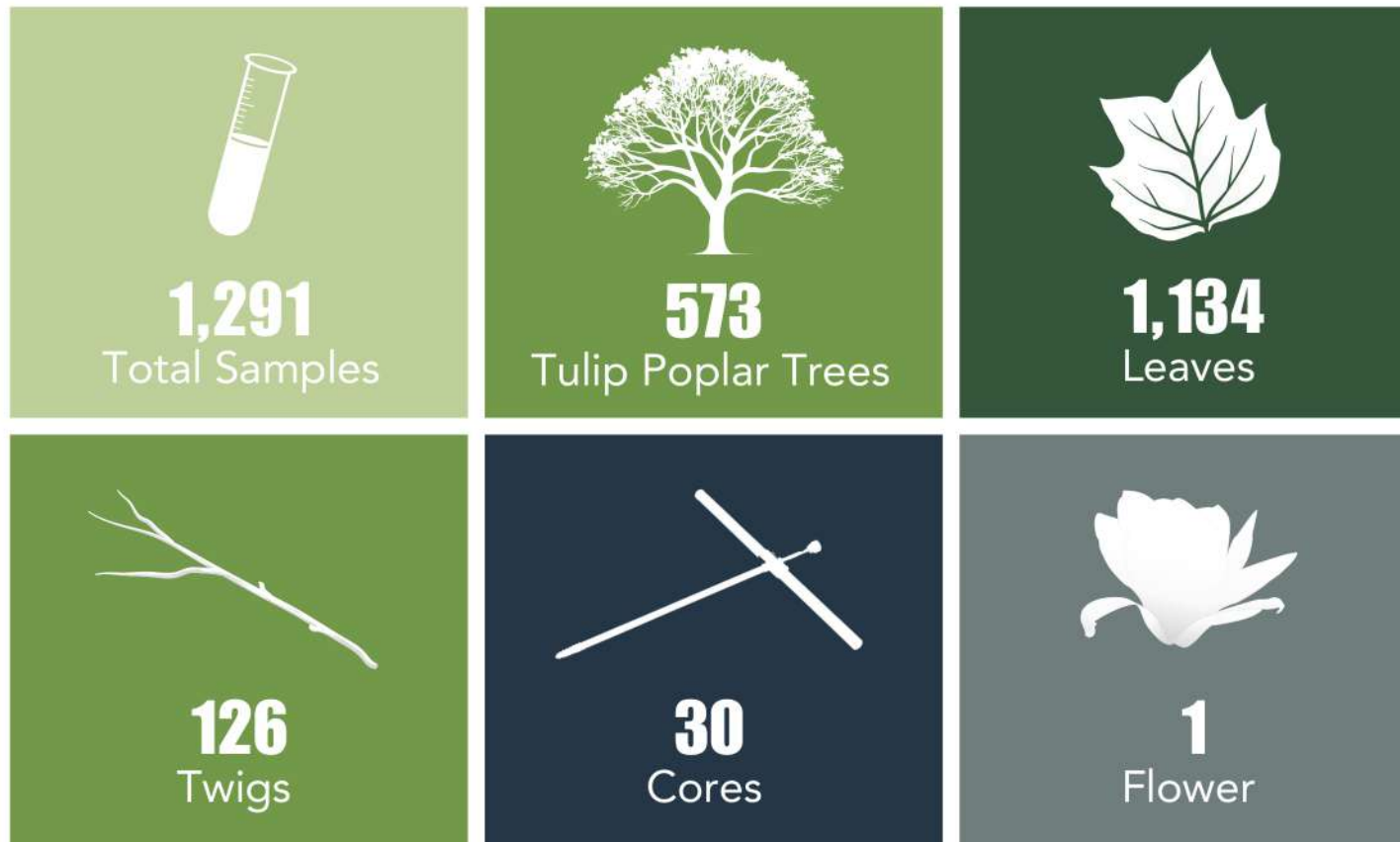
## How were samples analyzed?

Tulip poplar samples were sent to the project partner, Dr. Richard Cronn at the U.S. Forest Service Pacific Northwest Research Station in Corvallis, Oregon. Dr. Cronn and Dr. Vikram Chhatre at the U.S. Forest Service Northern Research Station are performing genetic analyses on the samples to create a reference library of tree DNA for tulip poplar throughout its home range. This genetic database will allow tulip poplar timber to be traced to the original location where it was harvested, supporting sustainable, legal timber markets.

# DATA COLLECTION & RESULTS

How many samples were collected?

Adventure Scientists' volunteers sampled tulip poplar trees across 21 states. Volunteers collected a total of the following:

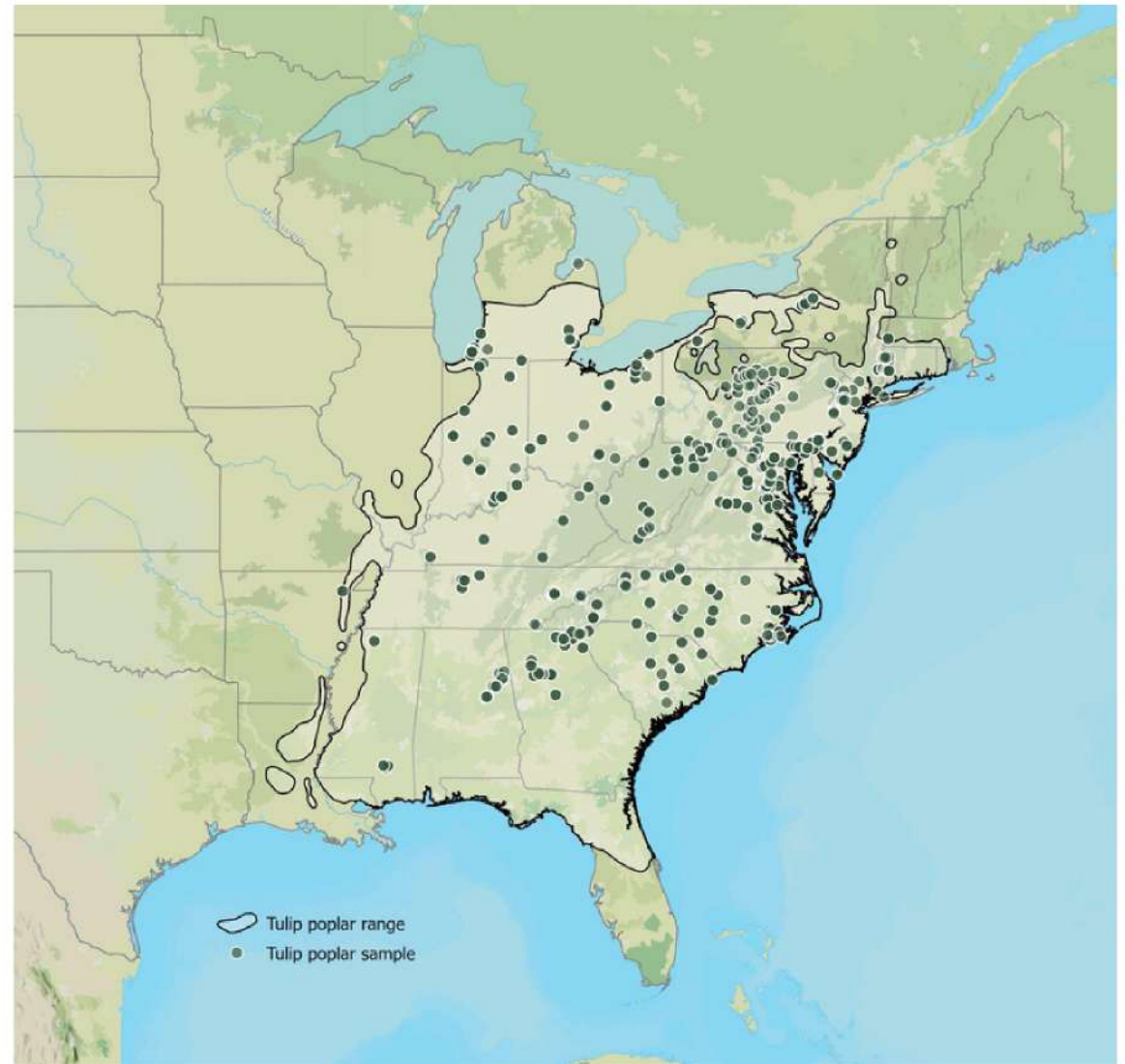


Volunteers submitted 1,017 samples during the growing season (May through September) and 274 samples during the dormant season (October).

# DATA COLLECTION & RESULTS

## How did we meet project goals?

The Tree Tracking: Tulip Poplar project aimed to collect samples from a minimum of 500 tulip poplar trees, including 100 tree cores, spanning the species' range to establish a comprehensive genetic reference library. Thanks to our volunteers' remarkable dedication, we achieved and exceeded our overall targets for tulip poplar collection.



**Tulip Poplar Sampling Locations**



# VOLUNTEER EXPERIENCE

In January 2024, following project completion, Adventure Scientists surveyed volunteers through an online form to gain feedback on volunteer experience (53% response). Highlights included the following:



**84%**

of volunteers felt that they contributed to the scientific community



**84%**

of volunteers who gained a greater understanding of a conservation issue



**100%**

of volunteers felt that they had contributed to a national conservation database



**4.6/5**

Average experience rating



“

I appreciate how Adventure Scientists makes the average person feel as if they are capable of doing really great things for research and the environment. I feel many people don't realize how well-equipped and capable they truly are.

**NICOLE SCHMID,  
A DELAWARE VOLUNTEER**

# OUR SCIENTIFIC PARTNERS



## RICHARD CRONN

RESEARCH GENETICIST, UNITED STATE FOREST SERVICE

*"In every project and in nearly every way, A.S. has exceeded my expectations. Y'all are incredibly capable collaborators, and you have brought diverse skills and enormous enthusiasm to the timber projects. Your ability to train and manage volunteers is impressive -- I'm not sure I've seen an organization that can so capably coordinate small armies across such diverse environments and across such huge geographic spans."*



# VOLUNTEER QUOTES

When volunteering with Adventure Scientists, I found myself in familiar forests, but with active eyes and ears, I noticed more than I ever had. Over the years of being outdoors, I was becoming jaded and this is just what I needed to see the forest with new eyes again. It also led me to spaces I didn't know had human impact and allowed me and my team to do a cleanup and restore the area back to the way it was intended.

**CHRIS HOLBROOK, A TENNESSEE VOLUNTEER**

I truly enjoy volunteering with Adventure Scientists. I am so grateful to be a part of the process and cannot wait for the next Tree Tracking Project!!

**ACACIA FIKE-NELSON, A NORTH CAROLINA VOLUNTEER**

When I took my job as Director of Conservation at a park, one of the first projects I had our team take on was the tulip poplar project. We had the perfect opportunity to be a part of a larger project and learn about our local forest. As a result, I had 3 people new to the project help me collect.

**JAXSON MACK, A NEW YORK VOLUNTEER**

# ACKNOWLEDGMENTS

## Tulip Poplar Acknowledgment

This project was funded in part by Lyda Hill Philanthropies, the Cornell Douglas Foundation, the Clif Family Foundation, and private donors who support Adventure Scientists. We are grateful for their generous support of this work and Adventure Scientists' mission.

We would also like to thank MiiR, Sunski, Outdoor Research, AllTrails, Mystery Ranch, Clif Bar, and GaiaGPS for helping us express appreciation to our volunteers with great incentives throughout the field season.

We especially thank our scientific partner and dedicated research teams, particularly Richard Cronn at the United States Forest Service.

Finally, we couldn't have gathered this critical data without our amazing volunteers – their time and effort have been instrumental to protecting the forests we love, and we are thankful for their enthusiasm and dedication to our mission.

The logo for MiiR, featuring the brand name in a bold, black, sans-serif font.The logo for Sunski, featuring the word "SUNSKI" in a yellow, cursive script font with a thin underline.The logo for Outdoor Research, featuring the letters "OR" in a bold, black, sans-serif font with a stylized underline.The logo for AllTrails, featuring a green mountain range icon followed by the text "AllTrails" in a grey, sans-serif font.The logo for Mystery Ranch, featuring the words "MYSTERY RANCH" in a black, sans-serif font with a stylized horse head icon to the left.The logo for Gaia GPS, featuring a green mountain range icon followed by the text "GAIA GPS" in a grey, sans-serif font.The logo for Clif Bar, featuring the words "CLIF BAR" in a bold, white, sans-serif font inside a red rectangular border.



# REFERENCES

American Hardwood Export Council (AHEC) (2024). *American Hardwood Guide - American Tulipwood*, <https://www.americanhardwood.org/en/american-hardwood/american-tulipwood>

Low, M. C., Schmitz, N., Boeschoten, L. E., Cabezas, J. A., Cramm, M., Haag, V., ... & Lowe, A. J. (2022). Tracing the world's timber: the status of scientific verification technologies for species and origin identification. *Iawa Journal*, 44(1), 63-84.

Luppod, W. and Bumgardner, M. (2022). Regional Analysis of U.S. Lumber Exports for Important Hardwood Species from 1990 to 2020. *Forest Products Journal*, 71(3):216-233.

Millenium Ecosystem Assessment (MEA) (2003). Ecosystems and human well-being: a framework for assessment. <https://www.millenniumassessment.org/documents/document.300.aspx.pdf>

United Nations Economic Commission for Europe (UNECE), Forestry and Timber Section. (2011). *Forest Products Annual Market Review 2010-2011*. [https://unece.org/DAM/publications/timber/FPAMR\\_2010-2011\\_HQ.pdf](https://unece.org/DAM/publications/timber/FPAMR_2010-2011_HQ.pdf)





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