CARY INSTITUTE OF ECOSYSTEM STUDIES

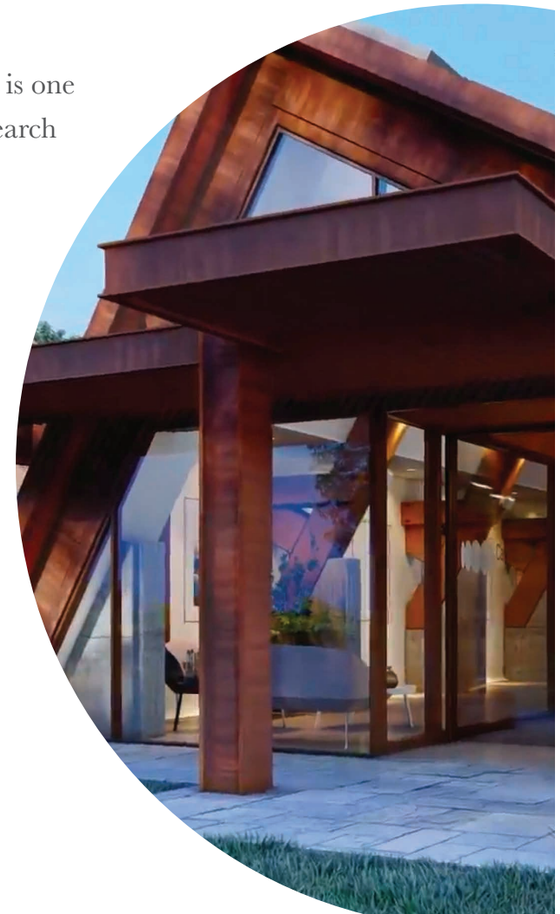
Science for the future of our planet

Sydney Turner

You can't make the world better without knowing how it works.

Founded in 1983, Cary Institute of Ecosystem Studies is one of the world's leading independent environmental research organizations. Our staff are global experts in climate change and the ecology of: cities, disease, forests, and freshwater. Their discoveries have shaped the field of ecology and guide effective resource management and public health strategies – regionally and globally.

We dedicate this report to our federal, state, and private foundation funders, the members of the Mary Flagler Cary Legacy Society, the members of the Aldo Leopold Society, the Friends of Cary, and to our Trustees. We are grateful for your generous support.



OVERVIEW

"Thank you for taking the time to get to know Cary Institute better. We have ambitious plans for our science and we want you to be a part of them."

-Joshua R. Ginsberg, President

79 research sites worldwide

21 different countries


Amanda Subalusky

In deepest gratitude to our donors.

You are helping to build the future of environmental science by:

- Hiring new scientists. As the first generation of scientists at Cary retire, we are excited by the places our new scientists are taking us.
- Creating 21st century facilities to tackle 21st century climate questions.
- Catalyzing innovation in ecosystem science.
- Sharing our science. You allow us to get information into the hands of people who need it the most and you allow us to inspire the next generation of scientists.
- Reducing our carbon footprint. Soon the campus will be carbon neutral or better thanks to you.

Research

Amanda Subalusky

"In a complex changing world, Cary is the quintessential ecosystem research center providing necessary knowledge and wisdom to light the way forward."

-Thomas E. Lovejoy, Cary Institute Trustee

Stephan Reiss

3 *out of* 4

emerging infectious diseases in people come from vertebrate animals

RESEARCH : DISEASE ECOLOGY

predicting disease outbreaks

Cary is using AI + big data to protect human health

Ebola, avian influenza, hantavirus, rabies – these are just a handful of the emerging infectious diseases that can be transmitted from vertebrate animals to people, with devastating effects.

We are determining which combinations of species, pathogens, and environmental conditions give rise to disease outbreaks in order to predict when and where an infectious disease might emerge.

With the help of donors like you, our predictive models and forecasts help communities and public health officials take action to lessen disease risk or even stop an outbreak before it starts.

Dennis Fraevich

"We are proud to support organizations like Cary Institute that are investing in prevention strategies that will stop this awful disease from infecting more people."

-Alexandra Cohen

Steven & Alexandra Cohen Foundation

400,000

cases of Lyme diagnosed each year

RESEARCH : DISEASE ECOLOGY

lyme & tick-borne disease

Imagine if you could reduce the risk of being bitten by a Lyme-infected tick

In many parts of the US, enjoying the great outdoors comes with the risk of getting sick from a tick bite.

Due to climate change, blacklegged ticks are spreading into previously unsuitable regions, threatening the health of even more communities. We are developing models that can forecast their future range and predict regions most at risk, to guide management actions that protect people.

Through The Tick Project, we are also testing environmental interventions with the potential to reduce ticks in neighborhoods. If successful, methods can be utilized by municipalities and individuals to reduce cases of tick-borne illness.

Amber Ferrell

"A lot of attention is focused on stopping the spread of pests that are already here, but we really need to focus on stopping the next pest, not the last one."

-Gary Lovett
Forest Ecologist

+$4 billion
in damages each year

RESEARCH : FORESTS

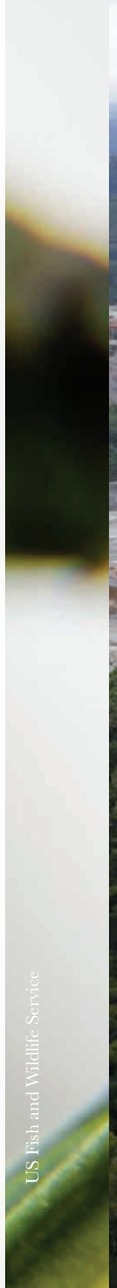
imported forest pests

Cary is responding to trees in crisis

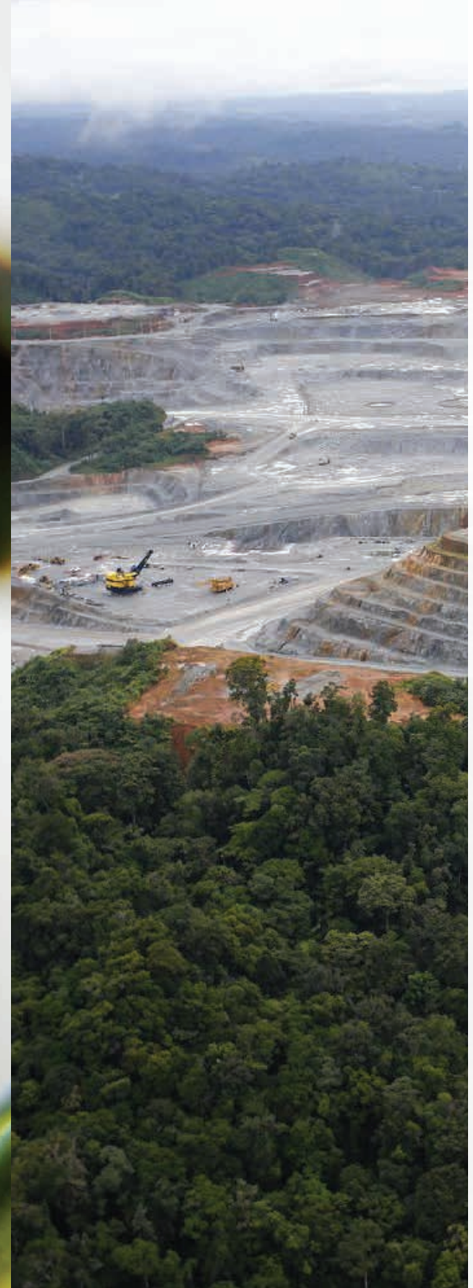
Emerald ash borer, Asian longhorned beetle, hemlock woolly adelgid – these are just a few of the imported forest pests decimating trees in our forests, parks, and neighborhoods.

Due to lax policies, new invaders continually arrive via international cargo, often as stowaways in solid wood shipping pallets or in woody plants bound for the nursery trade.

A Cary initiative, Tree-SMART Trade is a set of science-based policy recommendations designed to prevent the importation of insects and tree diseases through international trade. Our work with legislators and partner organizations resulted in Customs and Border Protection tightening its enforcement of wood packing regulations, and highlighted the issue in the 2018 Farm Bill. Unfortunately, too many pathways for new invasions remain open. Our fight continues.



US Fish and Wildlife Service



RESEARCH : FORESTS

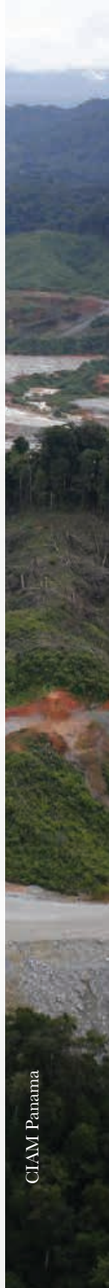
making forests resilient

Maximizing natural climate solutions

Forests are a top defense against climate change, acting as important carbon sinks.

Tropical forests contain large stocks of carbon that are being released due to high rates of logging, mining, and agriculture. Our research on disturbed forests in Panama is revealing how reforestation efforts can be tailored to maximize carbon storage and combat climate change, while supporting wildlife.

We are also studying trees' ability to adapt to climate conditions in the northeastern US. By knowing how trees are changing today, we can devise management strategies that will promote healthy forests in the future.



CIAM Panama

"Legacies of racial segregation and bias continue to plague cities. There is a pressing need to understand the feedback loop between inequality and environmental conditions, to make cities more livable for all."

-Steward Pickett
Urban Ecologist

RESEARCH : URBAN ECOLOGY

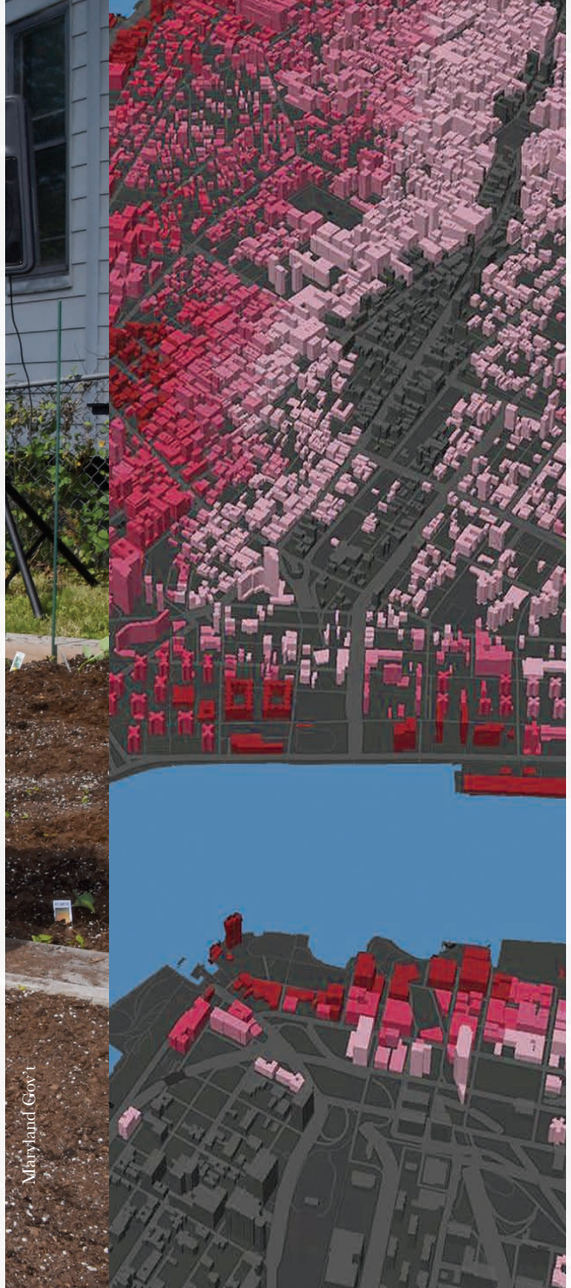
environmental justice

Imagine sustainable cities that benefit all residents

Legacies of environmental injustice have driven vulnerable communities into neighborhoods that are prone to flooding, heatwaves, pests, failing infrastructure, pollution, and a lack of access to green spaces that enhance wellbeing.

Climate change is impacting low-income and minority communities most severely. We are working to identify equitable mitigation strategies.

Green infrastructure is usually assumed to be a benefit everywhere and for everybody in a city. Is this assumption correct? With the help of generous donors, we are working to discover how to best improve the equity of green infrastructure through inclusive policy and practice.



Maryland Gov't

RESEARCH : URBAN ECOLOGY

climate change & cities

Cary is working to achieve urban resilience + sustainability goals

Over half of the world's population now lives in cities, and that percentage is growing.

Heat is the number one cause of weather-related death in US cities. We are guiding management efforts by pinpointing where people are at risk, to target interventions that save lives.

Flooding is a major risk due to sea level rise and intensifying storms brought on by climate change. By studying how built and natural features of the urban landscape interact with flood waters, we can guide city planning and develop science-based management solutions.

Rendering: Urban Systems Lab

Our foundation works to preserve the planet and Cary Institute is an invaluable partner in our efforts.

-Barry R. Shapiro

Chairman and President,
The Dr. Robert C. & Tina Sohn Foundation

RESEARCH : FRESHWATER

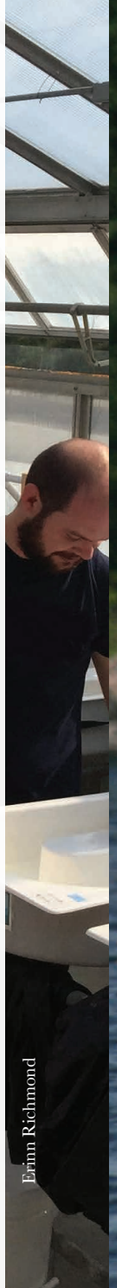
freshwater pollution

Freshwater stewardship starts with science

We all rely on clean water, but development, agriculture, and industry are threatening this limited but essential resource.

For decades, our scientists have been leaders in the ecology of freshwater. Current research explores how synthetic chemicals, such as pharmaceuticals and microplastics, move through urban and suburban streams, compromising water quality and altering aquatic life.

Ongoing studies explore the salinization of freshwaters due to road salt pollution, with a focus on salt accumulation in the environment and threats to groundwater. Our scientists are also part of long-term studies exploring the fate and impact of excess nutrients that can degrade water quality and fuel algal blooms.



Erinn Richmond

RESEARCH: FRESHWATER

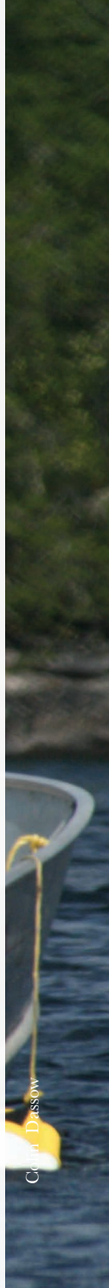
lake stewardship

Keeping lakes fishable, swimmable, and healthy

With collaborators on every continent, we are studying how lakes and reservoirs respond to changing environmental conditions. Our scientists are working to answer questions like: What causes algal blooms in pristine water bodies? How does watershed development affect aquatic life? How do invasive species alter lake ecosystems?

We are also looking at the ways people and nature influence freshwater fisheries. By surveying anglers, lake managers, lake conditions, and fish populations – we are identifying fishery management strategies that work.

We want to understand how individuals, non-governmental organizations, and government agencies can come together to best protect lakes, now and for future generations.



Cindy Dassow

science in action

Closing the door on forest pests

Our Tree-SMART Trade campaign provides science-based policy recommendations to reduce the unintentional importation of damaging forest pests and pathogens. We are raising awareness about the problem, developing protective legislation, and proposing changes to import regulations.

Preventing tick-borne disease

Drawing on decades of Cary research on the ecology of Lyme disease, we are testing environmental interventions with the potential to reduce ticks in neighborhoods. If successful, The Tick Project will revolutionize the prevention of Lyme disease and other tick-borne illnesses in communities.

Equity in green infrastructure

Green infrastructure can improve urban life by providing green space, reducing flooding, and supporting wildlife. Yet in many cities, green infrastructure is not equitably distributed or maintained. We are creating toolkits to ensure that all stakeholders have a voice in green infrastructure planning and development.

Mike via Flickr

Sharing Our Expertise

Thanks to the help of our donors.

Foundation grants and gifts from individual donors supplement our federal funding to make this work possible.

SHARING SCIENCE

the next generation of environmental stewards

Cary Institute is an innovator in K-12 ecology education, creating curricula and training teachers in cutting edge science applied to home, schoolyard, and regional ecosystems across the nation. Local opportunities include summer ecology day camps, Data Jam competitions merging art and science, and free online lesson plans.

In our Mid-Hudson Young Environmental Scientists program, students from local high schools work in teams with science teachers, undergraduates, and scientists to investigate regional water quality challenges.

We host one of the nation's longest-running Research Experiences for Undergraduates programs. Each summer, students partner with scientist mentors to conduct independent research projects and share their findings.

Cary also offers Fundamentals of Ecosystem Ecology, a graduate-level course that attracts students nationally and internationally.

SHARING SCIENCE

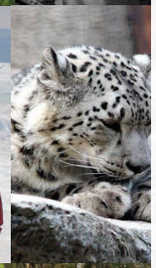
talking about ecology

Ecological education is a lifelong process, and we strive to bring quality environmental content and programming to people of all ages. By translating our research into accessible stories, and hosting engaging lectures, workshops, outdoor programs, and opportunities for hands-on science learning, we are investing in ecological literacy.

"Cary Institute instills a sense of community, bringing together people who care about the environment, and providing both a local and global perspective. As members of the Aldo Leopold Society, we are proud to support Cary Institute."

-Kathleen & Stuart Kofsky





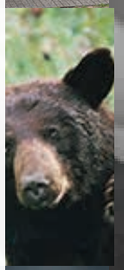
SHARING SCIENCE

talks, walks, and forums

We are committed to sharing science with the public – to inspire, educate, and engage. To that end, we host lectures and science conversations at our Millbrook campus, in New York City, and virtually. Past events include: Cary's Charlie Canham on the future of northeastern forests, Cornell's Anurag Agrawal on butterfly conservation, and Cary's Barbara Han on using artificial intelligence to predict and prevent pandemics. Access an archive of past events at: www.caryinstitute.org/videos

Outdoor education programs take advantage of our 2,000-acre campus. Popular programs include identifying butterflies and trees, exploring the phenology of the Fern Glen, and hands-on stream ecology. Forums and workshops are often collaborations with regional partners. Past offerings include reducing road salt pollution to freshwaters and managing forests on private lands. Our weekly scientific seminars, given by academics from around the world, are also open to the public.




Tickbusters on the lookout for Lyme
The New Yorker

Tracking a virus
NBC News

Lyme disease season is here. These are tips on how to avoid it
The New York Times

Lower income neighborhoods have bigger mosquitoes
CNN

Is our destruction of nature responsible for Covid-19?
The Guardian

Human impact on the environment may make pandemics more likely
CBS News

In cities and farms, disease-carrying animals thrive
Smithsonian

Destroyed habitat creates the perfect conditions for coronavirus to emerge
Scientific American

Mary Moeller

SHARING SCIENCE

giving voice to ecology

Science & the media

The success of science is often gauged by publications in peer-reviewed journals and subsequent citations by peers. We are proud of how we rate using this metric. But we are also pleased that our scientists make an extra effort to connect their research discoveries with journalists, so that wide audiences can benefit from their expertise. Fostering these relationships is vital in today's media landscape, where fewer and fewer reporters are dedicated to covering the environment.

During the period covered by this report, Cary Institute scientists were featured and quoted widely in print, internet, radio, and television media, with coverage including: *The New York Times, The Washington Post, The Wall Street Journal, National Public Radio, Bloomberg News, Huffington Post, The Economist, The New Yorker, Wired, Slate, National Geographic, Smithsonian, Scientific American, BBC News, Yahoo News, MSN News, NBC, CBS*, and more.

donate

Future generations need our research. We're pursuing the science needed to help solve humanity's greatest environmental challenges.

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Cary Institute of Ecosystem Studies

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science for environmental solutions

Pasha Feinberg