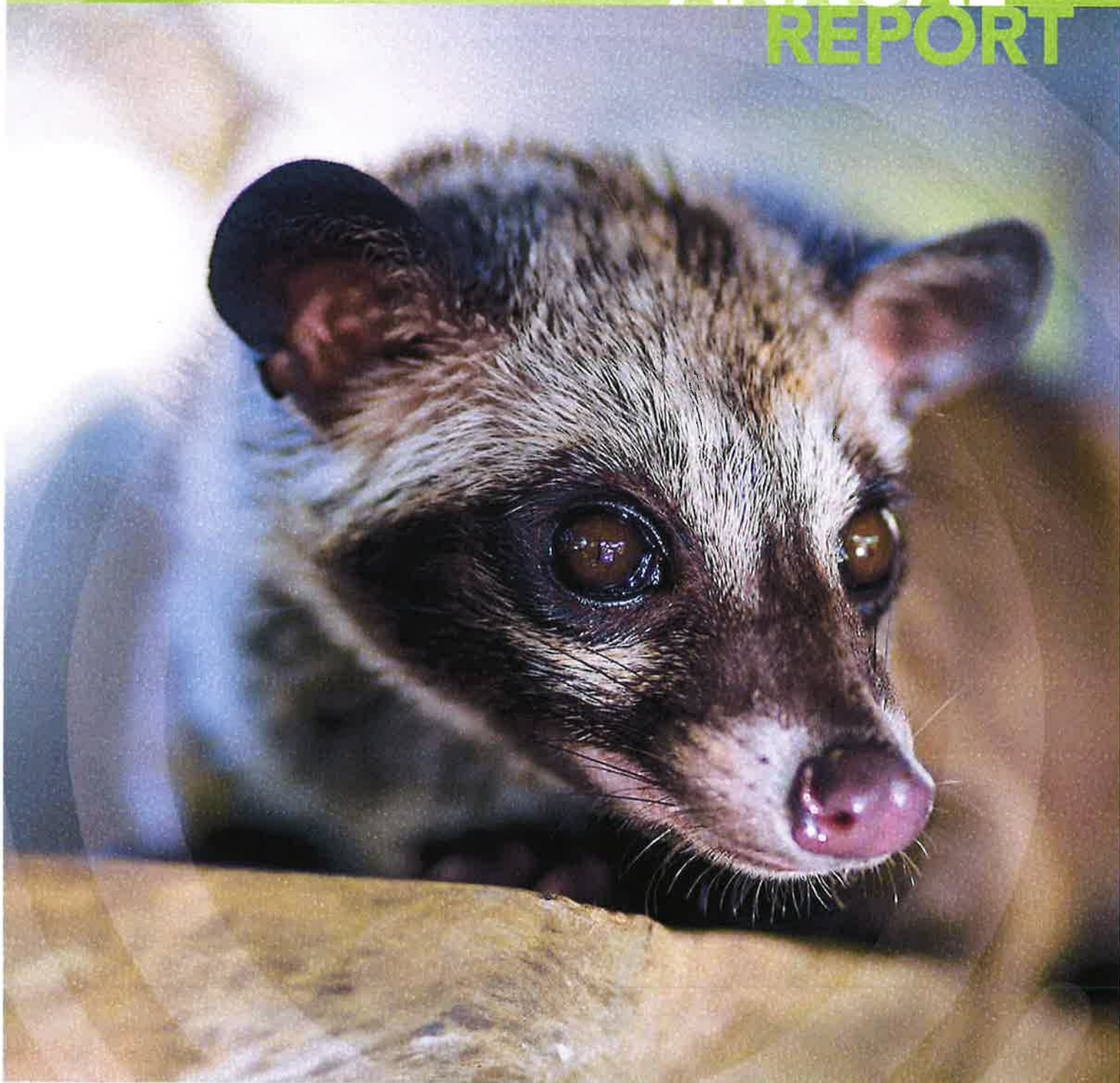


# EXHIBIT 33



EcoHealth  
Alliance

FISCAL YEAR  
**2015**  
ANNUAL  
REPORT





# ABOUT ECOHEALTH ALLIANCE

## BUILDING ON OVER 40 YEARS

of groundbreaking science, EcoHealth Alliance is a global, nonprofit organization dedicated to protecting wildlife and safeguarding human health from the emergence of disease. The organization develops ways to combat the effects of damaged ecosystems on human and wildlife health. Using environmental and health data from the past 60 years, EcoHealth Alliance scientists created the first-ever, global disease hotspots map that identifies at-risk regions to help predict and prevent the next pandemic crisis. That work is the foundation of EcoHealth Alliance's rigorous, science-based approach, focused at the intersection of the **environment, health, and capacity building**. Working in the U.S. and more than 30 countries worldwide, EcoHealth Alliance's strength is founded on innovations in research, training, global partnerships, and policy initiatives.

### Two statements guide all aspects of our work.

EcoHealth Alliance's **VISION** is to be the organization leading the change in perspectives, policy and practices that increase global capacity to respond to emerging threats at the intersection of health and the environment. Our **MISSION** - EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.

Our research, programs, and scientists continue to be featured in prestigious **peer-reviewed journals** such as *Nature*, *Science*, *PLoS One*, *The Lancet*, and *Institute of Medicine* reports. EcoHealth Alliance regularly garners **top media placements** in such outlets as *The Wall Street Journal*, *The New York Times*, *The Huffington Post*, and *TIME*.



Initially thought to be the source of the 2003 SARS outbreak, civets are found throughout Southeast Asia. It wasn't until 2005 that EcoHealth Alliance and its partner scientists discovered that bats were the reservoir for SARS. The transmission cycle of SARS included civets becoming infected in markets where bats and other wildlife co-mingled in close proximity to each other.



# BOARD OF DIRECTORS

EcoHealth Alliance's Board of Directors set the strategic direction and ensure the financial health and sustainability of the organization. Our Board of Directors provide specific expertise relevant to their personal and professional backgrounds to help the organization enhance its ability to conduct research, advance science, and protect human, animal and ecosystems health.

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# LETTER FROM THE CHAIR

June 30, 2015

Dear friends,

As we approach the end of our fiscal year, I want to take the opportunity to thank all of those who have helped the organization move forward in its important mission. First and most importantly, we could not do what we do without our brilliant scientists who work in sometimes difficult and challenging field sites around the world. Over the past 12 months, the EcoHealth Alliance team has worked in Southeast Asia, the Middle East, West and South Africa as well as in South America on varied conservation and public health programs. In addition, our research would not be possible without the collaborative partnerships we've nurtured over the past 40 years with in-country NGOs, foreign ministries, universities, labs and public health agencies. Local conservation and global health issues are complex and require multi-disciplinary efforts to create better solutions to our most pressing environmental problems. Of course, we could not do any of this work without our dedicated office staff who work tirelessly to coordinate all of this work around the world.

Our distinctive 'One Health' approach to protecting the planet, wildlife and the health of local communities requires the best science to combat the threats of wildlife extinction, deforestation, and the rise in emerging infectious diseases caused by unsustainable land-use changes around the globe. It's a staggering fact that 60 percent of all new diseases begin in wildlife species. Stressed ecosystems and shrinking habitats have created a new threat to our very own health.

Just a little more than a decade ago, Severe Acute Respiratory Syndrome (SARS) rose in the headlines from Southern China - a strange, new and unheard of disease began ravaging through cities at an unprecedented rate - where did it come from, how do we stop it, and how can we prevent it from happening again? All of these questions loomed heavily, and as SARS traversed the world it not only took the lives of many, but caused a global economic crisis.

When swine flu (H1N1) erupted in Mexico, we saw its emergence circle the globe in a few months. Global travel and trade provide a free ride for viruses to reach the farthest corners of the globe as well as the most congested and populated cities.

Now, Ebola has become part of the lexicon of our daily lives. The world watched as Ebola's deadly march invaded West African countries. Fears of Ebola loomed as containment and treatment were fraught with a lack of infrastructure in stricken countries. More than 10,000 people died from the infection in just over a year. For those people that survived Ebola, the scars from the disease run deep. For now, Ebola transmission has trickled but EcoHealth Alliance scientists know that the risk remains and the virus may become an ever-present disease in West African communities, re-emerging from wildlife in the near future.

Sincerely,



Ellen Shedlarz  
*Chair, EcoHealth Alliance*





# LETTER FROM THE PRESIDENT

June 30, 2015

Dear friends,

As the summer kicks into gear, our scientists are setting out across the globe for another round of cutting-edge fieldwork in collaboration with our partners. Looking back at the 2015 fiscal year, I am proud to say we have passed more milestones, collaborated in training with more alliance partners, and provided invaluable guidance to keep more government agencies and corporate stakeholders on the path to eco-friendly, sustainable and health-conscious decision making. This is all possible because of your terrific and dedicated support. We have made serious progress with our biosurveillance efforts in Southern China, an emerging disease hotspot where rich biodiversity, rapid human development, and fragmented wilderness make for a dangerous mix—something that became all too apparent after the first outbreak of SARS more than 10 years ago. Although initially thought to originate in masked palm civets, the outbreak was traced to bats sold at wildlife markets. By cultivating relationships with local scientists and farmers, we've created a resilient network that's helping us keep tabs on the status of at-risk communities which rely on these markets for their livelihoods. Under our signature 'One Health' approach, we couple that work with field sampling, economic and cultural analysis, and cutting-edge lab work. We know this focus on preventative research and capacity building can save lives (human and animal), and even billions of dollars in the long run. It's a win-win for conservation and for health!

In the same spirit we went back to West Africa. Even as news crews and international agencies began to pack up and the immediate threat of Ebola was fading, we went back to find out where the disease lies dormant between outbreaks—in what populations of animals, and to which habitats it retreats. By keeping our finger on the pulse of certain networks like the bushmeat trade, we're able to begin forecasting the next spillover of the disease into humans. Though the trauma to West Africa was staggering, we also learned a great deal from the global response of governments and public health agencies to the international crisis. Analyzing how local infrastructure accelerated rates of transmission, how more developed nations contained the disease after it passed through their borders, and how local traditions exacerbated or prevented spread of the disease has only left us better prepared for the next pandemic.

EcoHealth Alliance is continually called upon for its expertise in wildlife-borne viruses. Over the past 50 years, a series of new diseases have emerged—HIV/AIDS, Ebola, Nipah virus, SARS, West Nile virus, Lyme's disease, and now MERS—with each new disease, our lexicon has grown. Drawing together the disparate data behind these outbreaks, we've synthesized a map of global 'hotspots' that helps us identify where the next major pandemic is likely to emerge. We have a legacy of working in the conservation space for more than 40 years, saving species and habitats from the massive changes being made to the planet's wild landscapes. We've pioneered the strategy of using our own health concerns to protect wildlife and their habitats from deforestation, intensive agricultural expansion, and the adverse effects of global travel and trade.

In reading this annual report, my hope is that you gain a sense not only of the breadth of our work, but also its focus. Our tagline is "local conservation, global health" for a reason. Our unique group of talented scientists and analysts allows us to understand problems at the global level, while simultaneously acting on those problems with local precision—in the open-air markets of Guilin, China; in the livestock pens of South Africa; in the forests of Cambodia. Together, we are making a difference in the lives of individuals, animals, and ecosystems. From all of us at EcoHealth Alliance, many thanks for your dedicated and passionate support—our work would not be possible without you.

Cheers,



Dr. Peter Daszak  
*President, EcoHealth Alliance*



## PROGRAM UPDATES

# ONE HEALTH APPROACH

Many of the planet's current and evolving human health challenges have ecological links. Despite these connections, human health is largely viewed in isolation from the health of animals and the environment. Approaching health problems through a comprehensive perspective that considers environmental determinants and drivers of disease will enable informed and proactive understanding and action to address major challenges facing our health and the health of our planet.

### **A 'One Health' approach considers the integral links among human, animal and environmental health.**

This approach promotes sharing of information and perspectives across disciplines to provide more comprehensive and upstream understanding of health concerns at the human-animal-environment interface. This, in turn, can yield innovative, cost-effective solutions.

### **One Health can provide high value for a range of critical health topics, including:**

- Improving data and information sharing systems to more fully utilize information from food safety, animal and human health to improve healthcare outcomes.
- Emerging diseases in humans, given their high rate of emergence from wildlife.
- Rabies, given susceptibility of >120 species, near-global presence, and its role in more than 50,000 human deaths annually.
- Antimicrobial resistance, given widespread medical and food industry antimicrobial use, paired with complex environmental, ecological and evolutionary factors.
- Climate change, given potential impacts on disease host range and pathogen persistence.
- Food security, given dependence on food systems and rapidly changing practices.
- Wildlife trade, often unregulated, of animals and the pathogens they may harbor.



Support for a One Health approach has been expressed by the World Health Organization, The Food and Agriculture Organization of the U.N, the World Organisation for Animal Health, the U.S. Institute of Medicine, the American Medical and American Veterinary Medical Associations, and the U.S. Centers for Disease Control and Prevention. **EcoHealth Alliance seeks to move the support from theoretical One Health discussions to actionable, on-the-ground One Health activities that yield tangible human health benefits and promote the health of our ecosystems.**

**To advance a One Health approach, EcoHealth Alliance seeks to undertake a systematic approach to create a roadmap that will provide a clear route to implementable, sustainable, and effective One Health infrastructure. Overall outputs sought are:**

- Establishing best practices that optimize the development and implementation of One Health infrastructure at different scales and scopes.
- Determining urgent health priorities ripe for a One Health approach where benefits of efforts can be maximized.
- Creating sustainable mechanisms for formal and informal professional networking across disciplines to boost creative and upstream problem-solving for health issues.
- Driving a culture of change in professions to increase interest and recognition of local and global benefits from collaboration and a broader view of health and environmental links.

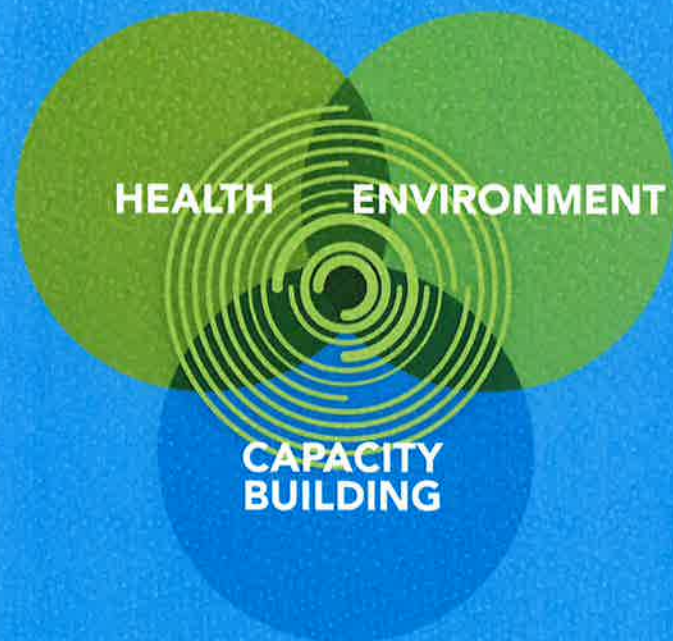


# ORGANIZATIONAL UPDATE

In fiscal year 2015, EcoHealth Alliance's technology team made great strides developing various web platforms to identify, review and unravel emerging infectious disease origins. The 'Emerging Infectious Disease Repository' coined as EIDR, was developed to be a centralized web platform dedicated to identifying the origins of emerging infectious diseases. Through EIDR, multiple infectious disease events can be compared, historical disease emergence can be visualized spatially, and individual emergence events can be explored in depth. This work builds upon EcoHealth Alliance's global 'hotspots' map and research published in the prestigious journal, Nature.

With EIDR, a user can explore an interactive table of emerging infectious disease events. The information displayed is customizable, allowing the user to perform specific searches using a filter feature to search for events with a common variable, such as a specific host, or pathogen. To learn more about EIDR, please visit: <https://eidr.ecohealthalliance.org>

New emerging diseases put tremendous pressure on the global health community to act quickly to determine the source of the outbreak, control it and identify the transmission cycle. EcoHealth Alliance continues to work with public health agencies, foreign ministries and non-governmental organizations around the world in hotspot regions where wildlife and local populations come into contact. The scientists at EcoHealth Alliance are focused on identifying wildlife reservoirs of disease and the factors that spark a disease to jump from one species to another. Developing biosurveillance software programs is another way that EcoHealth Alliance predicts and prevents possible pandemic events.



**EcoHealth Alliance works at the intersection of ecosystem, animal and human health through local conservation programs, and develops global health solutions to address emerging diseases.**



## SPOTLIGHT ON EcoHEALTH ALLIANCE SCIENTIST

### DR. KEVIN OLIVAL SENIOR RESEARCH SCIENTIST

**Q: What attracted you to EcoHealth Alliance?**

**A:** My original interest was in conservation. When I started my course of study I knew that I wanted to do something conservation minded that also involved genetics. So that naturally took me to the field of conservation genetics. All of my initial ideas were centered around using genetics to inform conservation. Dr. Peter Daszak, president of EcoHealth Alliance, became involved in my work early on with a grant for Nipah virus work before I joined the organization. It's been 7 years now at EcoHealth Alliance and the work, the people and the mission keeps me engaged each and every day.

**Q: Can you tell us more about your background in evolution and ecology?**

**A:** My PhD looked at how we could understand Nipah virus ecology by looking at the genetics of bat populations. That got me interested in how I could integrate evolutionary and genetic data to understand emerging diseases, and emerging disease risk. That was over a decade ago; now there are a number of ways these fields can be linked. It's a specialized field with a lot of potential because it brings together two aspects of biology—ecology and evolutionary biology with clear public health implications.

**Q: Were you always interested in conservation?**

**A:** I grew up in Hawaii and I loved being outside and exploring the natural world. I became so much more aware of all the major conservation threats when I started working at the University of Hawaii and began to really understand conservation biology more in depth. A quarter of the endangered species that live in the United States live in Hawai'i. It's a special place that has a fragile ecosystem, every time I go and visit I realize this more and more.



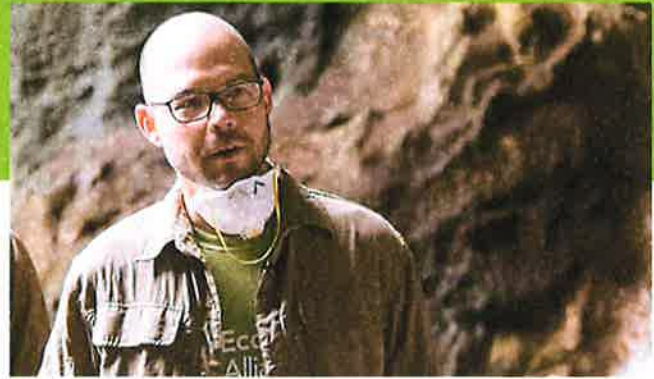
**Q: How does conservation and public health fit together?**

**A:** Being just focused on conservation without taking into account the public health concerns is just one side of the story. Our programs and research take a 'One Health' approach to environmental issues. The health of the environment, wildlife and people are all inextricably linked together. So often, people don't associate their own health when considering the impact that deforestation, climate change and wildlife trade have on the global stage. All of the aspects of a healthy planet are affected by the things we do to nature from land-use change to pollution – a damaged or weakened ecosystem will ultimately affect our own well-being.

**Q: Where has your work taken you?**

**A:** I've spent a good amount of time in Southeast Asia among other parts of the world. From Borneo to Bangladesh, our field sites are located in some highly biodiverse regions. The programs I am involved with have a lot to do with viral discovery and for this reason I've worked with bat species for many years. We know that bats are the reservoir for many viruses and some of the field work I am involved with includes taking biological samples from bats in a humane manner. We wear protective clothing, masks, and eye protection and capture bats during the night in some remote areas. It's painstaking work because we are being very careful to keep the animal unstressed and we are also working to protect ourselves during the sampling process.

## SPOTLIGHT ON ECOHEALTH ALLIANCE SCIENTIST



**Q: Aren't bats incredibly important to a healthy ecosystem?**

**A:** Yes! Bats are vital to ecosystems worldwide by acting as a natural pest control by eating insects and helping to pollinate plants and disperse seeds. There are a lot of misconceptions about bats that are still out there. We are working to promote positive messages about this incredibly diverse group of species. I believe protecting bats plays an important role in protecting our own health and the health of the environment.

**Q: What are some of the emerging diseases that you've researched?**

**A:** There's quite a long list! I've been involved with Middle East Respiratory Syndrome (MERS) in Saudi Arabia, Nipah virus in Bangladesh, SARS in China, Ebola in West Africa and swine flu H1N1 in Mexico. New diseases are emerging around the world and the modeling and the analysis we've done has shown these diseases are going to continue to emerge. Our work has a true sense of urgency knowing these diseases could have huge impacts on public health. I think the science we're doing to better understand the risk of spillover is really important, because we're beginning to rank these threats to determine risk factors. The data we're collecting will help us determine where we need to be laser-focused and where funds are needed to address a specific threat. We're translating that science on the ground to the policy makers, and to communities in at-risk areas.

**Q: What are your interactions like with local communities in these regions?**

**A:** Our scientists are consistently traveling to our field sites, working with communities, and collecting data about animals where people are living. When you get to know the people and the cultures in places like Bangladesh, China, and Thailand, your work becomes more about the bigger picture. You think about the people who might be exposed to a new disease and how that is going to affect their lives and livelihoods. One thing we know is pandemics can

spread around the world quickly. My work at the local level transcends to understanding the real threat at a global scale.

**Q: What about your work investigating MERS?**

**A:** I was involved with that initial MERS investigation with my colleague, Dr. Jon Epstein. At the time, we didn't know how big MERS was, so that was sort of an interesting, and a somewhat scary thing. We knew it was an emerging disease that initially looked like SARS, but didn't know much more than that. At the time we went to Saudi Arabia there were only one to two known human cases. So we were protecting ourselves as if it was something serious, but we didn't know how bad it was. It was an interesting time to be involved with that work, and MERS is still out there. Viruses evolve and transmission cycles are key to understanding how we can stop them in their tracks.

**Q: What can people do to keep epidemics from spreading? Is it as easy as washing your hands?**

**A:** Washing your hands can actually go a long way. But I think information is also key. I think the work we are doing at EcoHealth Alliance is unique and focused on some big environmental health issues. I encourage people to stay informed and learn what the risks are and how you can play a part in being involved. We have a long way to go to identify all the risk behaviors and viruses out there that could potentially cause a global pandemic. In the meantime, protecting wildlife and empowering conservation is something we need to continue to advocate. Our 'One Health' approach is not just a philosophy, it is a concerted effort to protect all living things on this planet.

*You can follow Dr. Kevin Olival on Twitter @NYCbat*



# PROGRAM UPDATES

Working in the U.S. and more than 30 countries worldwide, EcoHealth Alliance's programs are founded on innovations in research, training, global partnerships, and policy initiatives.

Current program highlights include:

## PREDICT

Avian Influenza, HIV/AIDS, SARS, and Influenza H1N1: these diseases are not just infamous for their human and economic impact, they also share one common trait. All four of these diseases are animal-related, and they are not the only ones of their kind.

In an effort to identify and respond to new zoonotic diseases before they spread to humans, the U.S. Agency for International Development (USAID) established its Emerging Pandemic Threats (EPT) program. The EPT program consists of four projects: PREDICT, RESPOND, IDENTIFY, and PREVENT. The PREDICT project seeks to identify new emerging infectious diseases that could become a threat to human health. PREDICT partners locate their research in geographic "hotspots" and focus on wildlife that are most likely to carry zoonotic diseases - animals such as bats, rodents, and nonhuman primates.

EcoHealth Alliance works at the leading edge of this field by building local capabilities and testing high-risk wildlife in Bangladesh, Brazil, China, Colombia, Indonesia, Malaysia, and Mexico. After scientists collect swabs or small amounts of blood, they analyze the samples in the lab to look for evidence of disease. The findings are catalogued in a database that mathematical experts use to create predictive maps of potential disease outbreaks. This approach not only allows researchers to find new diseases, but also helps communities prepare for and respond to the threat of an outbreak.

The strongest foundation of EcoHealth Alliance research is the connection between local conservation and



global health. EcoHealth Alliance goes beyond scientific fieldwork to support local researchers and actively build local capacity. As a PREDICT partner, EcoHealth Alliance works with scientists and policymakers in each country to create a network of research, communication, and response partners - on a local, regional, and global level.

### The EPT program is:

- Detecting and identifying zoonotic pathogens in wildlife - over 35,000 animals have been tested and 200 new viruses have been discovered to date.
- Determining the potential risk and methods of transmission for specific zoonotic diseases - key points for spillover have been identified and global risk maps highly refined.
- Implementing the "one health" approach of cross-discipline research - bringing more stakeholders - including the public - to forge conservation and health solutions.
- Supporting the growth of sustainable, country-level programs and response capabilities.
- Promoting the actions that minimize or eliminate the potential for the emergence and spread of new disease threats.

### PREDICT-2 collaborators include:

- EcoHealth Alliance
- The University of California Davis School of Veterinary Medicine
- Columbia University Center for Infection and Immunity
- Wildlife Conservation Society
- The Smithsonian Institute
- Metabiota Inc.
- ProMED Mail
- HealthMap / Harvard School of Medicine



## PROGRAM UPDATES

EMERGING DISEASE  
HOTSPOTS

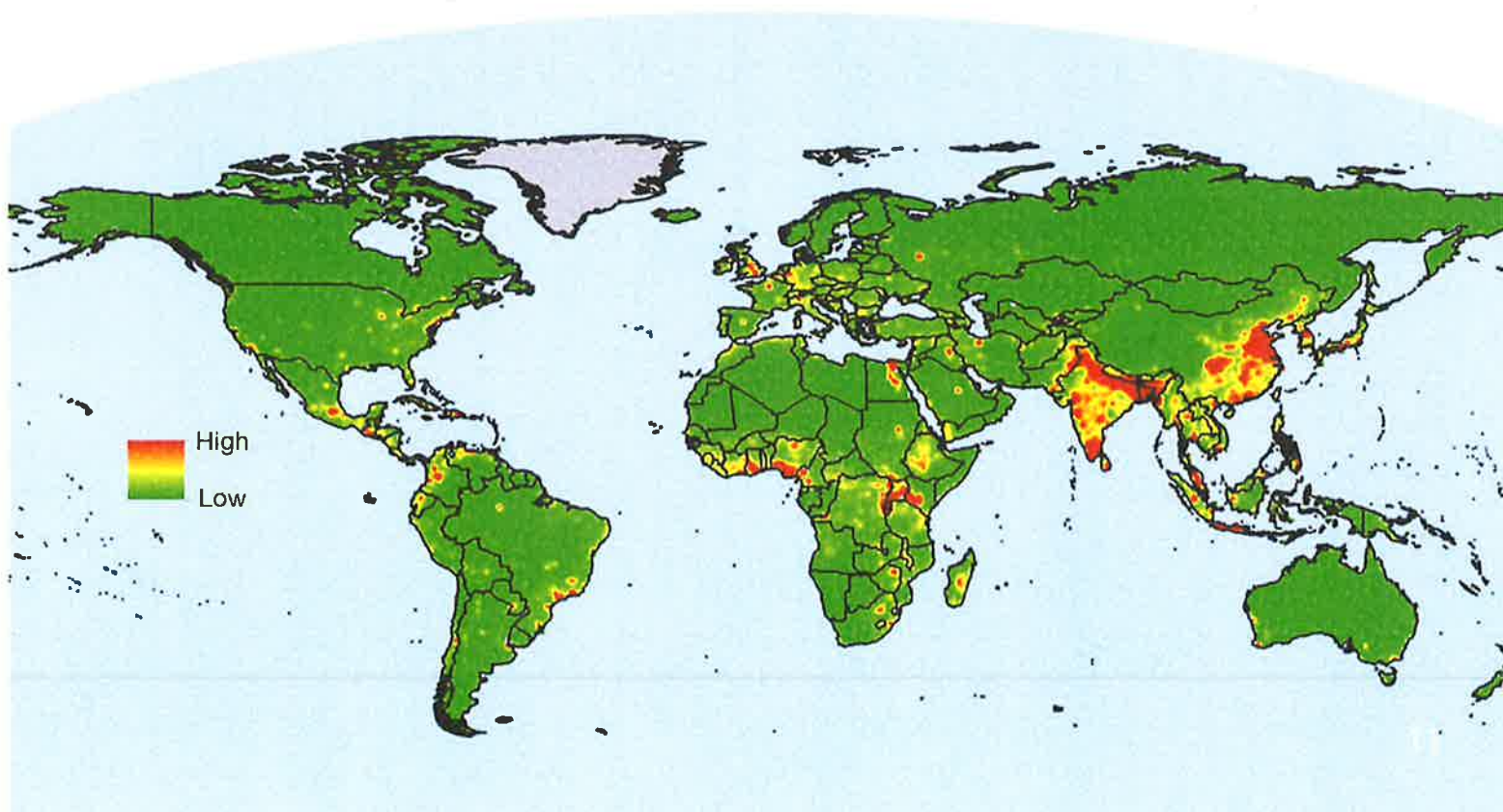
EcoHealth Alliance is discovering emerging diseases using a first-of-its kind predictive map of disease hot spots. EcoHealth Alliance scientists uncovered the specific factors that make a region predisposed to disease emergence by collecting data on outbreaks over the past 50 years. By identifying potential infectious disease threats, we can protect both public and environmental health.

As the leading cause of human fatalities worldwide, infectious diseases lead to the deaths of 14 million people per year. Additionally, over three-quarters of emerging infectious diseases (EIDs) are a result of zoonotic pathogens (i.e. originating from wild or domestic animals and spreading to humans). EcoHealth Alliance scientists are actively working in many countries to identify potential infectious disease threats through viral discovery.

In Malaysia and China we are testing people and wildlife for new and potentially dangerous viruses. Hunting wild animals for food brings people into close contact with a multitude of species and a vast number of potential new diseases. Working with the Global Viral Forecasting Initiative, EcoHealth Alliance is studying the risk of viral emergence in highly exposed groups of people.

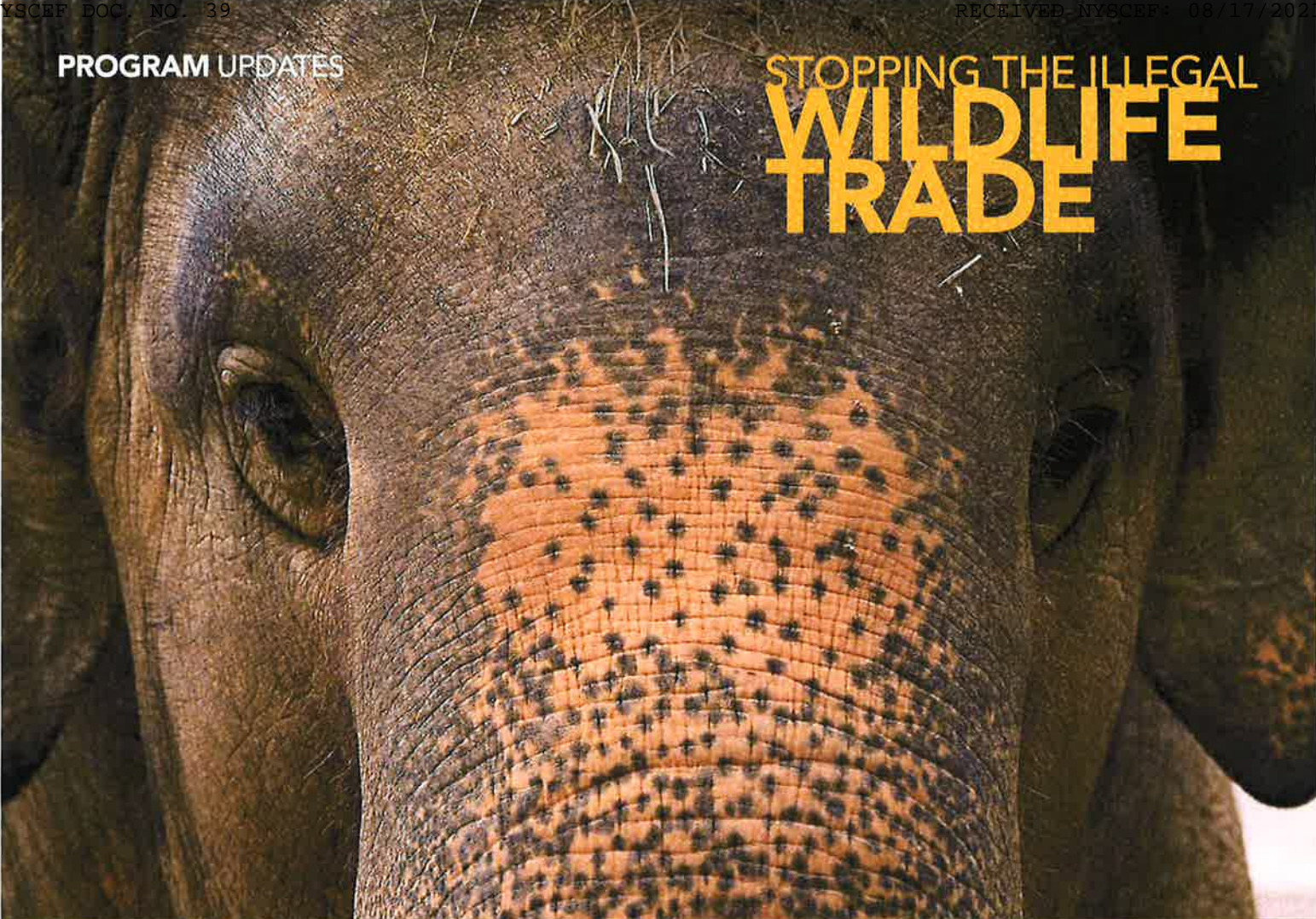
**Our goals for this program include:**

- Setting research priorities in global disease hotspots
- Identifying new disease emergence and drivers
- Creating proactive preventative measures and disease forecasting
- Studying interactions between humans and wildlife
- Building predictive models to anticipate future emergence of unknown zoonoses





## PROGRAM UPDATES

STOPPING THE ILLEGAL  
**WILDLIFE  
TRADE**

The global wildlife trade is big business and the industry is worth billions annually. The U.S. is the largest importer of wildlife and wildlife products on record. The market for wild animals and animal products comes with a significant risk to wildlife worldwide due to extinction, spread of disease and the introduction of invasive species into delicate ecosystems. The wildlife trade fuels the pet industry and also provides products ranging from "bushmeat" (meat of wild mammals such as apes and monkeys) to fashion products (fur or skins) as well as products thought to provide medicinal benefits.

EcoHealth Alliance's health and policy team are conducting ongoing efforts to assess and mitigate threats from the global trade in wildlife including:

- Informing policy makers and global organizations such as the World Health Organization on the disease threats that result from wildlife trade.
- Working with conservation authorities to advance the protection and welfare of wildlife.
- Educating consumers on the health risks related to 'non-traditional' pet choices.
- Using innovative science, EcoHealth Alliance is mapping the spread of pathogens through trade and travel networks to predict possible disease threats. Working with our partners around the globe in highly bio-diverse regions, EcoHealth Alliance is educating wildlife hunters to educate them on the health risks of the trade. We have successfully turned hunters into wildlife field technicians by training them in disease surveillance efforts, providing a new way to make their livelihoods.



## PROGRAM UPDATES

# STOPPING THE ILLEGAL WILDLIFE TRADE

*-continued-*

The United States is one of the top importing countries involved in the illegal wildlife trade. There are steps the public can take to support the elimination of the illegal wildlife trade both abroad and domestically:

- International travelers should avoid purchasing and/or carrying wild animal products, including meat, skins, and traditional medicines. Smuggled wildlife imports are often concealed in boxes or coolers; if you see a passenger carrying a suspicious container report it to Customs and Border Protection officials.
- When traveling domestically, be aware of national and state laws regarding the transport of wild animals. Some laws differ among states.
- We encourage you to make conscientious non-traditional pet choices. Always make sure pets are captive-bred and choose pets that present minimal health and environmental risks, and can be adequately cared for in a captive situation. Please visit [www.EcoHealthyPets.com](http://www.EcoHealthyPets.com) for more information.

### Ongoing EcoHealth Alliance projects include:

- Characterizing the scope and scale of global wildlife trade using international trade databases.
- Informing international trade and animal health groups of necessary measures to strengthen policies on wildlife harvest and movement.
- Modeling the spread of pathogens through trade and travel networks to predict emergence.
- Assessing exotic pet choices to provide scientifically-based recommendations for healthy- and environmentally-friendly pets via our EcoHealthyPets program.
- Conducting disease surveillance of confiscated wildlife imports to inform government partners about wildlife-associated pathogen risk.
- Developing outreach materials for travelers and airport staff that increase public awareness of the illegal wildlife trade.
- Working with hunters in source areas to educate them on the health risks of the bushmeat trade, and engaging them in disease surveillance efforts.



Official records show that pangolins are being illegally traded on a "shocking" scale. Annual seizures have been estimated at roughly 10,000 animals but experts warn the illegal trade is far greater.

### Our program goals include:

- Drawing upon the best available scientific findings to make policy recommendations that reduce the risks of disease emergence and the decline of wildlife populations due to illegal wildlife trade.
- Developing proactive steps to mitigate the transmission and spread of diseases of wildlife origin to other wildlife, domestic animals, and humans.



## PROGRAM UPDATES

# INFECTIOUS DISEASE EMERGENCE AND ECONOMICS OF ALTERED LANDSCAPES (IDEEAL)

Land-use change is a significant driver of emerging infectious disease. Over 60 percent of emerging infectious diseases over the past six decades, including SARS, H1N1/ Swine Flu, and HIV-AIDS have originated in animals, with nearly half of these linked to changes in land-use. Forest degradation resulting from agricultural intensification and other human activities accounts for about 15 percent of greenhouse gas emissions - roughly equivalent to the emissions generated by the entire global transportation sector. The key to reducing the threat of diseases with pandemic potential and slowing global climate change is to more accurately account for the value of ecosystems and base land-use choices on real benefits and costs.

### Goals:

#### The four main goals of the Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL) project are:

1. Building economic models of land-use change and disease emergence that can be used by local and regional decision maker;
2. Describing the relationship between disease emergence, land-use change, and human behavior, and quantifying an ecosystem's disease-regulating value;
3. Building toolkits and establishing a center of excellence to develop and promote best practices, research, and reduced-impact land-use guidance;
4. Engaging private companies and educating and empowering civil society stakeholders to work together for a healthy and sustainable future.

### Our Approach:

This USAID funded project is currently based in the Kinabatangan Basin in Sabah, Malaysia. EcoHealth Alliance works closely with the Sabah Wildlife Department, University of Malaysia, as well as representative community groups. Our modeling strategy uses existing datasets collected by EHA and others identified through partners and government agencies in Malaysia. We calculate the value of damages from past disease outbreaks, and model expected damages under different land-use scenarios, and different outbreak severities. We then run our models with data incorporating different rates of exposure to disease by men and women of all ages.

EcoHealth Alliance has spent the last 40 years addressing complex environmental and social challenges through multidisciplinary collaborative international networks. The IDEEAL project leverages our experience in building successful partnerships, developing outreach programs, and our specific expertise in modeling disease emergence and its economic implications. Developing an economic cost/benefit analysis of land-use change in relation to health requires specific information on the frequency of disease emergence and outbreaks, and the impact on individuals, on communities, and on production, trade and travel. Our approach for the IDEEAL project brings together these components to produce actionable information for local stakeholders and decision makers to mitigate threats from climate change and emerging infectious diseases.



## PROGRAM UPDATES

# ECONOMICS OF EMERGING INFECTIOUS DISEASES

Outbreaks of emerging diseases and pandemics inflict damages and costs on society that include the direct costs of treating illness, the effects of a reduction in labor supply caused by an unhealthy and/or dying work force, as well as losses in sectors unrelated to health such as travel and trade.

The rate at which emerging disease events occurs is increasing, and in order to minimize the damages, it is important to examine the benefits, costs, and effectiveness of underlying policy approaches in addition to determining the magnitude of the damage, and on whom the economic burdens fall. This program comprises a wide range of projects that take into account the uncertainty surrounding the timing, location, and virulence of an outbreak.

### Goals:

- Economic impacts of emerging infectious disease events. What are the total damages associated with past events?
- Optimal pandemic policies responses. Should we invest more in preventing the outbreak in alleviating the damages of an outbreak, and when should we invest and implement these policies?
- Financing options for global disease surveillance and response. Multi-lateral organizations have investigated the

costs necessary to bolster infectious disease surveillance and response capacities in all countries around the world. Global donations required to fund these upgrades are not sufficient. What other options does the global community have?

- Valuing ecosystem services. With specific consideration of the role of intact ecosystems in mitigating infectious diseases, what is the optimal use of land and resources considering benefits and costs of converting land and the benefits of preserving intact landscapes?
- Extractive Industries. What are the damages that industries and surrounding communities can sustain if precautions are not taken to lessen the risk of infectious disease outbreaks?
- Impact of disease on commodity prices. How do different media announcements regarding disease outbreaks impact the behaviors of hedgers and speculators?

Ultimately, the Economics of Emerging Infectious Diseases program seeks to determine how to optimally allocate resources to address a pandemic threat, whether devising strategies to mitigate the underlying causes, or providing the necessary knowledge for individuals, businesses, and society as a whole to minimize economic damages in the event of an imminent pandemic. EcoHealth Alliance's experience determining the distribution of the damages as well as the underlying causes will be invaluable to policies makers.



EcoHealth Alliance's Economics of Emerging Infectious Diseases program seeks to determine how to optimally allocate resources to address pandemic threats. The organization is developing strategies to mitigate and minimize economic damages in the event of an imminent pandemic.



## PROGRAM UPDATES

# PROJECT DEEP FOREST

Deforestation is the permanent destruction of forests in order to make land available for other uses such as agricultural and farm expansion, urban planning and extractive industries. An estimated 18 million acres of forest — roughly the size of Panama — are lost each year, according to the United Nations' Food and Agriculture Organization (FAO). Thousands of wildlife species rely on the delicate ecosystems created by the richly bio-diverse forest environments. Deforestation and human encroachment displace these species and force heightened interaction between people and animals, indicating a high potential for disease transmission as seen from the toll of Nipah virus, Avian Influenza and SARS.

In the past year, our scientists have begun sampling species for pathogens in each country along a deforestation gradient, i.e., looking at areas with no deforestation, some deforestation, and areas where once pristine forests have been completely removed. In each region, EcoHealth Alliance scientists are investigating the number of viruses present

in different wildlife groups. Project Deep Forest allows the organization to create outreach via local communities and corporate stakeholders to promote the preservation of natural lands and diminish the devastating effects of land-use change.

EcoHealth Alliance's economic team has shown that reducing deforestation is cost-effective. For example, reducing emissions from deforestation is considerably less expensive than reducing emissions from fossil fuel combustion and other industrial sources. Additionally, preserving tropical forests helps protect the millions of plant and animal species that are indigenous to tropical forests and in danger of extinction. Keeping forests intact also helps prevent floods and drought by regulating regional rainfall. And because many indigenous people rely on tropical forests for their livelihoods, investments in reducing deforestation provide them with the resources they need for sustainable development without deforestation.



An estimated 18 million acres of forest, which is roughly the size of Panama, are lost each year, according to the United Nations' Food and Agriculture Organization

## PROGRAM UPDATES

# HEALTH & POLICY INITIATIVES

Despite the strong inter-dependencies of people, animals and the environment, wildlife and ecosystem health are typically not adequately considered in the development of human health, agriculture, or conservation policies. As a result, these initiatives are missing the critical piece of the health and biodiversity puzzle. Policies often end up lacking in science-driven guidance, and responses are reactive rather than proactive in predicting and preventing health and conservation threats.

EcoHealth Alliance has a core focus of translating its strong ecosystem health science into actionable information for policy makers. For example, on a local level, EcoHealth Alliance presented on the scale and impacts of the illegal wildlife trade in New York to the state's District Attorney Association to raise awareness among prosecutors. On a national level, EcoHealth Alliance provided scientific guidance through invited briefings to Congressional and White House officials on pandemic prevention and control, and natural resource management. This was especially relevant given the U.S. government's growing focus on global health security and its concerns over the illegal wildlife trade.

Towards shared conservation goals, EcoHealth Alliance also continued its fruitful collaboration with the Secretariat of the Convention on Biological Diversity (CBD), providing the ecosystem health perspective at a regional workshop in Brazil hosted by the CBD and the World Health Organization. EcoHealth Alliance also provided input on the CBD's publication "Healthy Planet, Healthy People – A Guide to Human Health and Biodiversity". EcoHealth Alliance has also continued to provide ecosystem and public health expertise to intergovernmental organizations including the World Organisation for Animal Health (OIE), the International Union for the Conservation of Nature (IUCN), and the UN's Food and Agriculture Organization and World Health Organization, including expert advice on Avian influenza and Middle East Respiratory Syndrome (MERS-COV).



EcoHealth Alliance executive vice president for health and policy, Dr. William B. Karesh is often called upon to present findings at the OIE Global Conference on Biological Threat Reduction.

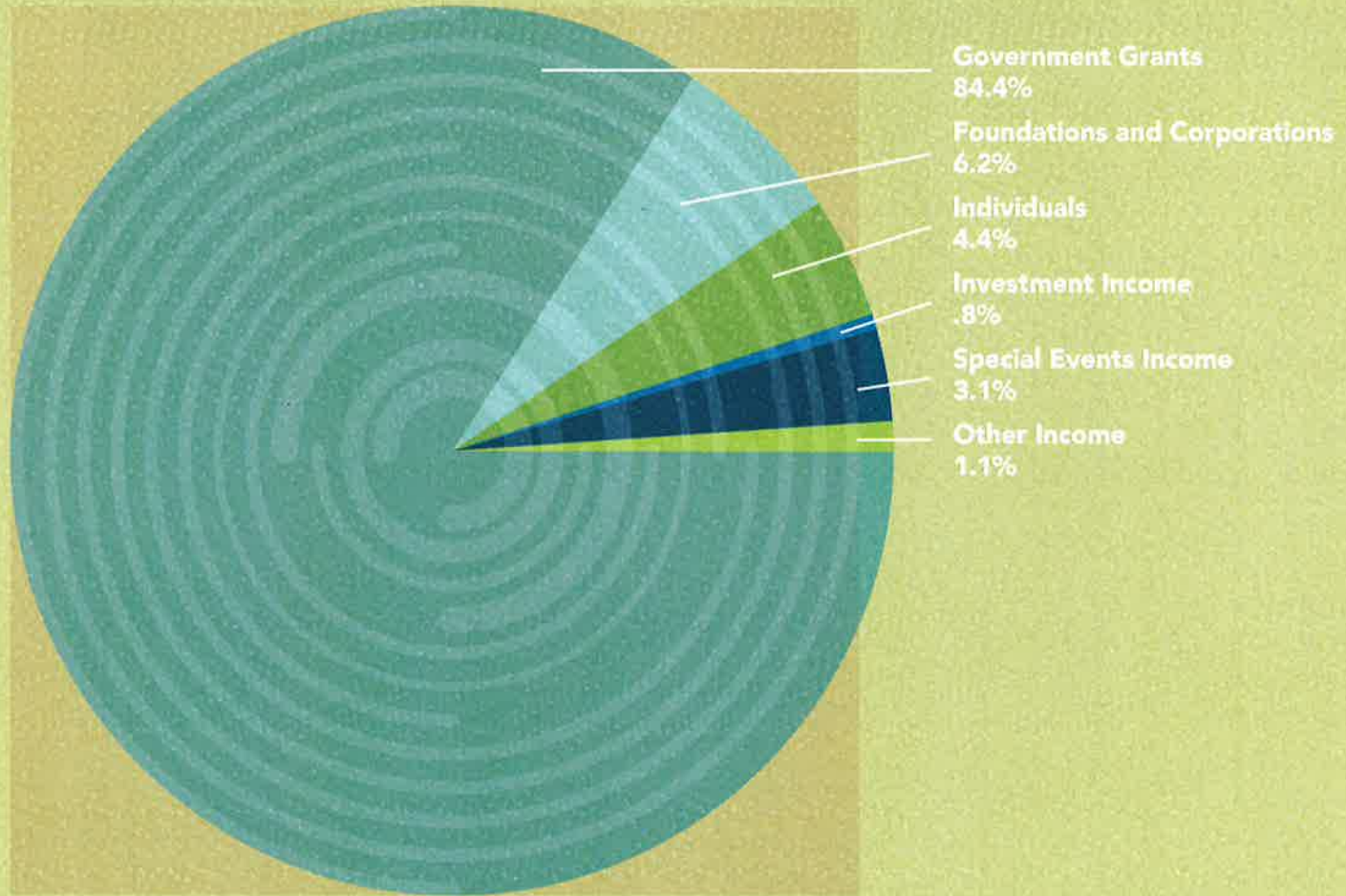
Internationally, EcoHealth Alliance has worked with government partners from health, agriculture, and wildlife agencies to develop surveillance programs and processes that enable early detection of disease risks for both humans and animals. EcoHealth Alliance provided technical and editorial support for the IUCN-OIE Guidelines to Wildlife Disease Risk Analysis, which will serve as a resource for governments, wildlife managers, and land use planners to promote more proactive consideration and mitigation of disease risks.

Recognizing the importance of both regulatory approaches and corporate practices to health and the environment, EcoHealth Alliance strives to also work closely with private industry to develop sustainable and healthy practices. Across the world and on local levels, EcoHealth Alliance staff and partners engage policy makers and industry partners to provide sound guidance based on science and build capacity to more efficiently and effectively promote wildlife and domestic animal health, public health, and natural resource management.



# FINANCIAL STATEMENTS

## EcoHealth Alliance Income Statement FY2015



### FY2015 Income

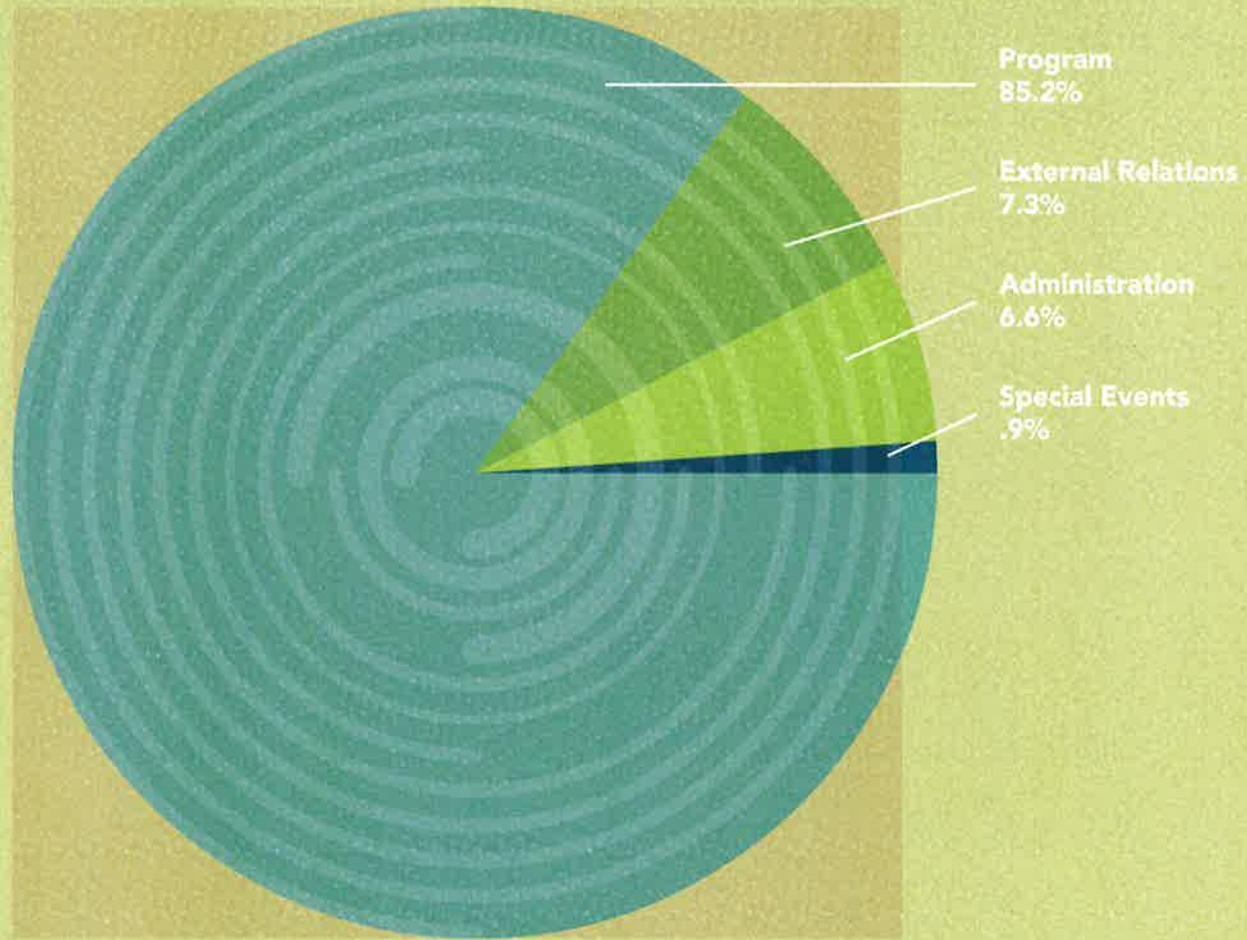
Government Grants	\$ 8,602,395 .
Foundations and Corporations	\$ 633,098 .
Individuals	\$ 444,088 .
Investment Income*	\$ 79,629 .
Other Income	\$ 118,111 .
Special Events Income	\$ 312,018 .
<b>Total Income</b>	<b>\$10,189,339 .</b>

\*Includes investment gains of \$24,812

The Consolidated Statements of EcoHealth Alliance as of June 30, 2014 including the Consolidated Balance sheet, Consolidated Statement of Activities, Consolidated Statement of Functional Expense, and Consolidated Statement of Cash Flows were audited by the firm of Loeb & Troper. The above presentation has been derived from those audited financial statements. Copies of the audit as well as the Internal Revenue Service Form 990 tax return are available upon request to the Chief Financial Officer at EcoHealth Alliance, 460 West 34th Street, 17th floor, New York, NY 10001

# FINANCIAL STATEMENTS

## EcoHealth Alliance Expense Statement FY2015



### FY2015 Expenses

Program	\$8,078,967.
External Relations	\$ 690,942.
Administration	\$ 625,586.
Special Events	\$ 83,750.
<b>Total Expenses</b>	<b>\$9,479,245.</b>
<b>Change in Net Assets</b>	<b>\$ 710,094.</b>

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# EcoHealth Alliance

## SENIOR MANAGEMENT TEAM

Dr. Peter Daszak  
*President*

Dr. William Karesh  
*Executive Vice President for Health and Policy*

Harvey Kasdan  
*Chief Financial Officer*

Dr. Jonathan Epstein  
*Associate Vice President*

Anthony M. Ramos  
*Senior Director, Marketing & Development*


**Local conservation.  
Global health.**


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