

# Smithsonian

## Surprising Science

November 8, 2011

### Ecology Explains How the World Works



*Ecologists warn that New England's maples could be at risk (courtesy of flickr user paul+photos=moody)*

The blog [io9](#) is running a series of [Public Science Triumphs](#), explaining how publicly funded science makes the world a better place. “It’s tempting to offload the cost of science onto business, but there are some kinds of research that only government can make possible,” io9 editor Annalee Newitz wrote this weekend in the *Washington Post*. That research, often called “basic,” may seem useless to some but can lead to great payoffs in the future. Basic research provides the foundation for monumental discoveries, fosters the development of ground-breaking technologies and gives us the information we rely on when making important decisions, like when and where to build and

how strong to make a structure.

An important, and often under-appreciated, source of that information comes from the world of ecology. Everything in the world is connected, but not in the new age way most people mean when they say that. It’s all connected through more mundane (though, frankly, more fascinating) ways, like carbon and nitrogen cycles, food webs, water and fire—the subjects of the science of ecology. And it’s this kind of information that will help a builder to know why a warehouse will flood even if constructed a fair distance from the river, explain how [reintroducing wolves](#) to Yellowstone led to an increase in beaver dams and guide management decisions, such as setting levels for sustainable fishing of [salmon](#).

Ecology is not a glamorous science; no one will ever accuse an ecologist of being motivated by money. (The practical clothes and sensible sandals usually deter such accusations.) Field sites are basic, at best. Your average college dorm provides more space and better food. But an ecologist probably won't mind because she's [happier out in the muck](#) anyway.

Much ecological research provides a simple slice in time, perhaps a few years of data. But to truly understand how everything is working together, more data is needed. That's where the [Long Term Ecological Research \(LTER\) Network](#) comes in. These are sites all over the world (included 26 in the U.S. LTER Network, funded by the [National Science Foundation](#)) that have been collecting data on [primary production](#) (the energy created by plants), the distribution of organisms in the ecosystem, the decay of dead organisms, the movement of water and nutrients, and the patterns of disturbances—at some sites for more than 30 years. Put that data together and an ecologist will have a picture of how organisms and the world around them are working together, and affecting the human population, too.

At [Harvard Forest](#), for example, LTER ecologists have documented the spread of the [Asian long-horned beetle \(ALB\)](#), which took up residence in Worcester, Massachusetts a decade ago. Scientists have been trying to keep the beetle confined to the city, but LTER scientists found that the insect has spread to the nearby forest, infesting nearly two-thirds of the maple trees in one area. “If the ALB continues to spread outside Worcester, the abundance of red maples could provide a pathway for its dispersal throughout New England and other parts of eastern North America,” [says the study's](#) co-author, David Orwig of Harvard University. And if the beetles spread and take out New England's maples, they would also destroy the region's maple industry and even, perhaps, a good portion of the autumn tourist trade. More than one million people come to the area each year, spending about \$1 billion in their quest to see the red maples' stunning foliage. Knowing the maples are at risk may lead to changes in how the infestation is being fought.

Ecology, and especially long-term ecological projects, are scientists' “gifts to the future,” as one of my colleagues put it. There is no Nobel Prize for ecology, and groundbreaking research papers are rare. Ecologists are pursuing this science because they simply want to know. And the benefits for the rest of us can be monumental. By better understanding how an ecosystem works, we are able to make better decisions that can save money and prevent disasters. No company is ever going to pay for this—their shareholders would never stand for it—but I'm glad to see NSF and other government agencies step in.