



All [Eco] Systems in Check

Oracle Arizona, September 1991

Earth on Earth?

Eight scientists sealed themselves in a huge building called Biosphere 2 in Arizona. Biosphere 2 was designed to contain all of the biomes of Biosphere 1—Earth. The scientists expected to spend two years isolated in this glass earth that imitated biomes on Earth—complete with various plants and small animals. The purpose? To see how this glass copy functioned—and what it could tell us about sustaining life on Earth.

Within 18 months, though, oxygen levels unexpectedly dropped to low levels—putting the scientists in danger. The rich soil used for plant-



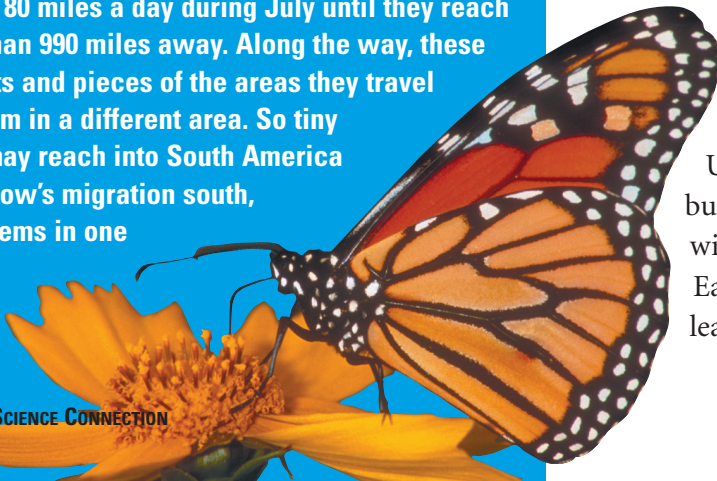
growing contained a large amount of organic materials. Bacteria consumed those materials, using up oxygen and releasing carbon dioxide. The carbon dioxide became trapped in Biosphere 2's cement. Plants weren't able to utilize the carbon dioxide and release oxygen for the humans and animals to breathe. Oxygen had to be pumped into the glass building. But that wasn't enough to save most of the small animals. Of the 25 small-animal species, 19 became extinct. Pollinating insects died too—and plants along with them.

Though it didn't accomplish its original mission, Biosphere 2 proved one thing: If humans destroy the natural systems that sustain Earth, the damage will be irreparable.

Today, Biosphere 2 serves as an environmental and research lab for Columbia University students. The building continues to provide us with information about life on Earth—and lessons that can be learned from nature.

We're all Connected

There are many ways animals connect one part of the earth to another. One of them is through migration. Animals migrate from one place to another when the weather changes or in search of food. The arctic tern travels more than 8,000 miles from the Arctic and Northern Europe to Antarctica. Atlantic salmon swim almost 1,000 miles in six weeks to spawn at the river where they were born. Monarch butterflies from the northern U.S. travel 80 miles a day during July until they reach California—more than 990 miles away. Along the way, these animals pick up bits and pieces of the areas they travel over, depositing them in a different area. So tiny pieces of the U.S. may reach into South America by way of the swallow's migration south, connecting ecosystems in one part of the world to ecosystems in another.



BEWARE OF DANGER

Prairie dogs are real “city” dwellers. They burrow underground to carve out miles of tunnels—or underground cities—to live and breed. Black-footed ferrets sneak into the tunnels to catch and eat the prairie dogs. In 1901, a prairie dog city originating in Texas reached 240 miles long (386 km) and 99,400 miles (159,964 km) across. To make these tunnels, prairie dogs dug under and destroyed an area of grassland that could have fed 1.5 million cows. Farmers weren’t happy, so they poisoned the animals to regain the land. As the prairie dogs declined, the ferrets’ food supply—and ecosystem—was cut off. In the 1970s, black-footed ferrets were thought extinct. But in 1981, a small colony was discovered in Wyoming. Today, the number of black-footed ferrets has risen to above 300. Many people are more aware of what happens when one organism becomes endangered: The rest of the world is in some kind of danger, too.



Hole in the Sky

All ecosystems on Earth are protected from the Sun’s harmful ultraviolet rays by a band of ozone gas high above our planet’s atmosphere. In 1982, scientists working in Antarctica discovered that the ozone layer above the continent was wearing thin. The culprit? Perhaps the buildup of chlorofluorocarbons (CFCs)—chemicals from aerosol sprays, foam plastics, air conditioners, and refrigerators. The CFCs rise into the atmosphere and destroy the ozone. Scientists believe that’s the reason why phytoplankton—the tiny plant that’s the first link in food chains in the Antarctic Ocean—are being killed. How may that impact the food webs of Antarctica—and the rest of the world?

FOLLOW ME

Even though humans destroy habitats, they sometimes create new ones—without meaning to. Mice have followed humans—much to human dismay—and have moved from grasslands to homes, where food and warmth is always available. Insects, beetles, moths, ants, and cockroaches followed too. And so did dogs, cats, birds, reptiles, and other family pets that originated in natural environments.

Sound Off

What does a bird’s chirp or a bee’s buzz tell us about the ecosystem around us? Lots, say acoustic ecologists. Acoustic ecologists keep their ears open for sounds that indicate changes in their environment. For the past 25 years, the sound of natural environments—and the ecosystems those sounds belong to—have changed drastically. As more houses are built to accommodate a growing population and more cars are needed to move all those people around, the sound of bird chatter is drowned out by the sound of city clatter. Acoustic societies want people to listen up. They say paying close attention to the sounds in your environment—from your backyard to your kitchen to a nearby forest—can give you clues to your surroundings. Get your ears ready for some serious listening. How many different sounds can you hear outdoors? How many of the sounds are made by nature? How many are not? What kinds of things do the sounds tell you about the environment?

