A plane crashes on a remote tropical island. Its marooned passengers soon discover that their new home is also populated by bizarre creatures—from marauding polar bears to a mysterious man-eating beast. This is the premise of *Lost*, currently one of TV’s top-rated dramas. While the creatures on *Lost* may be fantastically fictional, the idea that islands harbor unique and otherworldly creatures is very much rooted in reality. “Many of the world’s gaudiest life forms, both plant and animal, occur on islands,” writes David Quammen in *The Song of the Dodo*, a book that engagingly examines island biogeography, the study of species distribution on islands. 

“Perhaps the creators of *Lost* had Quammen’s words in mind when they plopped polar bears down on their uncharted desert isle. If the presence of arctic animals in the South Pacific setting seems utterly preposterous, imagine the Dutch pilot who in 1910 first reported seeing enormous “prehistoric” lizards living on the island of Komodo. Or the first humans to lay eyes upon the fearsome-looking “demon-headed” babirusa in the Indonesian archipelago.

Sometimes truth really is stranger than fiction. 

**The Big and Small of It**

It’s impossible to discuss island creatures without employing the use of superlatives. From the dragons of Komodo to the devils of Tasmania, islands boast some of the world’s biggest, smallest, and most distinctive creatures. “Islands are the world’s great repositories of biodiversity,” says Duane Silverstein, executive director of Seacology (www.seacology.org), a nonprofit organization devoted to preserving island habitats and cultures. A disproportionately high number of island species are also endemic—they’re found nowhere else in the world. Take Madagascar, where more than 6,000 of its plants, 100 of its birds, and 80 of its mammals are found nowhere else. 

Compared to their mainland relatives, island species tend toward either gigantism or dwarfism. The largest lizard, the aforementioned Komodo dragon, which measures up
to 10 feet long, lives on Komodo and neighboring isles. Giant tortoises weighing up to 600 pounds reside on the islands of Aldabra and the Galápagos. The fossil record is full of further examples, including dwarf elephants and pygmy hippopotamuses, which roamed the Mediterranean and Madagascar, respectively. California’s Channel Islands were once home to a pygmy mammoth, the ultimate oxymoron.

The trend toward bigness or smallness on islands may seem arbitrary, but some patterns have emerged. Island mammals tend toward dwarfism; reptiles, birds, and insects toward gigantism. Many interrelated factors govern why a specific species grows bigger or larger, most importantly food availability, metabolism, and the presence or absence of predators and competitors. To take one simplified example, if a small-bodied species has no predators and a plentiful food supply, over time it is likely to grow larger as the advantages of bigger body size (defense, better fat storage for lean times and body warmth) mean that the largest individuals of each generation are likely to produce more offspring that survive to reproductive age.

To take a counter example, for large mammals, food supply is more limited. The absence of predators leads to an overpopulation of the species, straining the available food supply. Smaller individuals, who need less food to survive, have a reproductive advantage. The result, over generations, is dwarfism.

Flightlessness is a common evolutionary outcome for island birds, and a logical result of the trend toward gigantism. Eventually, larger birds lose their ability to fly—or flee. When an island once free of predators is no longer so, flightless birds have a distinct disadvantage. The doomed dodo of Mauritius was the first recorded species to be driven to extinction by human activity, around 1692. The elephant birds of Madagascar and the moas of New Zealand fared no better, but some extant examples remain: The Galapagos cormorant is larger than all other cormorants, and the only one of its kind that can’t fly.

In addition to big birds and miniature mammals are the just plain odd inhabitants of island biomes. Take Visayan warty pigs, found on only two
islands in the Philippines. Males of this species grow long, floppy manes in November and shed them at the end of the breeding season. No other wild pig in the world is known to do this.

**Island Inspirations**

Exactly why islands harbor the weird and wonderful of the world is a question that has prompted centuries of scientific investigation. History’s most notable naturalists, Charles Darwin and Alfred Russel Wallace, who concomitantly hit upon the theory of evolution by natural selection, both found inspiration in their travels to islands. Wallace made his most profound realizations in the islands of Southeast Asia; Darwin in the Galapagos.

Darwin and Wallace were not only drawn to islands for their unique creatures, but because their limited size and isolation render them veritable living laboratories. They allow patterns of evolution to be seen more clearly. What Darwin and Wallace realized is that from a single colonizing species, a number of different forms arise to fill available ecological niches, each specially adapted to a particular environment or food source.

This process is now known as adaptive radiation. The finches of the Galapagos Islands, collectively called Darwin’s finches, provide a classic example. In the Galapagos, 14 finch species arose from a common ancestor. Even more impressive are Hawaii’s honeycreepers. From a single founder, a North American finch, at least 50 varieties arose to fill different available niches throughout the Hawaiian islands.
A species that has been completely removed from a particular area, but which still exists in another area. Also known as 

**extirpated**: A species that has been completely removed from a particular area, but which still exists in another area. Also known as locally extinct.

**fauna**: The animal life of a particular region.

**feral**: Formerly domesticated animals that have reverted to a wild state.

**flora**: The plant life of a particular region.

**insular**: Relating to, characteristic of, or situated on an island.

**introduced species**: An organism that has been brought into an area it did not previously inhabit, usually as the result of human activity.
have taken place on Hawaii, which comprises less than 1 percent of our country’s total land mass. Today, 85 percent of Hawaii’s endemic plant species are in danger of extinction, according to the World Conservation Union (IUCN).

All island species are at risk, but life is much riskier for island birds and reptiles, according to the IUCN’s recently released Global Species Assessment report. Of all recorded species extinctions since 1500 A.D., the report states, “In total, 62 percent of mammals, 88 percent of birds, 54 percent of amphibians, 86 percent of reptiles, and 68 percent of mollusks were island species.”

The greatest threat to island species is the introduction of non-natives such as goats, pigs, cats, and rats. Invaders may directly prey on natives, outcompete them for food and space, destroy their habitats, or carry diseases for which locals have no natural resistance.

The combination of invasives and a small geographic range can be deadly for island species. “On an island, there’s no place to run, no place to hide,” explains Silverstein. “If a bird habitat is threatened on a major continent, there is very likely to be 50, 100, 1,000, or maybe only 3 or 4 other habitats for that bird on that same large continent. But more often than not on a small island, there will be just one little area where they live. And then a new predatory species is introduced, and that’s it.”

Perhaps the most dramatic example of this is the brown tree snake on Guam. Prior to the 1940s, Guam was home to only four species of snake; all were small and relatively harmless. At some point during the late 1940s or early 1950s, the brown tree snake—a mildly venomous variety that grows up to eight feet long—was accidentally transported from its native range in the South Pacific to Guam, most likely as a stowaway on a military cargo ship. With no natural predators and an abundance of small-bodied prey, this nocturnal climber proliferated in its new habitat. By the mid-1980s, the snakes had virtually emptied Guam’s forests of their native birds and lizards. Twelve bird species, including the Micronesia kingfisher, were completely eliminated. Several others had their numbers drastically reduced.

The brown tree snake has become public enemy #1 on Guam, causing frequent power outages, killing domestic pets, and injuring children. They are responsible for millions of dollars in damage annually. Today, some forested areas contain an estimated 13,000 snakes per square mile, according to the U.S. Geological Survey. With little hope of ridding Guam of this pernicious pest, scientists are concentrating their efforts on keeping the snake from hitching a ride to other islands, like Hawaii. In the last five years, the USDA has trapped more than 5,000 snakes at Guam’s international airport!

Whether they are introduced accidentally or intentionally, as in the case of the feral pigs on California’s Channel Islands (see story on page 12), non-native species can wreak havoc on ecosystems.

Other factors contributing to the vulnerability of island species are habitat destruction, hunting, disease, the pet trade, and climate change.

Species inhabiting smaller islands are more vulnerable to extinction than those living large. If a population is small to begin with, the introduction of a new predatory species or the occurrence of fire, disease, or other natural event, may kill enough individuals that there is no longer a viable population left to perpetuate that species. Moreover, species on smaller islands may have weaker immune systems, according to a recent study by researchers at the University of Michigan. Small species’ lack of immunity is a natural result of their being

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**Paradise Lost?**

The very features that make islands hotspots of biodiversity also make them among the earth’s most vulnerable ecosystems. “In the last 400 years, the majority of all plant and animal extinctions on this planet have occurred on islands,” says Silverstein, who adds that in the United States, nearly three-quarters of all extinctions living things to make the journey.

Oceanic islands tend to be largely devoid of mammals, which don’t travel as well across open water as birds and reptiles. Even if a mixed-sex pair does manage to make a sea crossing, the likelihood of them establishing a viable population in the new territory is slight. They just aren’t as adaptable as reptiles, plants, and birds.

Continental islands are more likely to harbor mammals, which, if they weren’t already present at the time of separation, may have swum over from the mainland or walked across a long-ago land bridge.

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▲ Since its accidental arrival in Guam a half century ago, the brown tree snake has irrevocably altered the island’s ecology and economy.
exposed to fewer parasites in the course of their secluded existence. When new parasites are accidentally introduced to a small island, the native species are extremely vulnerable to infection.

The isolation that once protected island biomes has vanished, the victim of international air and boat traffic, commercial fishing fleets, and global communication and economy. Silverstein reflects, “The poet John Donne said, ‘No man is an island.’ If he were alive today, he might say, ‘No island is an island.’ They’re not really islands any more.”

**The Human Element**

The precarious state of island plant and animal species is mirrored by their human residents, according to Silverstein, who points out that island cultures and languages are also in dire straits. Rather than focusing solely on saving island wildlife, Seacology looks for solutions that address the needs of people as well.

With 109 projects throughout the world, Seacology works with island communities to figure out how to best help them protect their own environments. “We go to the island villagers and say, ‘What do you want? Not what we, sitting in an office in the U.S., say you should want, but what do you want in exchange for setting aside a forest reserve or a marine reserve for, say, twenty years?’ And typically they will say they want a school or a community center or a water-delivery system.”

Building such a facility in an impoverished region—where per capita income may be less than $100 annually—helps villagers resist pressure from developers, logging companies, and commercial fishing fleets that seek to exploit their island’s natural resources. This in turn helps preserve those resources for generations to come. “You really can’t have effective conservation without taking into account people who live in the impacted areas,” says Silverstein.

How this equation works comes home in one of several examples offered by Silverstein. The Hainan gibbon, the most endangered relative of the golden-cheeked gibbons housed at the Los Angeles Zoo, lives on Hainan Island off the coast of China. The biggest threat to its survival is deforestation, as the needs of the burgeoning human population for charcoal and lumber are fast depleting China’s forests. Working with a local China-based organization, Seacology reached an agreement with the four tribal villages on the outskirts of Bawangling Reserve, home to all known remaining Hainan gibbons (fewer than 20 individuals). In exchange for scholarships for roughly 200 middle schoolers (in a region where few kids stay in school past sixth grade), the villagers have promised to stop cutting down the trees. They are also being trained in alternatives like honey harvesting and herb farming. “So we’re helping to save arguably the world’s most endangered primate, and at the same time providing scholarships for every middle school-age child in four villages,” says Silverstein.

The Nature Conservancy (nature.org) and Conservation International (www.conservation.org) are among dozens of organizations that work to preserve fragile ecosystems, including some island regions. Among the Nature Conservancy’s projects are the Solomon Islands, the U.S. Virgin Islands, the Grenadines, Palau, and California’s own Santa Cruz Island. Conservation International focuses on saving biodiversity hotspots, areas that have already lost at least 70 percent of their original vegetation. Many of the 34 hotspots they have targeted are island regions, including Madagascar, Polynesia, and New Zealand.

While the plucky survivors of *Lost* continue their weekly struggle for survival, so too real-life island inhabitants face an uncertain future. Island species are about 40 times more likely to go extinct than their continental counterparts. Without widespread, collaborative conservation efforts between international and local communities, the fantastic flora and fauna of islands may soon only be the stuff of television and movies.