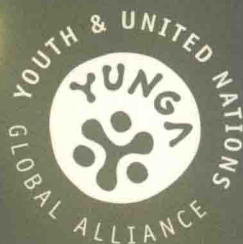


YOUTH AND UNITED NATIONS GLOBAL ALLIANCE **LEARNING AND ACTION SERIES** SUPPORTED BY  Sida

THE **YOUTHGUIDE** TO **BIODIVERSITY**

1ST EDITION



THE YOUTHGUIDE TO BIODIVERSITY

1ST EDITION

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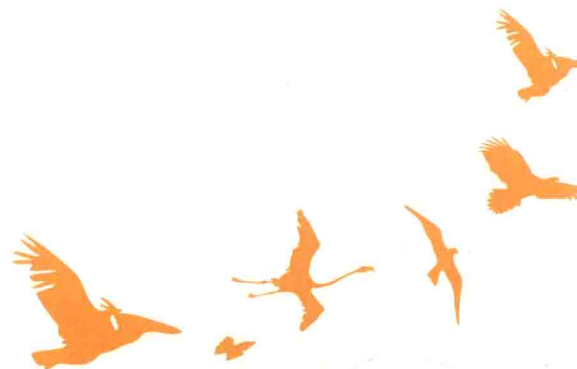


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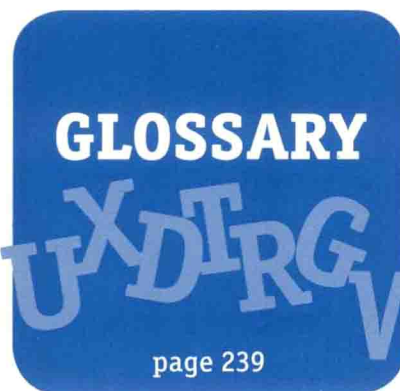
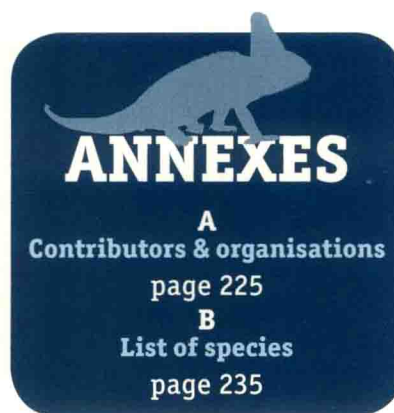
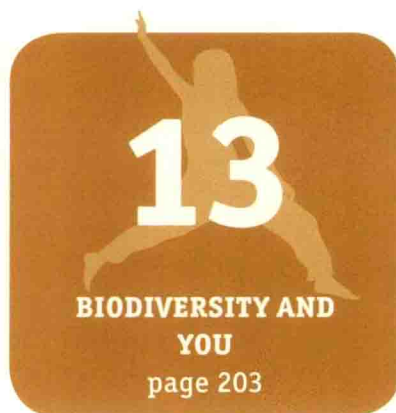
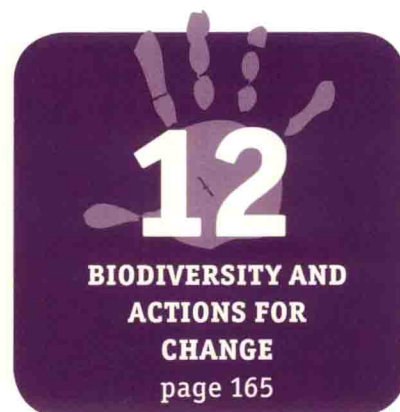
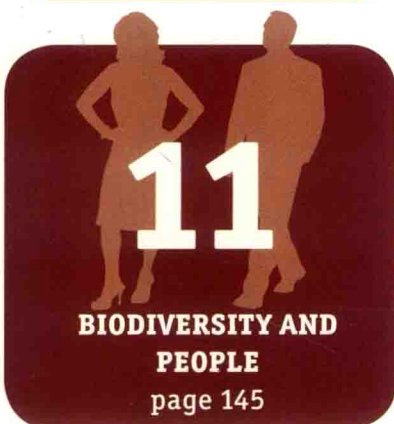
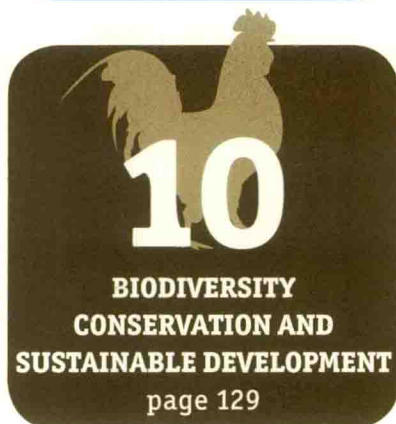
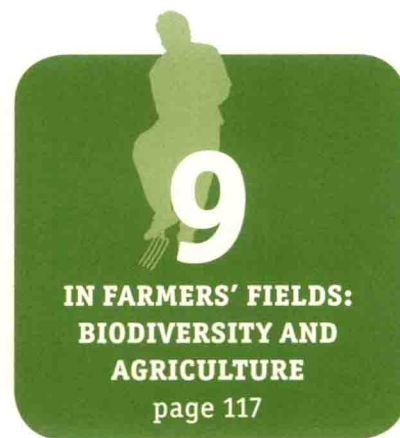
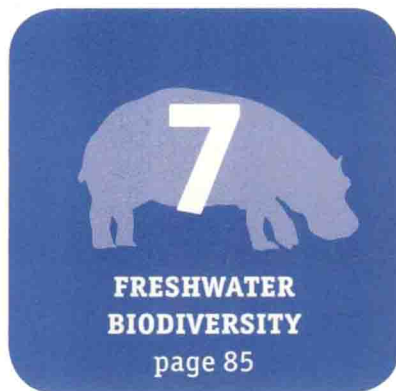
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PREFACE

A CAMOUFLAGED CREATURE THAT CAN LOOK IN TWO DIFFERENT DIRECTIONS AT THE SAME TIME...

A CREEPY CRAWLY WITH NO EYELIDS...

A HUGE, TRUMPETING MONSTER THAT CAN SMELL WATER FROM A DISTANCE OF THREE MILES (4.8KM)...



NO, THIS IS NOT A DESCRIPTION OF A TOTALLY WILD SCIENCE FICTION MOVIE!

Welcome to planet Earth, whose inhabitants include chameleons, who can see in two different directions at the same time, insects without EYELIDS and elephants with their great sense of smell.

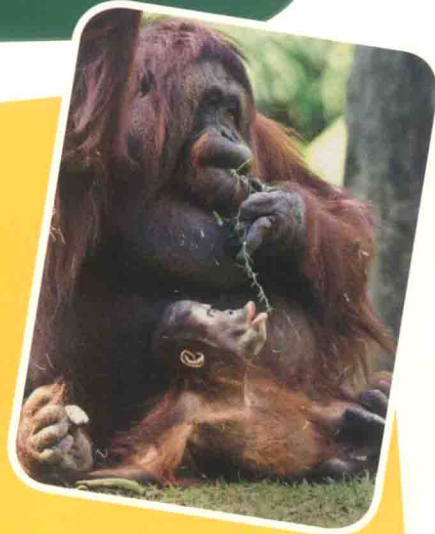
These are just a few examples. The variety of animals and plants on Earth is truly wondrous. Moreover, its diverse ecosystems, such as deserts, oceans, rivers, mountains, marshlands, forests, and grassy plains are specifically suited to the creatures and plants that live there. But changes to an ecosystem's environment can spell doom for its native plants and animals, and unfortunately, this is happening all too fast today. Many species are at risk of disappearing entirely. While extinction has always happened as a natural part of a gradual evolutionary process, the current rate of extinction of animals and plants is thought to be hundreds, perhaps even thousands, of times faster than that brought about by natural evolutionary processes.

Biodiversity experts say that nowadays most extinctions are caused by human activity, such as deforestation, mining, conversion of land, building dams, roads and cities, overfishing, and other activities that lead to habitat destruction, climate change, and pollution. So much so that the International Union for Conservation of Nature (IUCN) has 5 689 entries on its endangered species list (www.iucnredlist.org), many of whom might be familiar to you like species of gorillas, orangutans, turtles, eagles, whales, cranes,

seals, foxes, bears, and tigers but also many species of plants, birds, insects, reptiles, amphibians and fish.

Most of us believe that all life has the right to exist, and many of us also feel a personal loss when wildlife is damaged or destroyed. However, loss of Earth's biodiversity affects us in material ways too. In fact, biodiversity is the foundation on which human life depends. Plants and animals provide food and medicine, rivers provide precious drinking water, and trees absorb greenhouse gases and protect land from erosion. Damaging natural ecosystems may also affect natural processes, such as flood control and crop pollination, among others.

We invite you to dive into this comprehensive youth guide for in-depth insights into biodiversity, the benefits it provides to us, the threats it faces, and what actions we can take to protect it. The guide is richly illustrated, including award-winning photos taken by youth from around the world as part of the 'See the Bigger Picture' contest that supported *The Green Wave*, a global campaign promoting biodiversity. At the end of the guide there is a useful tool for setting up an action plan and undertaking your own biodiversity project, with Six Simple Steps towards Change. Take inspiration from far-reaching projects of other young global leaders and their innovative projects. At the end of each chapter and in the annexes, you will find additional resources, assignments for further learning about your surroundings, and other useful information.



“IT MIGHT BE TOO LATE TO SAVE SOME SPECIES FROM EXTINCTION, BUT IT’S NOT TOO LATE TO TAKE ACTION TO SAVE OTHERS. PEOPLE LIKE YOU CAN MAKE THE BIGGEST DIFFERENCE, AND GETTING INFORMED AND MOTIVATED IS A GREAT WAY TO START.”

Anggun,



Jean Lemire,



Carl Lewis,



Fanny Lu,



Debi Nova,



Lea Salonga



& Valentina Vezzali



CBD, FAO & YUNGA AMBASSADORS

© FAO/Simone Casetta



ANGGUN

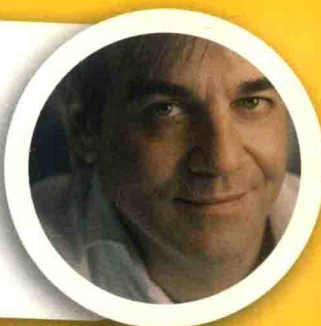
YUNGA AND FAO GOODWILL AMBASSADOR

“Humanity must learn to share the planet with other species and as individuals we must change our daily habits to help preserve our biodiversity.”

JEAN LEMIRE

CBD AMBASSADOR

“The health of our planet relies on an exquisitely delicate balance and extraordinary diversity of life. The more we learn about biodiversity and discover its beauty, the more we care for it.”



DEBI NOVA

YUNGA AMBASSADOR

“May this guide inspires you to experience and explore the wonders of nature, preserve it and motivate your family, friends, classmates, and community to save our planet’s biodiversity.”



FANNY LU

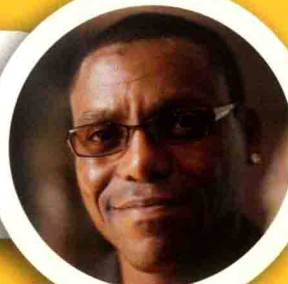
YUNGA AND FAO GOODWILL AMBASSADOR

“I hope this guide opens your eyes to the incredible biodiversity around us and motivate you to take action.”

CARL LEWIS

YUNGA AND FAO GOODWILL AMBASSADOR

“We must win the race against time to preserve what we have left of our biodiversity, every action that you and I take is important.”



LEA SALONGA

YUNGA AND FAO GOODWILL AMBASSADOR

“Our world is truly wonderful; let us learn to live in harmony with it and preserve it for future generations to also enjoy.”

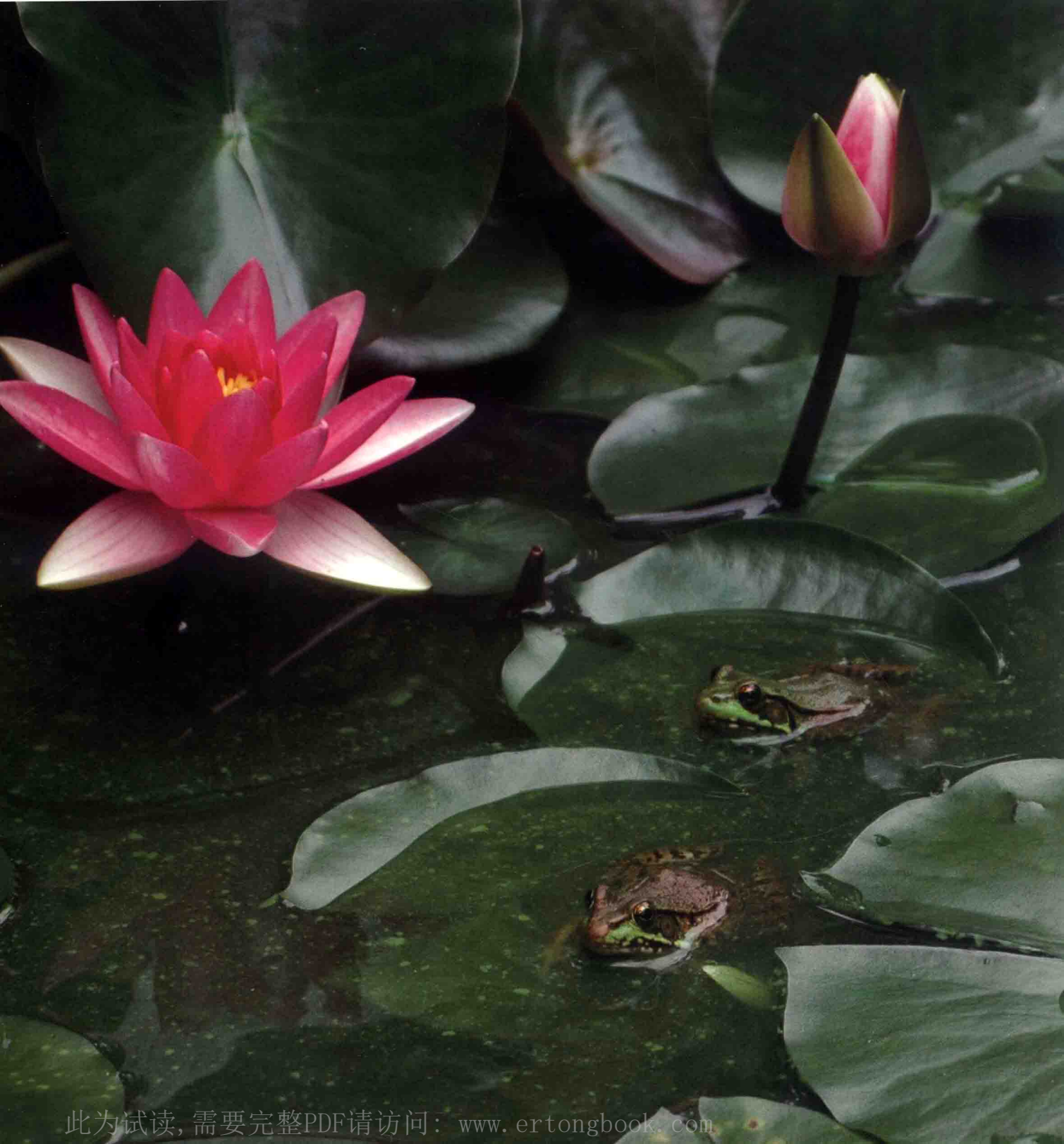
VALENTINA VEZZALI

YUNGA AMBASSADOR

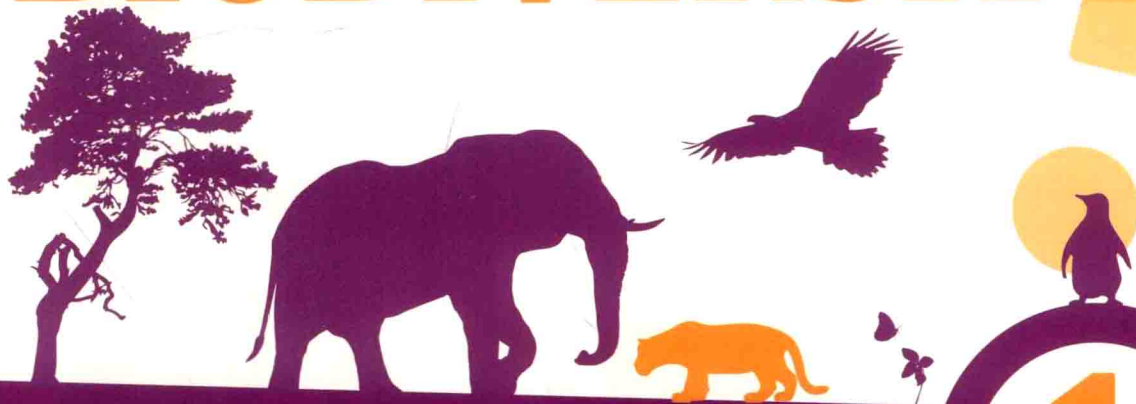
“We’re surrounded by awe-inspiring and life-enriching plants and animals. Can you imagine living in a world without them? I can’t – so let’s take a stand for biodiversity!”



Download this guide and other interesting resources from:
www.yunga.org



WHAT IS BIODIVERSITY?



DEFINING BIODIVERSITY AND ITS COMPONENTS,
AND WHY THEY ARE CRITICAL FOR HUMANS AND
FOR ALL LIFE ON EARTH

Christine Gibb, CBD and FAO

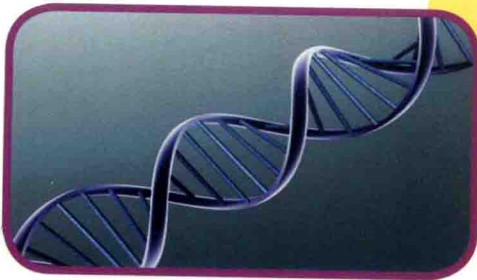
“Bio” means life and “diversity” means variety, so **biodiversity** (or biological diversity) is the incredible variety of living things in nature and how they interact with each other. It’s one of the world’s most precious treasures. Every human being, plant and animal contributes to the diversity, beauty and functioning of the Earth. This chapter introduces the concept and components of biodiversity, and some of the ways that biodiversity enriches our lives. The uses of biodiversity will be explored in later chapters.

When you see text highlighted like this it indicates the word is in the glossary so you can find out more on what it means.

BIODIVERSITY, A THREE-PART CONCEPT

Biodiversity consists of all the many species of animals, plants, fungi, micro-organisms and other life forms and the variety that exists within each species.

It also includes the diversity present in ecosystems – or explained another way – the variation we see in the environment including landscapes, the vegetation and animals present in it, and the various ways in which these components interact with each other. Biodiversity is very complex and is often explained as the variety and variability of genes, species and ecosystems.



GENES

Genes are the units of heredity found in all **cells**. They contain special codes or instructions that give individuals different characteristics. Let's compare, for example, the genes coding for the necks of two different species: giraffes and humans. Even though both species have the same number of neck vertebrae (seven), the neck lengths of the two species are very different – approximately 2.4 metres for giraffes versus 13 centimetres for humans. This is because a giraffe's genes instruct each vertebra to grow up to 25 centimetres in length, whereas a human's instruct each vertebra to grow to less than two centimetres.

Genetic diversity occurs within a species and even within a variety of a given species. For instance, in a single variety of tomato, the genes of one individual may cause it to flower earlier than others, while the genes of another individual may cause it to produce redder tomatoes than other plants. Genetic diversity makes every individual unique. So in fact no two living things in nature are exactly the same. Chapter 3 delves into genetic diversity in greater detail.

DIATOMS ARE MICROORGANISMS.

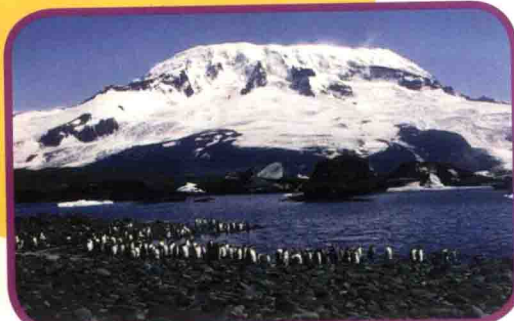
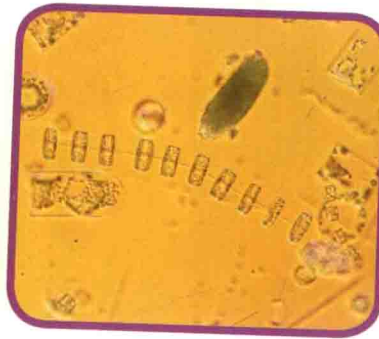
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YELLOW STRIPED LYCHNIS MOTH CATERpillARS
ON THE ROADSIDE IN AVEYRON, FRANCE.

© Clémence Bonnefous (age 8)

SPECIES

In our world you can find a dazzling array of animals, plants, fungi and micro-organisms. The different kinds of these are called 'species'. **A species is a group of similar organisms (individual living creatures such as spiders, walnut trees or humans) that can breed together and produce healthy, fertile offspring.** Although we may not think about it, we see various species as we go about our daily lives, such as humans, goats, trees and mosquitoes. Species diversity is the most obvious type of biodiversity. Our planet supports millions of species, many of which are not yet identified! At present, there are 310 129 known species of plants and 5 487 known species of mammals. There are perhaps millions of tiny organisms or **micro-organisms** that scientists have yet to identify. Chapter 4 explores species diversity, and answers species-related questions such as: why are species important?



SCHOOL OF FAIRY BASSLETS BETWEEN GIANT
SEA FAN IN CORAL REEF.

© Korallenriff_139905

THE TEMPERATE RAINFOREST ON FRASER ISLAND,
GREAT SANDY NATIONAL PARK, QUEENSLAND,
AUSTRALIA IS A UNESCO WORLD NATURAL HERITAGE
SITE.

© Michael Weber

KING PENGUINS IN THE SUBANTARCTIC REGION.

© Michael Weber

In the same way that humans live in communities, so too do animals, plants and even micro-organisms. **Where communities of plants and animals live together, and share their space, their land and their climate, they form an ecosystem.** Ecosystems are what many people call "the environment" or "nature". Chapter 5 provides an overview of ecosystems, and Chapters 6, 7, 8 and 9 take a closer look at biodiversity in several ecosystems. There are many kinds of ecosystems on Earth. Ecosystems can be small like puddles, or large like deserts, forests, wetlands, mountains, oceans, lakes and rivers.

ECOSYSTEMS

BRINGING BIODIVERSITY TO THE WORLD STAGE

In 1992, an Earth Summit was held in Rio de Janeiro, Brazil, where governments, indigenous groups, women's groups, environmental groups, activists and other non-governmental organisations met to discuss the environment.

It was the largest international environmental meeting ever. In Rio, world leaders agreed that it was important to protect

the environment for all people, including future generations. To reach this goal, the leaders decided to adopt three conventions (or agreements): the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD).

At the summit, participants agreed on the following definition of biodiversity:

"the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

This is the official definition used by the Convention on Biological Diversity.



© Mario Moreno Ruiz (age 16)



Convention on
Biological Diversity



IT'S ALL ABOUT THE INTERACTIONS

Perhaps the most important characteristic of biodiversity is that all of the components are linked to each other.

For example, if a mouse eats a chemically-contaminated seed, it may survive, but if a hawk eats many mice that have eaten such seeds, the hawk may die from a lethal dose of the chemical. Because of their position in the food chain, top predators such as hawks are susceptible to such **biomagnification**, the accumulation of substances that increase in concentration up the **food chain**. Biodiversity linkages can also be beneficial: the restoration of coastal mangrove forest ecosystems provides an important nursery **habitat** for fish and other marine species, improves fisheries along the coastline, and protects human settlements from extreme weather events.

Similarly, the re-naturalisation of upstream rivers allows the recreation of a natural food chain, decreases the amount of mosquito larvae (thereby decreasing the incidence of malaria or similar mosquito-borne diseases), improves fisheries, and purifies water. If one level of biodiversity is interrupted, the other parts experience a ripple effect, which can be harmful or helpful to biodiversity.

The box: "Smaller Habitats Lead to Smaller Gene Pools" shows how the deterioration of an ecosystem negatively affects both species diversity and genetic diversity.

The box: "The Black Bear and the Salmon: Mighty Ecosystem Engineers" illustrates one positive example where two species play vital roles in engineering an ecosystem.



IMPROVING ONE ASPECT OF AN ECOSYSTEM BENEFITS THE WIDER ECOSYSTEM. A FORESTRY PROGRAMME TO REHABILITATE HILLSIDES IN NEPAL IMPROVED THE FLOW OF WATER FROM SPRINGS, WHICH, IN TURN IMPROVED CROP PRODUCTION.

© FAO/Giampiero Diana

SMALLER HABITATS LEAD TO SMALLER GENE POOLS



The Florida Everglades in the USA is a unique ecosystem that was once home to many wading birds, mammals, reptiles, insects, grasses, trees and other species. It used to cover an area as large as England (over 9 300 square kilometres), but has shrunk over the years as more and more people moved there. The people also changed the ecosystem by building water management areas and canals, and filling in swampy areas for agriculture.

These ecosystem changes were bad for many species, including wood storks and Everglade kites.

The changes even affected the genes of some species such as the Florida panther! As suitable habitats were broken up into smaller and smaller pieces (scientists call this process “fragmentation”), only a few Florida panthers could survive.

With fewer breeding partners around, the variety in the **gene pool** (the total variety of genes available) declined. So the changes to the ecosystem negatively affected both species diversity and genetic diversity.

A KITTEN (TOP) AND ADULT (BOTTOM) FLORIDA PANTHER. THE KITTEN WAS MARKED WITH A TRANSPONDER CHIP, THE SAME KIND OF CHIP THAT IS USED TO IDENTIFY HOUSEHOLD PETS. THE ADULT WAS TAGGED WITH A RADIO COLLAR, WHICH HELPS BIOLOGISTS TRACK THE ANIMAL AND COLLECT DATA USED IN PANTHER CONSERVATION.

© Mark Lotz/Florida Fish and Wildlife Conservation Commission.

Sources: www.biodiversity911.org/biodiversity_basics/learnMore/BigPicture.html and www.nrdc.org/water/conservation/qever.asp