



# GOD MADE THAT!

CATHOLIC NATURE  
FIELD GUIDE

BY KATHLEEN M. HOENKE AND WILLIAM A. JACOBS  
ILLUSTRATED BY FIONA OSBALDSTONE

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For Finn and Ella, may you forever wander in the wonders of nature,  
finding in its beauty a path that leads you to God.

—K.H.



To my parents, Julia and Walter, and my grandparents, for their faith, love,  
and respect for people and nature. To my beloved wife, Lynn, my wonderful  
children, Erin, Cara, and Willy, and their spouses, and my precious  
grandchildren, Jacob and Jonah, who bring joy to my life.

A special dedication to Cristina Gaztelu Vargas,  
whose faith and courage have been invaluable.

—B.J.



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# FOREWORD

The brilliant and faith-filled authors of this field guide have spent many years observing God’s beautiful design in nature. They have studied the important role humans have in protecting it.

Exploring our world helps us grow in love and understanding of God and his awesome creation. Bill Jacobs, one of the authors of this book, once said to me that so much of the trouble in the world is because we “have lost our relationship with the land. We have forgotten where we’ve come from.” He’s right. God speaks to us through nature, which is why it can be so much easier to slow down, think, and pray outdoors.

My favorite feature of *God Made That!* is the traditional wisdom of Indigenous peoples that is skillfully woven in with scientific information and prayerful thanksgiving. We can learn so much about how to care for nature from the original people of this continent. Who better to learn from than those who have thrived on North American land for tens of thousands of years?

I am an enrolled citizen of the Mohawk Nation. This means that my ancestors were the original inhabitants of eastern New York State. I am from the same tribe as Saint Kateri Tekakwitha, a holy Mohawk woman who loved God and nature. Mohawks and other Indigenous communities believe that, when making decisions, it is important to think of the people who haven’t been born yet. This is known as the Seventh-Generation

## FOREWORD

principle. This is especially important when interacting with the environment. God calls us to take care of the Earth so that it will be just as beautiful and abundant for our grandchildren and their grandchildren.

I am so excited for you to experience this field guide. It is full of mind-boggling facts, captivating stories, and delightful activities for exploring where you live. It will help you learn and appreciate how people live in communion with nature, and what we can do to help care for this gift from God. God gave us this very important job from the beginning of creation. As an Indigenous person, I am thrilled to know that young Catholics are learning about nature in a way that honors traditional wisdom and love of our Creator. I hope you love it as much as I do.

SHAUNA'H FUEGEN, OFS



# PREFACE

Welcome to this field guide!

This is a guide to our homes on Earth, the places where human beings live, including habitats, ecosystems, and biomes, and the characteristic species of plants (*flora*) and animals (*fauna*) that live on the Earth. It is also a guide to how our experience of *nature* can help us connect with God and grow in our friendship with him. God created the world as a gift to us and wants us to enjoy exploring it!

This field guide is inspired by Catholic ecology. *Ecology* is the study of the relationships between people, plants, animals, and all other living things and their physical surroundings. These physical surroundings are also called the *environment*, which is made of both living and non-living things. Plants, animals, and non-living things are created by God. They are by *nature* destined for the *common good* of past, present, and future humanity. People are called to be good stewards of *creation* (all that God has created), beginning with the places where we live.

This book talks about the science of ecology. It also looks at what the Bible and the Church teach us about our relationship with the world and each other. As we explore creation and see how it helps us become closer to God, we are following in a long line of people who have done the same thing. Throughout this book we will meet saints and other members of the Church who give an example of loving and caring for all God's creatures.

Some of the words that might be new for you are defined in the glossary beginning on page 187. The first time they are used they are in bold italics—*like this*.

This guide can be used anywhere—at home, in the classroom, or in the field. It offers a way for us to learn on our own, and it can also help parents and teachers teach ecology as an integral part of our Catholic faith. Some activities are best used in the biome of that chapter, and some can be done anywhere. Most of the activities are meant to get us outside, observing and exploring nature!

# PREPARE TO EXPLORE!

## Nature Safety

- Go with a friend, family member, or teacher. Use the buddy system.
- Always ask permission and let someone know where you will be and when you are coming back.
- Learn about an area before you go. If you are exploring a park, is there a map? Are there any hazards such as wide streams or steep hills that might pose a problem? Are the trails marked? Is the nature hike too long?
- Check the weather before you go.
- Drink water before, during, and after outdoor activities.
- Bring whatever you may need in the field, such as water, snacks, warm clothes, sturdy shoes, compass, whistle, insect repellent, cell phone, sunscreen, and a hat.
- Look down for holes, rocks, logs, mud, sharp sticks, steep cliffs, and anything else you might step on, trip over, fall into, slip on, or get stuck in.
- Look up for standing dead trees (called *snags*), sharp branches, broken tree limbs, wires, and anything else that might fall or be dangerous. Do not touch wires.

## GOD MADE THAT!

- Do not swim or go into water alone.
- Remember road safety. Watch out for cars when you're near a road.
- Learn to identify and avoid poison ivy and other poisonous plants and berries. Poison ivy has groups of three leaves, and we say, "Leaves of three, let it be." Not only should you not eat any plant that has not been positively identified, but you should also wash your hands before eating or even before touching your face, in case you have come into contact with something poisonous.
- Watch out and listen for snakes, wasp nests, bears, mosquitoes, and other potentially dangerous wildlife.
- Avoid getting stung by a bee, wasp, yellow jacket, hornet, or fire ant. Some people may have a serious allergic reaction to insect stings.
- If you live in an area with ticks, try to avoid tall grass and brush. Use a tick repellent if needed, with adult supervision. Check your clothes as you go and check yourself carefully for ticks when you get home. Remove ticks promptly, within twenty-four hours.
- Be careful about too much heat. (Young children can overheat quickly and at lower temperatures than adults.) Take frequent breaks in the shade and drink plenty of water.
- Know who to call and where to go in an emergency.
- If you get lost, stay put in a safe place until help arrives.

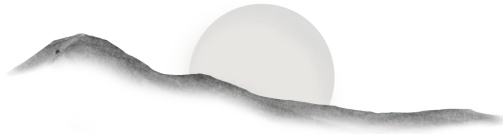


## Before You Go Outside . . .

- Pack this book.
- You might also want to bring a sketchbook or a notebook to write notes about what you see. This can be your *Nature Journal*. Throughout this book you will find prompts about things you can write about in your journal, and ideas for things to sketch. You will need your Nature Journal for most of the suggested activities.
- A few of the activities in this book suggest using the internet to find information. Because sites are always changing, we recommend that kids and grownups explore these resources together. Read more about this on the Resources page 177.
- If you have a cell phone with internet access, consider using an app called iNaturalist that will help you identify and record all the species you observe. You can find more information on the Resources page, 177.

# PART 1





## CHAPTER 1

# OUR COMMON HOME

### Our Homes on Earth

What kind of a home do you live in? There are many kinds of homes. Some homes are small, and some are big. Some homes have a backyard, and some do not. Some homes are in the city, some are in the country, and some are in between. Some of us struggle to find a home, and some of us move around.

The Earth is everybody's home—our *common home*. *Common* means shared. The Earth is the planet we live on. God created it as a gift for all people. Studying about our world is an important way for us to learn about God and his love for us.

### Many Kinds of Creatures

The Earth is home to many kinds of beautiful plants and animals of different sizes, shapes, and colors. Together, the many kinds of living and non-living things on Earth tell us more about God than any one thing tells us by itself. The great variety of living things, or *organisms*, on Earth is known as *biodiversity*. The parts of the Earth that support life make up the *biosphere*. This field book primarily explores plant and animal life.

Differences in organisms exist because those organisms live in many different kinds of homes and natural communities.

Living *beings*, such as people, plants, and animals, are all God's *creatures*. Non-living things, such as air, water, rocks, and soil are also God's creatures, because everything has been created by God. In this field book

the words *beings*, *things*, and *creatures* all have the same meaning. All three words are used throughout the book. Many Church documents also use these words in this way.

People are special to God. We are created in his image and likeness. We can love, reason with our minds, and choose to do good. Of all the creatures on Earth, only people are called to know and love God.

Saint Josephine Bakhita once said, "I remembered looking at the moon and stars and the beautiful things in nature and saying to myself, 'Who is the master of all these beautiful things?' And I experienced a great desire to see him and know him and honor him. And now I do know him. Thank you, thank you, my God!"<sup>1</sup>

Like Saint Josephine, you may feel amazement when you experience the peace and beauty of nature.

You might wonder, *How could God create something so beautiful?* And just imagine—God thinks of you as more marvelous than all of the plants and animals. The human person is his greatest creation of all!



## What Is a Biome?

A *biome* is a large *community* of organisms that includes people, plants, and animals. A biome makes up a large area of the Earth. Within each biome, plants, animals, and other organisms share similar ways of living because they share the same *climate* and landscape. Climate is the weather of an area over a long period of time.

Organisms develop changes that help them fit the conditions found in

their particular biome. These changes are called *adaptations*.

This field guide contains chapters about nine biomes found in North America and the islands of Hawaii and Puerto Rico. You probably live in or near one of these biomes.



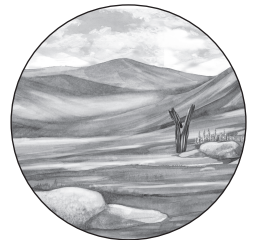
A **forest** is a community of plants, animals, and other living things that is dominated by trees. Forests are important for people and many kinds of plants, animals, and other organisms. They provide shelter, air, water, food, wood, and medicines. Forests are found where there is enough water moisture to grow trees. We will look at four forest biomes: temperate deciduous forest, coniferous forest, temperate rainforest, and tropical rainforest.

A **grassland** is an area where the plant life is dominated by grasses. Grasslands have few trees, unlike forests, which have many trees. A grassland has enough water moisture to grow grasses and wildflowers, but may not have enough water moisture to grow trees.



A **desert** is a large, dry area of land with thinly scattered plant life. Deserts are found where there is too little water moisture to grow trees and most other plants.

The **tundra** is extremely cold and dry, much like a desert but usually colder.



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The **saltwater** or marine biome is composed of the ocean and bays and is the largest biome.

The **freshwater** biome consists of lakes, rivers, streams, and wetlands across the land.



## NATURE JOURNAL IDEA

What biome do you live in? How do you know? What biomes would you most like to visit and why?

## Ecosystems and Habitats

*Indigenous peoples* have been a part of the biomes of North America for thousands of years. Their understanding of ecosystems and the plants and animals that live there is called **traditional ecological knowledge**.

This knowledge is very important to learning how to care for our common home.



An *ecosystem* is a community of living and nonliving beings, together in their environment. There may be many ecosystems in a biome. The non-living parts of an ecosystem are called **abiotic**, while all living things (even the tiniest) are called **biotic**. Both biotic and abiotic parts of an ecosystem help to shape it and make it what it is.

Within an ecosystem there are many smaller **habitats**. A habitat is

the place where a person, plant, animal, or other living thing makes its home. Habitats provide shelter, water, food, and space for people and wildlife. Almost every place on Earth, from the hottest deserts to the oceans, is a habitat for some kinds of plants and animals. People too!

In an ecosystem, each organism has a role. This is called a *niche*. Within an ecosystem many niches fit together like a puzzle. When all organisms and their surrounding environment are healthy and working together, then the puzzle is complete. People and all of God’s other creatures need a complete puzzle in order to survive.

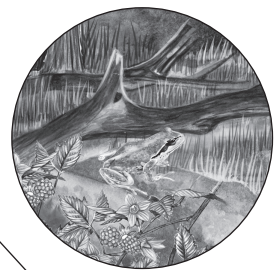
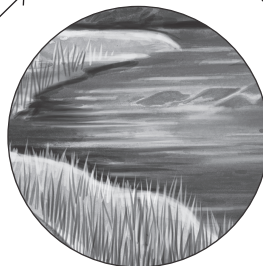
Remember, you live in a biome, an ecosystem, *and* a habitat. The biome is the biggest area on Earth that your home is part of, and the habitat is the smallest area, right where you live.

When Jesus lived on Earth in the Holy Land, he experienced the subtropical woodland biome. This biome has hot, dry summers and moderate, wet winters. Today the Holy Land is home to many rare plants and animals that thrive there, such as orchids.



**BIOME**

**ECOSYSTEM**



**HABITAT**





## NATURE JOURNAL IDEA

How do you think the climate of the area where Jesus lived affected his life?

### Plants, Animals, and Non-Living Things

#### Plants

*Plants* make up a large group of organisms. Most of them use sunlight to make their own food. Since they can make their own food, they are called *producers*. These plants use green matter called *chlorophyll* to absorb energy from sunlight into their leaves and stems. In a process called *photosynthesis* the plants create food by using sunlight, water, air, and nutrients from the soil, air, or water in which they grow. This food is called *carbohydrates*.

Trees, shrubs, vines, grasses, vegetables, ferns, and mosses are all plants. Different kinds of plants live in different kinds of habitats.

To make more plants, most plants must create seeds by *pollination*. Pollination is when a plant's pollen reaches a flower or a cone of the same *species*, or sometimes a very similar species of plant, to make seeds. Some plants are also able to self-pollinate! This happens when pollen pollinates the same flower or a different flower on the same plant!

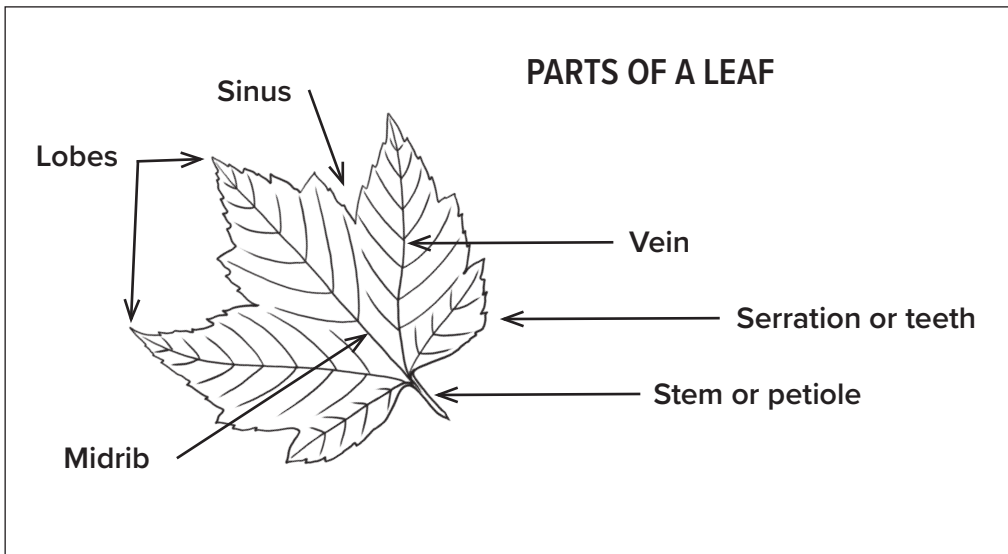
A species is a group of living beings that are alike. They can create new life with one another. For example, the corn we eat is a species of plant called *Zea mays*. All the members of a species that live in a community are called a *population*.

Most flowering plants need insects, animals, and wind to help them pollinate their flowers. Insects and animals serving this purpose are called pollinators. Some kinds of pollinators are bees, butterflies, hummingbirds, and even bats and flies.

Wildflowers grow beneath trees and shrubs in the forest. Some of the most beautiful wildflowers are found in the forest biomes. Like jewels from heaven, they come in all shapes, colors, and sizes, and are important food sources for insects.

Different wildflowers grow in different seasons. Many eye-catching flowers bloom in the spring in *deciduous* forests (forests that shed their leaves mostly in the fall) before the trees grow leaves and shade the ground once again.

Did you know that trees can “talk” to each other? In forests, trees have relationships with types of small organisms called *fungi*. Research has shown that these fungi, known as mycorrhizae, can pass messages from tree to tree about threats of pests and the health of other trees. Because of this, a forest can almost act like one living organism! God’s creatures are so amazing!



## Animals

*Animals* are a large group of organisms that can move by themselves and cannot make their own food the way green plants do. Animals eat

Birds are direct descendants of dinosaurs and are even called *living dinosaurs* by scientists!



green plants, fungi, and/or other animals. Mammals, birds, reptiles, fish, amphibians, insects, snails, and worms are all animals. Animals are *consumers*, meaning that to survive they must eat or consume plants or other animals. A consumer can be

an *herbivore*, meaning that it eats plants, or a *carnivore*, meaning that it eats other animals. Animals that can eat both plants and animals are called *omnivores*. People are omnivores.

Animals can be grouped into mammals, birds, arthropods, reptiles, and amphibians.

*Mammals* are animals that feed milk to their young. Rather than lay eggs, they give birth to their young (except for the platypus and the four spiny anteater species). Many mammals have hair or fur to keep them warm. People are mammals too!

*Birds* are animals that have wings and feathers. All birds that live today have wings, but they cannot all fly. Also, birds are the only living animals that have feathers! Some bird bones are hollow and full of spaces for air to help them breathe and fly! Birds eat many types of food, like berries, seeds, and insects. Some birds, such as owls and hawks, only eat other animals. Some birds live in the same region all year-round, and others *migrate*, or travel, to warmer parts of the world during the winter.

*Arthropods* are a group of animals that includes insects, crabs, and spiders. Arthropods do not have bones like other animals. Rather, they have hard outer shells called *exoskeletons* to protect them. They also have segmented bodies. Spiders and insects are both arthropods, but spiders

are not insects. Spiders have eight legs, while all kinds of insects have six. Arthropods are very important in the *web of life* (the many ways that organisms are connected). For example, they serve as food for many other species of animals, such as birds, mammals, reptiles, and amphibians. The order in which organisms depend on each other for food is called a *food chain* or *food web*.

Specific species of insects cannot survive without certain species of plant. They are dependent on those plants because they have evolved together throughout history. An insect's special plant is called a *host plant*. Without their host plant, many insects cannot survive. For example, the caterpillars of the endangered Saint Francis' satyr butterfly, named after Saint Francis, feed on a sedge, a grass-like plant. This is why it is important to plant *native plants*, or plants that evolved over time in certain places, and to protect habitats that already exist.

People need insects too! Insects pollinate many plants: they carry pollen from one plant to another. Pollination allows plants to make fruits and seeds. Without pollination, we would not have the majority of fruits or vegetables we are able to eat.

*Reptiles* are animals covered in thick scales. Most reptiles lay eggs. You may recognize lizards and turtles as reptiles. Reptiles cannot regulate their own body temperature as you and I do. People have an average temperature of 98.6 degrees, even when it is cold. But a reptile's temperature is determined by the temperature of the air or water that surrounds it. So, if the weather is very cold, their body temperature will be very low.

*Amphibians* are similar to reptiles in that they are cold-blooded. However, most "breathe" through both their lungs and skin. Some amphibians don't have lungs and only breathe through their skin! Most spend time both in water and on land. The majority lay eggs, and their young often go through *metamorphosis*, like some insects do, to become adults. For example, frogs are amphibians, and when their young hatch from

eggs, they must live as tadpoles, swimming in the water for a time before they become frogs that can also live on land.

Did you know that you can help pollinators in your yard? Plant a variety of native flowers of different shapes and sizes. You may want to research which host plants are needed near you. Also, leave an area of small branches and fallen leaves as well as some uncovered areas on the ground to create habitats for pollinators!



In this field guide you will meet some of the different plant and animal species found in each biome. After the common name of each organism, you will see the *scientific name* in parenthesis. The scientific name is the same in every language. This helps scientists around the world to communicate with each other about organisms. A scientific name is made of two parts, the generic name and the specific name.

The generic name (which begins with a capital letter) tells us what *genus* the organism belongs to. A genus is a group of species that are closely related and have similar characteristics. The second part of the scientific name is the species name. Sometimes scientists describe all the species within a genus. When this happens, you will see in parentheses the genus name followed by the abbreviation spp., which means more than one species. Sometimes you will also see a third part added to a scientific name. This describes a subspecies, which is a group or subdivision within a species that has become different from other members of the species, but not different enough to be considered its own species.

## Non-living Things

All people, plants, and animals depend on non-living things to survive. God's non-living creatures include water, air, soil, rocks, and sunlight.

In different habitats, non-living things may also be different. For example, shaded habitats are different than sunny habitats. Fresh water is

different from salt water. Soil can be different too, depending on what is inside it and how much rain has fallen. Fire is another non-living thing that has an important role in different habitats.

The non-living things in a particular habitat determine what living things, or organisms, can survive there. Organisms develop special ways of dealing with their non-living surroundings, called *adaptations*. For example, many desert animals can go a long time without drinking water.

In different forests, sunlight, water, soil, and air interact with one another differently. Because of the many trees, sunlight does not always reach the soil. Forests can be shady. In forests, leaves fall and over time create a layer that turns into more soil. The soil is soft and full of life. This kind of soil is *organic*. Organic material has nutrients for plants to grow. This layer of soil can be thick in some forests, such as the temperate deciduous forest. However, in many tropical rainforests the heavy rains wash away these nutrients. Because of this and other factors, the organic layer might be thin. Many plants in these forests have shallow roots so they can get the nutrients from this soil layer. This is one example of an adaptation in plants caused by their non-living surroundings.



## NATURE JOURNAL IDEA

If you look closely, you will see some of the relationships that exist between God's creatures, from the smallest to the largest. These relationships show the beauty and intricacy of God's design. Each relationship is important for the functioning of entire ecosystems, and in turn, of entire biomes. Describe some of the relationships you can see where you live.



Praise is due to you,  
O God, in Zion.  
You visit the earth and water it;  
you greatly enrich it;  
the river of God is full of water;  
you provide the people with grain,  
for so you have prepared it.  
You water its furrows abundantly,  
settling its ridges,  
softening it with showers,  
and blessing its growth.

— Psalm 65:1, 9–10



## Picture Perfect Plants

Did you know that a cell phone application called iNaturalist can help you identify plants and animals in the biome that you live in or visit?

*Materials:* electronic device, iNaturalist app

*Instructions:* Have an adult download the iNaturalist app. Now you will be able to take photos of plants and animals to keep. iNaturalist will tell you what kind of species you are observing. Keep a list of every species you see. The app also allows you to see what other people have observed in your area and in the whole world. For this activity,

practice taking clear photos of different plants. For each plant, practice taking a picture of the whole plant, a leaf, and if present, a flower. These are different ways to identify plants. You can also join Saint Kateri Conservation Center’s “Saint Kateri Annual Catholic Bioblitz” project in iNaturalist! The plants and animals you observe will be added to a list of species observed by Catholics all around the world. Every observation helps the science community know more about biodiversity. You can see more about this app in the Resources page, 177.



## Go on a Bug Blitz!

*Materials:* timer, Nature Journal, pencil

*Instructions:* Set a timer and count how many different kinds of insects you can find in a minute, ten minutes, or half an hour. Make sure to check under rocks, on flowers, and underneath leaves. Record the number in your Nature Journal. Try it again on a different day and in a different place. You can also take photos of the bugs you find and identify them using iNaturalist.