



KŪMOKUHĀLI'I

HAWAI'I'S NATIVE FORESTS



GUIDING QUESTION

How do Hawai'i's native forests gather and store freshwater?

WHAT WE'LL LEARN

Here in Hawai'i, our native forests are powerful water gatherers. They play an important role in generating our supply of freshwater. In this activity, we are going to explore how the plants in our native forests work together to collect and store rainwater. We'll look at the different layers of our forests, from the tops of the tallest trees to the tiniest mosses on the forest floor.

We'll also learn about threats our native forests face today. Most importantly, we'll see what we can do to help protect native forests to ensure our supply of freshwater into the future. E huaka'i kākou! Let's explore!

TIME

1.5 hours

MATERIALS

- "The Rain Follows the Forest" worksheet on pages 3 & 4 of this guide
- "Comparing Forest Layers" activity on page 5 of this guide
- "Layers in My Yard" diagram on pages 6 & 7 of this guide
- Learning journal or blank pieces of paper

GET STARTED

Answer the following questions in your learning journal or on a piece of paper. These are to get our thoughts going and see what we already know, so there are no right or wrong answers!

- **How do native forests in Hawai'i help us get our supply of freshwater?**
- **What causes damage to native forests? Why are damaged or disappearing forests a problem?**

If you can, share your answers with a family member or friend, and ask them to answer the questions too.

EXPLORE

WATCH →

[The Rain Follows the Forest](#)



After you watch the video, go to "The Rain Follows the Forest" worksheet on pages 3 & 4 of this guide. Answer the questions and go back to the video to find the answers if you need to. Follow the worksheet to learn more about the layers of plants in our forest and how those layers work together to collect and store freshwater.

ACTIVITY

COMPARE →

Use the “Comparing Forest Layers” activity on page 5 of this guide to compare the health of two forests in Hawai‘i.

DRAW →

Now that you are able to identify the different layers of a forest, we’re going to try to do the same thing in your yard or neighborhood. Time to head outside! Take a minute to look around and find a good “view” that goes from the ground all the way to the sky, with plants in between. (There can be man-made things in your view, but we aren’t going to focus on those.) A good way to narrow down your view is using a “frame.” You can take a real picture, or you can pretend to take a picture using your fingers as a frame.

Once you have your view framed, draw the plants that you see in the view, from the ground all the way to the sky, in the solid green box on the “Layers in My Yard” diagram. Imagine the solid box is your “frame.” The horizontal dashed lines will help you separate the plants into each forest layer, so you can draw on top of them as if they aren’t there- they are just guidelines.

Don’t worry too much about detail. It can be a quick sketch. Pay close attention to scale- how tall are the plants compared to each other? Try to draw them with their actual height in mind.

Label each forest layer in the small boxes on the left side. Don’t worry about identifying each plant or knowing it’s name. We just want to practice finding what layer it belongs to.

Answer the reflection questions to dig deeper into the layers in your yard.

REFLECT

In your learning journal or on a piece of paper, answer these questions again:

- **How do native forests in Hawai‘i help us get our supply of freshwater?**
- **What causes damage to native forests? Why are damaged or disappearing forests a problem?**
- **How did your answers change from when we started the activity? What helped you come to a better understanding of the importance of healthy native forests?**

If you can, share your answers with a family member or friend.

EXPLORE MORE

WATCH →

[The Rain Follows the Forest Documentary](#) (28 mins)



READ →

[Wai Magazine](#)



[Last Stand, The Vanishing Hawaiian Forest](#)



CHECK OUT →

[Conservation Connections](#), an interactive list of conservation sites and programs across Hawai‘i, including volunteer opportunities!



THE RAIN FOLLOWS THE FOREST

HAHAI KA VA I KA ULULĀ'AU



Answer these questions after you have watched “The Rain Follows the Forest” video.

Where does the water we drink and use everyday come from?

What three types of plants make up the layers of our forest?

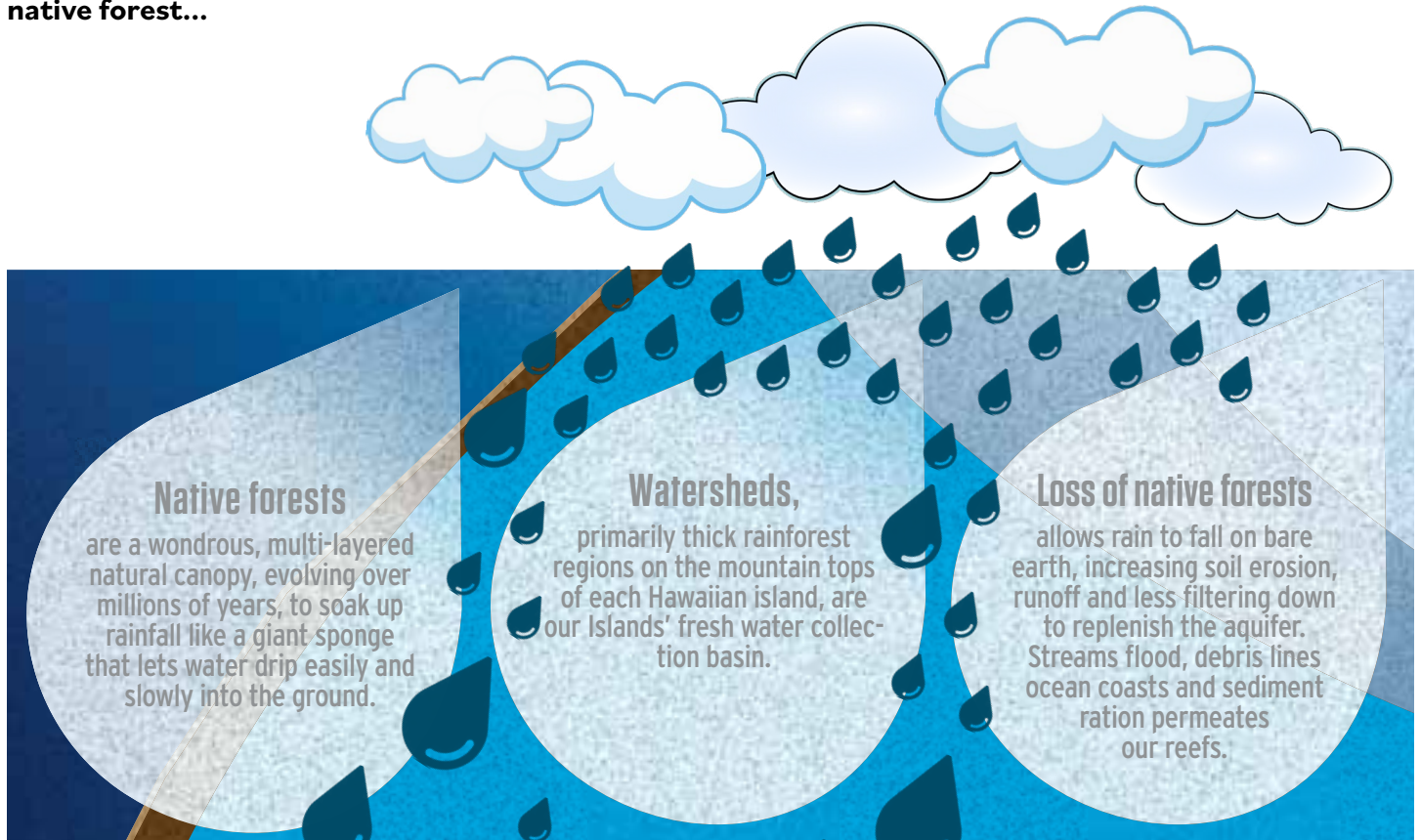
How much of Hawai‘i’s native forests have already been lost?

What are some of the problems that our native forests are facing today?

What are three actions we can take to help solve these problems?

FOREST LAYERS

Read through the following raindrops and follow their path as they fall from clouds down onto our native forest...



Graphic from [Wai Magazine](#)

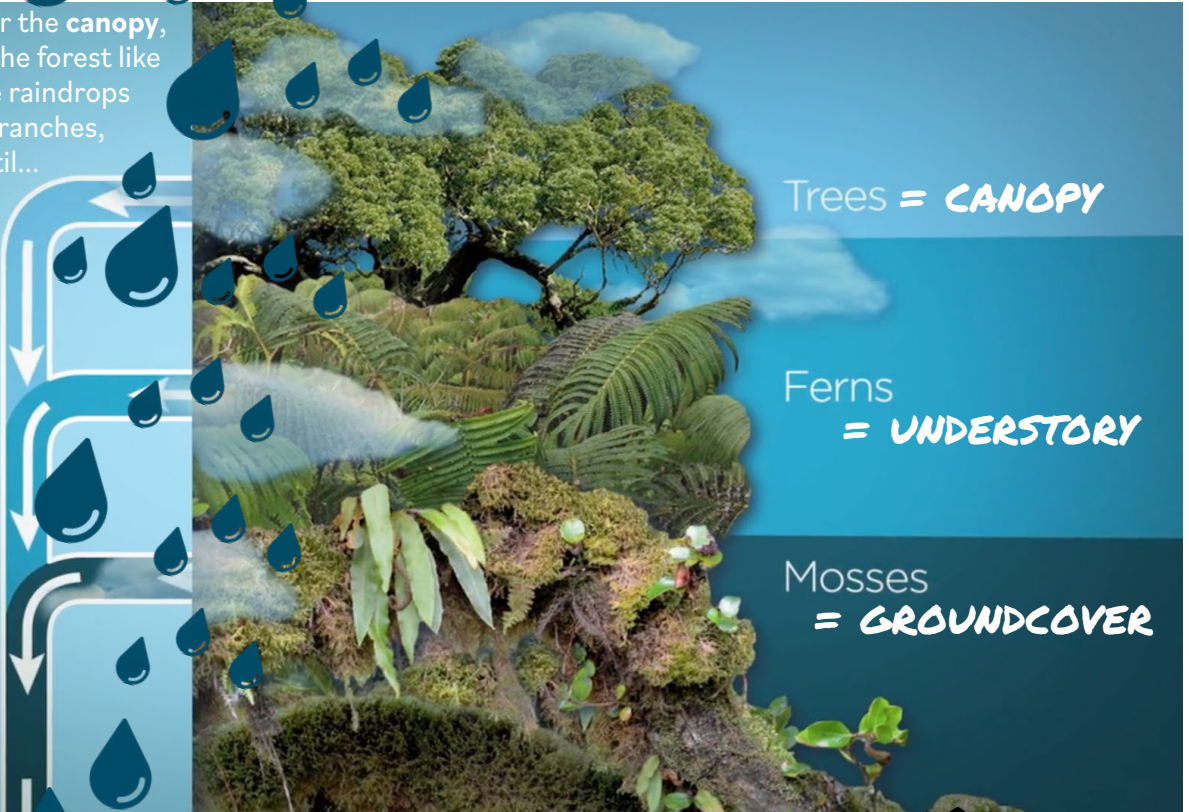
continued on next page

As the raindrops fall, they make their way through the layers of plants in our forest...

First they encounter the **canopy**, the tallest trees in the forest like koa and 'ōhi' a. The raindrops hit the leaves and branches, collecting there until...

they slowly drip down to the **understory** layer, on to shrubs, small trees, and ferns like hāpu' u.

Finally, the raindrops make their way down to the forest floor, where they encounter the **groundcover** layer, mosses and small ferns.



Trees = **CANOPY**

Ferns = **UNDERSTORY**

Mosses = **GROUNDCOVER**

AQUIFER = UNDERGROUND "WATER STORAGE TANK"



Graphic from [The Rain Follows the Forest](#)

Since the forest layers slow down rainfall and soak it up like a giant sponge, the raindrops are able to slowly drip underground. They travel through the layers of rock that make up our islands, down into the **aquifer**, our natural underground water storage tank. We use wells and pumps to access this supply of freshwater. **Native forests help keep our aquifers filled.** And that's not all our native forests do...

50

The percent a native forest can increase water capture by condensing passing clouds and reducing erosion.

That's right, native forests actually gather MORE water than non-native forests or bare ground by collecting moisture from passing clouds. And they stop dirt from washing into streams and the ocean.

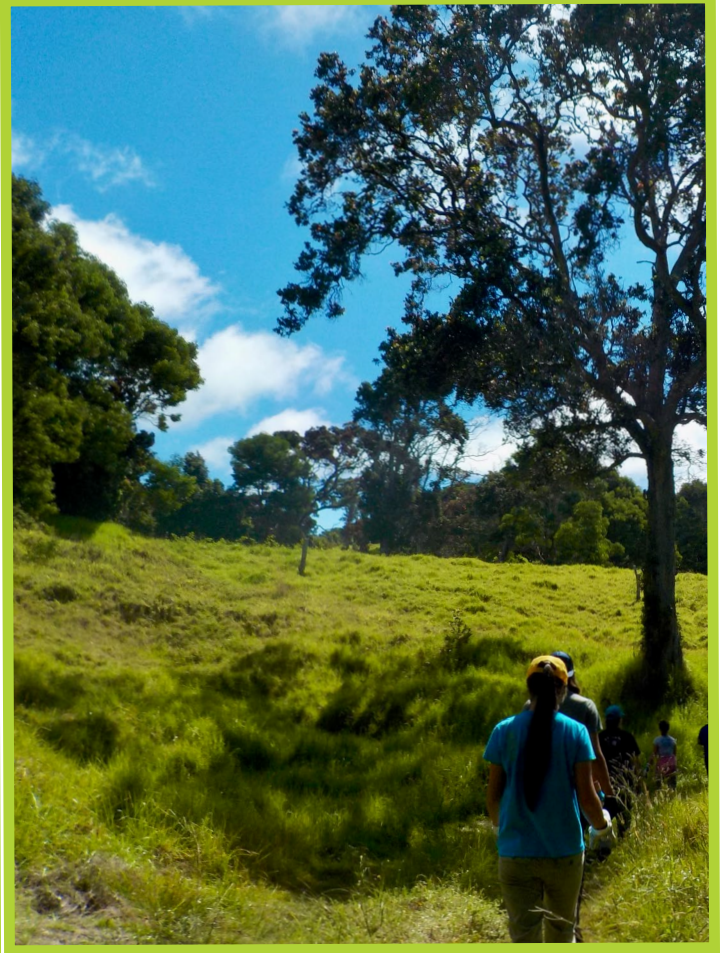
Our native forests are **Kūmokuhāli 'i**, upright, earthbound elements that define an area and spread out over the lands.

**'O KŪMOKUHĀLI'I, 'OHIAI O KA 'ĀINA
KŪMOKUHĀLI'I, WATER GATHERER OF THE LAND**

COMPARING FOREST LAYERS



FOREST 1



FOREST 2

What differences or similarities do you notice between the groundcover in Forest 1 and Forest 2? Understory? Canopy? (Pay close attention to the types and density of plants growing in each).

Which photo would you say is a healthy, intact native forest? Why? Which forest has been damaged?

What kinds of human activities do you think may have damaged that forest?

LAYERS IN MY YARD

The diagram consists of a large rectangular frame. On the left side, there is a vertical line. Three rectangular boxes are attached to this line, one at the top, one in the middle, and one at the bottom. From the right side of the middle box, a horizontal dashed line extends across the frame. Similarly, from the right side of the bottom box, another horizontal dashed line extends across the frame. The top box is not connected to any dashed line.

LAYERS IN MY YARD

DIGGING DEEP - REFLECTION QUESTIONS

1. How many plants were in the groundcover layer? Understory? Canopy?

2. What layer had the most plants present in your yard or neighborhood? What layer had the least?

3. How do you think your yard or neighborhood compares to a healthy native forest? Can it collect as much rain water and send it to the aquifer?
