Our Neighbors, Frog & Toad
The Environmental Importance of Amphibians in the Cordillera Vilcanota
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Meet the Marbled Water Frog

Lots of frogs and tadpoles live in the river near my house. They scare me!

I am a Marbled Water Frog tadpole--a baby!

You can identify me because I am a very big tadpole.

You can also see my intestines through my belly.

My tadpoles are dependent on water to breathe, so I must pick a spring that won’t dry up.

Our mother leaves us to grow up by ourselves. But she keeps living in the same spring as us.

And we Marbled Water Frogs love the water, even when we’re adults!

We are disappearing throughout South America.

Humans’ destruction of our homes is part of why we’re threatened.

And way too many of us are taken to the cities to be eaten by people.

But a new disease is killing many of us!

I guess Marbled Water Frogs are cool! I want to help them survive!
Amphibians: Disgusting?

Frogs are gross and dirty! They’re so slimy!

Slimy? Yes! Dirty and disgusting? No!

Actually, we frogs thrive in clean environments. We can’t survive in heavily polluted areas. We love clean water!

Our skin is different from yours. We partially breathe AND drink through our skin.

Our slimy skin keeps us wet. If we dry out, we can’t breathe or drink!

We love insects, but so do people! Even in Peru, in the Amazon, people eat beetle larvae called suri, and there are fancy restaurants in the USA that specialize in insects!

Low in fat and high in protein—perfect! Have you tried tasty bugs?

Ewwww, no!

Without us eating them, there would be lots more bugs around.

Now I understand! Frogs aren’t gross, they’re misunderstood. They’re actually very clean, and they control insect populations.
Beautiful, isn’t it?

I wish
I could read
the stories
written in the
stars...

I am the Mayu,
the celestial river!
Rivers on Earth are
just mirrors reflecting
my glory.

We stars
were important to your
ancestors. They used us
to tell when the planting
season would come.

We are
the Yana phuyu,
or the dark cloud
constellations!

I am the llama, and
this is my new-born
unallamacha!

I am Atoq,
the fox! I chase
the animals
throughout
the sky.

I am yutu,
the tinamou!
I chase Hamp’atu
because I want to
eat him.

I am Hamp’atu, the Toad. I
peek over the horizon in October,
during the first rains, then through
the year, I follow Mach’acuay.

I am Mach’acuay, the serpent!
Right now, in March, I am going
to dive into the horizon.

These animals must have been important to
the Inca since they saw them in the sky.
I stepped on a rock the other day, and something shiny jumped out from underneath. I still don’t know what it was!

I’m not the Andean Toad. I’m the Marbled Four-Eyed Frog! It’s not that hard to tell us apart. I’m not even a toad!

Hello, Andean Toad!

I also live under rocks.

As an adult, I don’t go to the water except to have babies.

My species only lives high up in the Andes in Peru, Bolivia, and a bit of Argentina.

Huh, I haven’t seen that many Marbled Four-Eyed Frogs besides you.

That’s because, well... there aren’t as many of us left.

I’m glad I can identify my frog and toad neighbors. I hope there will be more of them soon!
My grandmother always told me of the frogs that used to live in our stream... she said they used to protect the water... But where are they now?

What's happening?! Where are they taking us?

They bring us from all over the Andes to the big cities.

Some of us get sick and die on the journey.

Frog soup and juice! Prevents and cures mental problems, anemia, prostate problems, asthma, and menopausal disorders!

The maca and honey in frog juice are natural medicines, but frogs themselves don't actually cure any diseases. Why do city people with access to good medicines eat me and my friends?

If we want frogs to continue to be an important part of tradition, their uncontrolled harvesting must stop!
Meet the Andean Toad

What's this creature? It looks different from the other frogs.

Yes, that's because I'm the Andean Toad! You can tell by my dry, bumpy skin.

I have bumps on my neck that are poisonous to predators.

I can survive far from water and not dry out because of my special skin.

But I still need to go back to pools of water to reproduce.

We lay eggs here, and once they hatch, the tadpoles live in the water.

Now they're toadlets, so they're leaving the water. Look at their cute orange feet!

We live high in the Andes from Peru to Argentina.

But we are in danger from new predators like trout.

And llamas and horses eat the vegetation we like to hide in.

I didn't know I had such interesting neighbors. I hope that they stay safe here!
My mother tells me that toads suck blood. No wonder they come into my house... they are looking for their next meal!

Yum yum yum! So delicious and nutritious!

What's that?!

That means it's sucking your blood!

It's a frog!

The frog's throat is moving! What's it doing?

Look out!

Kill it!

Why would they think I'm sucking blood? I don't even like blood! When my throat moves, it just means I'm breathing!

Poor guy! You did nothing wrong, but they're still scared of you.
My father has me help him throw the toads out of the potato fields every year so that they won’t hurt our crops.

I love potato fields! The piles of stones make great homes!

The furrows keep me safe from the weather! It’s perfect!

If I eat the beetles, the beetles can’t eat his crops: I’m helping the farmer.

And when beetles come up from the dirt, I eat as many as possible!

The beetles lay their eggs in the fields, and their larvae eat the potatoes.
Yum!

Ah, a toad?! This is a bad sign...

If only the farmer knew I'm helping his potato crop!

Centuries ago, I was respected in Peru. People believed that when they heard many of us calling, they'd have a good crop.

They understood the work I did for them!

Hmm... Toads can do nothing but help our potatoes grow because they get rid of the insects that destroy them.
I've noticed toads around my house or hopping through the door. What do they want with me and my family?

My body doesn't produce its own heat like humans do... and I don't have sweaters to wear!

I'm sure I can find better shelter. Let me try in here.

I don't know... this doesn't seem much better right now.

That looks perfect for me. Time for a change!

I love it here! It's so warm and cozy!

I guess the toads are just looking for a place to survive the poor weather! I don't have to let them in my home if I don't want to, but I don't need to be afraid of them!
My teacher said that amphibians are indicator species. That’s a weird name. What does it even mean?

Oh, don’t call it weird! It’s special! It’s a super cool name!

It’s not doing so well. There aren’t a lot of other frogs here because it’s been so dirty.

If it’s too dirty for you guys, it’s too dirty for me.

Hey, frog, how’s the water these days?

It means—

Thanks anyway, frog! You always know if the water is okay for other animals like me.

Of course, I’m happy to help!

Did someone say the water’s too dirty?

Yep, that’s why the frogs are moving out.

That’s not good! I need clean water to drink and garden. It’s a good thing I got an early warning.

That’s what makes me an indicator species!

If the frogs are healthy, the environment can sustain other species.

We’re lucky that frogs can show us what we can’t see in our world.
In my family, we have always believed that the frogs are important for the fresh springs that irrigate our potatoes. But I'm not really sure why...

The rain is back... just my time of year! Soon there'll be pools ready to lay eggs in!

The frogs are emerging! We must sow the crops now, because the frogs always bring the rain!

A week later...

The rains have ceased! We must ask it to return before we plant all of our seeds!

I got one! Time for him to help us!

What am I supposed to do?!

That's it! Keep calling! If Kon won't rain for the sake of our crops, he will surely rain to save you!
It’s so dry and hot! I don’t want to shrivel up here!!

I am Kon, god of the rain and wind!

Kon took mercy on the frog, bestowing rain upon the land!

I am saved! Thank you, Kon! Have a good day!

I guess the frogs and the way that water cycles in our environment seem linked.

Healthy frog populations mean that it is raining enough for our crops—because they depend on the rain just as much as we do!
Frogs, toads... we use two different words for these animals. But is there a difference between them?

You and I are related...

...but I am special and different from you in many ways!

There are many kinds of frog, and “toad” is just a name for one type.

I like being in the water...

...and I like being on land!

I lay my eggs in chains, and you leave them loose.

I have special teeth that you don’t!

And I have lovely smooth skin, while yours is drier and bumpy.

Well, I have this parotoid gland, and you don’t! It releases a liquid that fends off predators!

We have many things in common, too.

Like that we both have the same general life cycle.

Basically, Toad, you’re just a special kind of frog.

I’m glad we’re family, frog!

It’s so fun to look at these animals more closely! Now I can finally tell the difference.
Look at these dead frogs!

A disease has been killing my friends. But I don't know what it is...

I do!

AAAH! Who are you?

A fungus grew over my skin, so I couldn't breathe.

Oh, no!

I'm the ghost of an Australian frog. I died from the same disease killing your friends: CHYTRID.

The fungus spread and then killed everyone in my pond.

That's horrible!

I hope you and your friends have a happier fate.

Me too.

So chytrid is what's been killing the frogs near my home--and all around the world!
My parents say the glaciers have gotten smaller since they were children. I wish the Apus could tell me why things are changing...

Well, not so long ago, I looked like this.

Now I look like this. The warming air is melting my ice and snow.

Humans burn lots of fuel, releasing invisible gases.

These gases let in the energy of the sun.

But when this energy bounces off the Earth and tries to leave again, the gasses trap it. Everything gets warmer!
During the summer, the water in the streams is mostly melted glacier. What happens when the glacier is gone?

Apu, this is also making less rain and snow fall. It’s getting drier here.

Many streams will dry up.

But we need the water!

And farmers need water for their potatoes and alpaca.

There will be less water in the future, and we must plan for this!

Animals and plants can live and grow where glaciers used to be.

Yes. The Andean Toad, Marbled Four-Eyed Frog, and I have found new homes there!

Fox, mountain passes that were filled with glaciers are now open.

I can use those passes to cross the mountains...

As the climate changes, so do many other parts of the environment. As Apu says, we should get ready for a future with less water.
What's this? What are people doing digging up the mountain?

There are precious metals in these hills, so we're going to dig them up!

Oh, but... water is reacting with the exposed rock and carrying contaminated water downstream...

*cough* The contaminated water coming from the mine is making me and my friends sick!

Oh, no!

Minning can have dangerous consequences and poison the water for people and animals!

We'll add lime, which counteracts the acid that forms when water mixes with the exposed rock.

Then, we'll cover the mining area with new soil and plant native plants.

This way, it's less likely the water will react with the rock.

With proper management of the site, the miners did their best to protect the environment!
The animals in the lake seem unhappy with the trout, but why? My family loves eating trout.

That was close! I wish the trout weren’t here. They’re not even from Peru—they’re North American!

The trout are hurting me, too! Please don’t eat me!

I won’t!... yet. The trout are eating all of you mayflies, so I can’t find food.

Yay! More trout!

The trout eat all of the animals that eat algae, and the decomposing algae use the oxygen.

The trout are really hurting me and my family. I’m hungry, and I can barely breathe these days.

That’s what makes trout an invasive species. They take over natural ecosystems.

Fishermen are the only ones happy about the trout. Humans put trout where they don’t belong.

Just one animal can throw off the balance in the whole lake! Are trout worth wrecking an ecosystem?
How do frogs and toads get from tiny eggs to... actual frogs and toads?

I lay a lot of eggs since most of my babies won't survive to see adulthood. I want to give as many of them as I can a chance to live.

Her eggs develop into adults very quickly, but my babies are tadpoles for a very long time! I must find a place with everything they need while they grow.

The sensory system I will use to see and feel the world is only just beginning to develop.

While I'm stuck inside this egg, all my energy will come from the yolk--like a chicken yolk!--that my mother left with me...

I'm growing very quickly! My organs are developing, so when I hatch, I'll be ready to eat, swim, and sense the world around me!

I'm so glad my mother laid so many eggs! They make a nice first, easy snack for me!

Up high in the mountains, the sun is really strong! Just like people, we can get sunburns, but we don't have clothes or sunblock to protect us!

That's why we hide in the mud!

And it's nature's sunblock!

It's like nature's sunblock!

And it makes a great blanket!

And we can find our food in the mud.

It's time for me to leave the stream and start my adult life!

After a long season of eating and growing, I'm feeling the weather getting dry. It's time for me to hide until the rainy season returns.

I kind of like it here! I guess you could call me a homebody, but I don't think I'll leave!

Here in the water, I have plenty of food and moisture to last me all year.

In other words: MUD is EVERYTHING

The rain is back!

I... I don't remember you being that cute...

And that's how the cycle of life continues for us!

I wish I could transform as much as frogs and toads do during their lives! It's like magic!
The Cordillera Vilcanota is a beautiful, glacier-blanketed mountain chain in Southern Peru. It supports endangered animals, breathtaking scenery, and rich cultural traditions. Join with the residents of Cordillera Vilcanota to explore their world!

Contained in this book are colorful adventures that will help you discover the hidden depths of a wondrous environment. They will show you the animals who live here, particularly the amphibians—the highest elevation frogs in the entire world! You will also learn about some of the challenges these animals face in a changing world and the role they have held in ancient local culture.

Everyone can pitch in to save this extraordinary place, and here is a great place to start.