

AMERICA'S RAIN FORESTS

A DISTANCE LEARNING ADVENTURE

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Thank you to all of the schools and classrooms that asked questions during **America's Rain Forests Electronic Field Trip**. Here are the answers to some of the questions. If you don't see the question asked by your class, please check the other Questions and Answers, since a similar question may be answered elsewhere.

**Brookline Regional School; Pittsburgh, Pennsylvania; Grades 4, 6 and 7
Susan Sbuscio**

What is the temperature range in the Tongass?

The Tongass NF extends over 500 miles from north to south. Although each area has its own temperature range, in general Southeast Alaska's maritime climate means cool summers and mild winters.

The temperate marine climate of Southeast Alaska is created by the nearness of the North Pacific Ocean and the steep coastal mountains on shore. The ocean warms the area in the winter and cools it in the summer creating a moderate climate that goes against the stereotype of Alaska's extreme weather.

The average summer temperature is about 65 degrees in July. Sunny days can occasionally push the thermometer into the 70s and 80s. Winter brings mixed snow, rain, and sunshine with a January mean temperature of 24 degrees. The first snowfalls often occur in late October but, generally, there is little snow accumulation at low levels until late November.

Southeast Alaska's maritime climate is characterized by relatively mild, cloudy, wet weather. Along the inside coast from Juneau and Ketchikan about 50% of the days have measurable rainfall. However, the rain is seldom heavy enough to cancel outdoor activities. It's common to see people holding picnics or participating in sporting activities in the light rain.

There's no hiding the fact that Southeast is damp. Juneau gets about 70 inches of precipitation a year, Ketchikan averages about 160 inches, and Skagway, which is in Glacier Bay's rain shadow, averages 27 inches. This precipitation also arrives as snow. More than 100 inches a year fall in the mountains behind Juneau. The snow accumulations feed the ice field and glaciers of Southeast Alaska.

Did you say that El Yunque means "Peak with White Clouds"?

Yes, the word was borrowed and modified by the Spanish from the native Taino Indians.

Do the snails bite and could you feel it?

Snails don't have teeth! They have a rasp-like "tongue" called a radula. They use their radula to scrape away at their food like fungi, leaves, and decomposing material. If you were very still and quiet, you may be able to feel the gentle rubbing of a large snail or slug, but it wouldn't hurt. Most likely you would just feel the slimy, coolness of the animal as it slowly moved along.

Gina Murrow
Anchorage, Alaska

On Alaska Radio last night (Oct. 13) there was a story that a conservation group has declared the Tongass National Forest endangered. Is this true? If so, what can we do about it?

Many people care deeply about the Tongass National Forest—one of the nation's crown jewels of its public lands system. Management of these lands continues to be controversial – some Americans want to see less timber harvested here, while others want to see more. It is important to have accurate information before you reach a conclusion about the future of the Tongass.

The Forest Service believes that the recent report by the conservation group contains a good deal of inaccurate data and misinformation. Among these inaccuracies, they note:

- The report states the amount of forested land on the Tongass is 8.5 million acres when in reality it's 9.7 million acres. The Tongass has about 9.4 million acres of old growth forest, of which about 5 million acres contain productive or commercial sized old growth. Nearly 90 percent of the 5 million acres of productive old growth forest is protected.
- The Tongass is the largest, most untouched national forest in the United States. The report fails to mention that the Tongass has nearly 6 million acres of some of the most pristine, untouched wilderness ever designated.
- The report says that there is industrial-scale logging when, in fact, there are no multinational corporations harvesting timber in the Tongass National Forest. Instead, Tongass timber goes to small, family-owned sawmills. These mills employ Alaskans and make value-added products such as window frames, moldings, dimensional lumber and siding.
- Since the Alexander Archipelago Forest Reserve (which is now the Tongass National Forest) was set aside in 1902, less than 500,000 acres has been harvested. Approximately 400,000 acres, or 7 percent, of the original productive old growth forest on the Tongass National Forest has been harvested since 1954.

Balancing the management of the Tongass is difficult, and people may have different opinions on what is best for the United States and the land. The management of the Tongass is guided by the Tongass Land Management Plan, which was signed in 1997. This plan ensures that resources are used in a sustainable manner, and that the things that make the Tongass so special today, will be here for future generations. Visit the Tongass NF website at <http://www.fs.fed.us/r10/tongass> for more information about the management of the forest, or for contact information if you would like to correspond with the Tongass.

Mrs. Beal's 6th Grade Class
Washington Elementary; Bessemer, MI

About how many animals survive in the forest fires of the rain forest?

Wildfires are rare in the wet and humid rain forest. In southeast Alaska, they sometimes happen after long dry periods in the summer. These fires are usually fairly small and last for a short time. Although we do not have figures, most animals are able to escape these fires. The loss of their homes, or 'habitat', is the biggest impact on the animals.

However in other areas of the United States, the threat from wildfires is growing. Wildfire is one of the most destructive natural forces known to mankind. While sometimes caused by lightning, nine out of ten wildfires are

human-caused. Put simply, "wildfire" is the term applied to any unwanted and unplanned fire burning in forest, shrub or grass.

The current increase in instances of wildfire can be explained by four key factors:

- Past fire suppression policies, including one of "total suppression," which allowed for the accumulation of fuel in the form fallen leaves, branches, and excessive plant overgrowth in forest and wild land areas.
- Increasingly dry, hot weather.
- Changing weather patterns across the US.
- Increased residential development in the wild land/urban interface.

To learn more about what you can do to prevent wildfires, go to <http://www.smokeybear.com>.

What are the biggest and smallest animals in the temperate rain forest?

At over 40 feet in length and weighing over 40 tons, the largest animal in Southeast Alaska is the humpback whale, which summers in the protected waters of the Alexander Archipelago. In the rain forest itself, the moose and brown bear vie for that title. A male moose in prime condition can weigh from 1,200 to 1,660 pounds. Most mature male brown bears weigh between 500 and 900 pounds (180-410 kg) with extremely large individuals weighing as much as 1,400 pounds (640 kg). Females weigh half to three-quarters as much.

The smallest animals in the temperate rain forest are shrews. There are four species of the Sorex genus in coastal Alaska, although only the masked shrew and the dusky shrew are considered common in southeast Alaska. Shrews are tiny and small ones weigh less than ½ a penny – about 1.5-20 grams (a penny weighs 3 grams). The little brown myotis (or little brown bat) is also a tiny resident of the temperate rain forest, weighing in at only about one-third of an ounce (9 gms).

Go to Alaska Department of Fish and Game's Alaska Wildlife Notebook Series for more information about these fascinating animals, <http://www.adfg.alaska.gov/index.cfm?adfg=home.main>.

About how many animal species are found in Alaska?

In the temperate rain forests of southeast Alaska, we have recorded:

- 67 different species of mammals (24 of which are common)
- 8 species of amphibians (of which only the boreal toad is considered common)
- over 300 species of birds – of which approximately 1/3 are fairly common or common.

Where do tree frogs keep their babies?

The tree frogs (coquis) of Puerto Rico are in the genus *Eleutherodactylus*. They do not pass through a tadpole stage and thus do not require a water location to reproduce. Instead, after fertilization by the male, eggs are laid by the female in humid areas—sometimes the rain-catching leaves of bromeliads can shelter the eggs and babies. When the eggs hatch, a fully-formed "froglet" (a tiny replica of the adult frog) emerges.

What are some of the names of streams in Alaska?

From Aats Bay in the southeast to the Zyzek-twina River near the Seward Peninsula, Alaska's place names reflect the colorful history of the state. In the book, *Dictionary of Alaska Place Names*, the U. S. Geological Survey has brought together a collection of over 40,000 of these. Some, such as Qimiqpayaat Kuugauzanga (Eskimo for Short Ridge Creek) may have a slightly

foreign ring to the English ear, while others such as Old Dummy Lake have a downright homey touch.

Alaska place names are fascinating! Some places in coastal Alaska have kept their Alaska Native names – Situk River, Alaganik Slough, Stikine River. Others are named for a local celebrity that has become associated with a place – Thorne River, Staney Creek, and Ratz Creek. Others have descriptive names such as Cobble Creek, Clear Creek, and Fish Creek.

Since the rain forest gets so much rain, does the rain ever drown the plants?
Probably not. The rain forest environment is adapted to deal with the huge quantities of rain. While some individual plants may suffer from too much rain, the forest as a whole, survives just fine. Sometimes major events like floods or mudslides might wipe out localized areas of plants.

How much water would a rain forest get in 20 years?
In Alaska's temperate rain forest, an average of about 160 inches of rain falls each year. Over 20 years, that accounts for about 266 feet of rain – that's the height of a 26 story building!

In Puerto Rico as much as 250 inches of rain falls in the higher elevations each year. After 20 years, this would amount to nearly 420 feet of rain – the height of a 42 story skyscraper!

Ginger Evens
Mitkof Middle School
Petersburg, Alaska

Why are the leaves poisonous for animals to eat?
It's a dog-eat-dog world in the rain forest! In a tropical rain forest, there are MANY critters who want to eat plants! Without some sort of defense, plants would be stripped bare of their leaves and would not be able to survive. Different plants have developed different strategies to "discourage" getting munched. Some have spines and thorns, some have thick, unpalatable foliage, and some have developed nasty tasting or dangerous chemicals.

You may be familiar with a non-rain forest example. The common milkweed grows across the United States. Milkweed has a milky, bitter sap that most insects will not tolerate. However, the monarch butterfly has adapted to the milkweed and its caterpillar feeds only on the distasteful plant. In turn, the monarch caterpillar tastes bad to the birds that would eat it!

Kaye Wylly

What is the tallest tree found in the rain forest?
In Alaska's temperate rain forest, the largest tree is the Sitka spruce. This tree may live to up to 700 years and reach a height of over 250 feet, and a circumference of nearly 15 feet.

Mr. Bascom's 5th grade
Clallam Bay, Washington

As a forest scientist, what do you do if/when you find an injured animal?
The natural world can be a harsh place, and animals do get injured and die. However, without proper training, you should never approach or handle an injured animal. They can bite or scratch you – and they can carry dangerous diseases.

Also, most of the time, a wild animal has a better chance of surviving by being left alone. It is difficult to care for wild animals – they are stressed by close

contact with people, they need special diets and care, and they can carry diseases that make humans sick. Injured wild animals need to be taken care of by specially-trained veterinarians and care-givers. In some places, there are organizations that take care of wild animals.

In special cases, such as with an injured bald eagle or hawk, the injured bird is carefully transported to a wildlife rehabilitation center for care and, hopefully, release back into the wild. Again, only trained professionals should handle wild animals.

You should NEVER bring home a baby animal! Its mother is probably hiding and watching, and will return to the baby once you are gone. If you bring a baby animal home, it will likely die – and if it doesn't, it will have to spend its life in captivity. Just don't do it!

Celia Szuba
Science Department, Onyx Team

What do the animals do in Alaska in the winter?

Animals have developed different strategies for coping with the sometimes severe Alaska winter weather. In Alaska's temperate rain forests (located along its southern coast), the weather is more moderate than in interior Alaska. Still, many animals migrate south to find warmer temperatures and more food. About 1/3 of southeast Alaska bird species migrate to warmer climates. Humpback whales also migrate to Hawaii and warm waters to bear their young.

Some animals, such as frogs and insects, cannot migrate. These animals burrow into the forest litter and are dormant during the coldest periods of the year. One amphibian, the wood frog, even has anti-freeze in its blood! The wood frog can freeze solid and then re-thaw and revive in the spring.

Still other animals spend the winter in a deep sleep. Some animals, such as the ground squirrel, are true hibernators whose metabolism grinds to a slow pace during the winter months. Others, like brown and black bears, enter a "winter sleep" – nestled snug into their dens, their heart and breathing rate slows considerably, but these animals often wake during the winter months and can become active.

The hardiest animals, like ravens, wolves, mountain goats, and deer ride out the winter months by staying active. Growing thicker fur, moving to areas of greater shelter and more food, and banding together help get them through the winter.

Do you enjoy working in the rain forest?

Both the temperate and tropical rain forests in the United States are special places. I have to admit that Alaska rain forest life is not for everyone! The area is rugged and remote, it rains a lot, and the winters are long and dark. However, the Tongass and Chugach National Forests are truly magical and are filled with animals like bears, bald eagles, and salmon that you rarely get to see outside of Alaska. Killer whales and Steller's sea lions live in the surrounding ocean. Each day is a new adventure, and the communities are small and friendly. In short, I love Alaska's rain forests!!

How many different species of hawks live in Alaska?

Ornithologists usually lump eagles, falcons and hawks together in the Order Falconiformes – we often call this group of predatory birds, raptors. There are 13 species of raptors that have been observed in Alaska's temperate rain forests. Of these, only the bald eagle, northern harrier, sharp-shinned hawk, and goshawk are considered common or fairly common.

Additionally, 11 species of owls have been observed in the temperate rain forest. Of these, only the short-eared owl is considered as even uncommon.

Are there any monkeys in Alaska?

There are no monkeys in Alaska's temperate rain forests.

What is the average number of wolves in the Alaskan rain forest?

The wolf (*Canis lupus*) occurs throughout mainland Alaska, on Unimak Island in the Aleutians, and on all of the major islands in Southeast except Admiralty, Baranof, and Chichagof. This range includes about 85 percent of Alaska's 586,000 square-mile area. Wolves are adaptable and exist in a wide variety of habitats extending from the rain forests of the Southeast Panhandle to the arctic tundra along the Beaufort Sea. Presently wolves are common over much of the state with densities as high as about one wolf per 25 square miles in favorable habitats. Densities are lower in the coastal portions of western and northern Alaska. Although the distribution of wolves has remained relatively constant in recent times, their abundance has varied considerably as prey availability, diseases, and harvests have influenced their numbers.

A study of the ecology of wolves in southeast Alaska was conducted on Prince of Wales and Kosciusko Islands from 1992 to 1995. Average home-range size of radio-telemetered wolves was 280 square kilometers (109 mi²), with 75 percent of the radio locations for each pack within "core areas" averaging 124 square kilometers (48 mi²). Pack sizes ranged from 2 to 12, with 7 to 9 typical in early autumn. Annual rates of dispersal averaged 39 percent; 71 percent of dispersers were adults 2 years old and older.

For current research on Southeast Alaska wolves, please go to <http://www.wildlife.alaska.gov/index.cfm?adfg=wolf.aawolf>.

How many salmon are there?

There are five species of Pacific salmon in Alaska. They are all anadromous, meaning that they lay eggs in fresh water streams or lakes, spend most of their adult life in the ocean and return to fresh water to spawn. Each species of salmon is known by two common names. They are:

- King or Chinook
- Silver or coho
- Chum or dog
- Red or sockeye
- Pink or humpback

How many different kinds of fish are found in each forest? How do the fish survive in such cold water?

In Alaska's temperate rain forest, 43 different species of fish have been observed in fresh water. Some of these species live their entire lives in fresh water, while others travel between fresh and salt water during their lives. A few species are actually marine fish that often enter fresh water.

Anadromous fish are those that lay their eggs in fresh water, spend much of their adult life in the marine environment, and then return to fresh water as adults to lay their eggs. Anadromous fish in Alaska's rain forests include the five species of Pacific salmon (ie. king, chum, coho, silver and pink salmon), rainbow trout and eulachon.

Salmonids (salmon, trout and char) are the most common type of fish in Alaska's rain forests. Cold, clean water is critical to their survival. Cold water can hold more oxygen than warm water.

How many different species of fish are in the rivers?

In Alaska's temperate rain forest, 43 different species of fish have been observed in fresh water. Some of these species live their entire lives in fresh water, while others travel between fresh and salt water during their lives. A few species are actually marine fish that often enter fresh water.

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What's the largest species of tree in the temperate rain forest?

In Alaska's temperate rain forest, the largest tree is the Sitka spruce. This tree may live to up to 700 years and reach a height of over 250 feet, and a circumference of nearly 15 feet.

How often are both rain forests visited by tourists?

Both the tropical and temperate rain forests are wonderful places to visit!

How can you tell if it is a male or female snake?

It is often very difficult to determine the sex of a snake. For most snakes there are no clear differences between the sexes. In a few species the female is consistently larger, for others the male is larger – but these size differences are rarely of use in the field. A herpetologist (a scientist who studies reptiles and amphibians) may compare the ratio between the tail and the body.

**Marcy Jasper, Teacher
Larson Elementary, Wasilla, Alaska**

Our second and third graders from Larson Elementary in Wasilla, Alaska would like to know if more people live in temperate rain forests or tropical rain forests.

Temperate rain forests are extremely rare. They are found only in Alaska, Canada, and the Pacific Northwest, in Tasmania, in Chile and in a few small scattered pockets along coastal areas. Although people live in and depend on these remaining temperate rain forests, they do not support as many people as do the much more widespread tropical rain forests.

**Mrs. Riley's Science Students
Fostoria Middle School, Fostoria, Ohio**

How would a drought affect the animals in a temperate rain forest?

While droughts are not common in the temperate rain forest, they can happen during the drier, summer months. Long summer days and extended dry periods can dry out the mosses and lichens and put stress on the understory plants and trees. Sometimes forest fires can even start and spread in these dry conditions. Generally, plants recover when the rains begin to again fall.

However, sometimes fish in forest streams are not as lucky. During dry periods, forest streams can get shallow and warm. Fish that live in the streams, or salmon returning to spawn, can die because of low oxygen levels. In extreme cases, an entire population of fish can be killed in a "die off" due to low rainfall and high temperatures.

What species of monkeys are found in the tropical rainforest?

There are no monkeys found in the tropical rain forest of Puerto Rico.

However, many of the world's monkeys and great apes depend on tropical rain forests in other parts of the world – in Central and South America, Africa, Asia and Indonesia.

Do the leaves in the temperate rain forest get as large as they do in the tropical rain forest?

Generally, no. There are many more different kinds of species in a tropical rain forest than in a temperate rain forest. Some grow huge, umbrella-like leaves to catch every bit of sunlight that filters through the closed canopy of a tropical rain forest. The only plant with similar leaves in Alaska's temperate rain forest is the Devil's club.

How many species of tree frogs are found in the tropical rainforest?

There are 16 species of *Eleutherodactylus* on the island of Puerto Rico. As the scientific name implies, *Eleutherodactylus* frogs have individual (non-webbed) fingers and toes. They do not pass through a tadpole stage and thus do not require a water location to reproduce. Instead, after fertilization by the male, eggs are laid by the female in humid areas. When the eggs hatch, a fully-formed "froglet" (a tiny replica of the adult frog) emerges. The genus can be divided into lowland and highland species; however, many lowland species can also be found in the highlands.

Mrs. Joseph
Cypress Bay High, Weston Florida
AP Environmental Science

How can a student prepare for a career involving field research in environmental science?

The most important thing a student can have for field research is an inquisitive mind! Researchers have a deep love and respect for the natural world and spend their lives trying to tease answers from the environment. Depending on their field of study, they often have extensive academic training in the life sciences, mathematics, and chemistry. In most cases, career researchers have earned a PhD from an accredited University, and have worked in their field in a variety of duties from field technician to lead researcher. There are many fine universities in the United States that specialize in environmental studies.

Elizabeth Wasserman, Interpretive Ranger
Lake Clark National Park & Preserve
Homer Field Office, Homer, Alaska

What bears live in the tropical rain forest?

Scientists identify eight different species of bears in the world (of which the black, brown and polar bear live in the United States). No bears live in the tropical rain forest of Puerto Rico. The Malayan sun bear is found in the lowland tropical rain forests of Southeast Asia, while the spectacled bear of South America inhabits a wide range of habitats, from dense rainforest to coastal scrub desert. Visit <http://www.americanbear.org/> for good information about the world's bears.

Lavonne D. Taylor
IDEA, Galena School District
Eagle River, Alaska

What would happen to the rain forest in Alaska if a hurricane hit?

Luckily, Alaska does not have hurricanes, which occur only in the Atlantic Ocean. We do, however, have major storms that bring very heavy rains and winds. Often these storms hit in the fall and are associated with typhoons in the Pacific Ocean.

Even though we don't have hurricanes, wind is an important "change agent" in the temperate rain forest. Sometimes high winds will cause a large area of mature trees to topple over. These areas are called "blow downs" and can

sometimes cover hundreds of acres. While mature trees are killed during a blow down, the opening in the canopy allows young trees and understory brush to get more sunlight and grow quickly. These natural openings in the forest make the forest more healthy and are important places for wildlife as they can often find more food.

**Mrs. Pierce's 6th grade Science Classes
Sequoyah Middle School, Broken Arrow, Oklahoma**

What is your day like (explain a day in the life of a forestry scientist)? (from Jesse)

There is almost no such thing as an average day for me because each day is so different. Examples of activities include: planning research, collecting data in the field or lab, analyzing data (exciting because the answer emerges), writing papers for publication (the fun of telling the story), evaluating manuscripts and grant proposals of colleagues, making decisions on whether papers should be published in journals for which I am an editor, and a few administrative duties like helping to run the Wind River Canopy Crane, and managing my research team. From Dr. Rick Meinzer, Research Ecologist, USDA Forest Service

SC Johnson Elementary School, Racine, Wisconsin 5th grade

How many eggs does a coqui lay? Do they lay them in trees? (from Anthony)

The Forest Coqui, *Eleutherodactylus portoricensis* has a yellow or tan body with silver or white eyes and a well-defined snout often marked with a white line. It has a white abdomen marked with white dots and red markings on the thighs and groin. Mature males measure 1.3 inches (34 millimeters) from snout to vent. Mature, egg-bearing females are slightly larger at 1.6 inches (41 millimeters). After mating the female lays from 15 to 25 eggs. The male rejects the female during the incubation period (17 to 26 days) and stays with the eggs to protect them from predators.

Although a mountain inhabitant, the Forest Coqui is terrestrial, preferring to spend its life in close proximity to the ground. During the day, it can be found under rocks, logs and leaf litter, under the roots of trees and in holes and crevices in mud banks. At night these tiny frogs come out into the open to forage, and to allow the males to call for mates from the ground or from low tree branches or bushes. Primarily an insectivore, its diet consists mainly of leaf litter insects such as beetles and slugs. The male's call is the familiar, "Ko-kee", also given by the Common Coqui (*E. Coqui*), but it is of a higher pitch, and given at much shorter intervals.