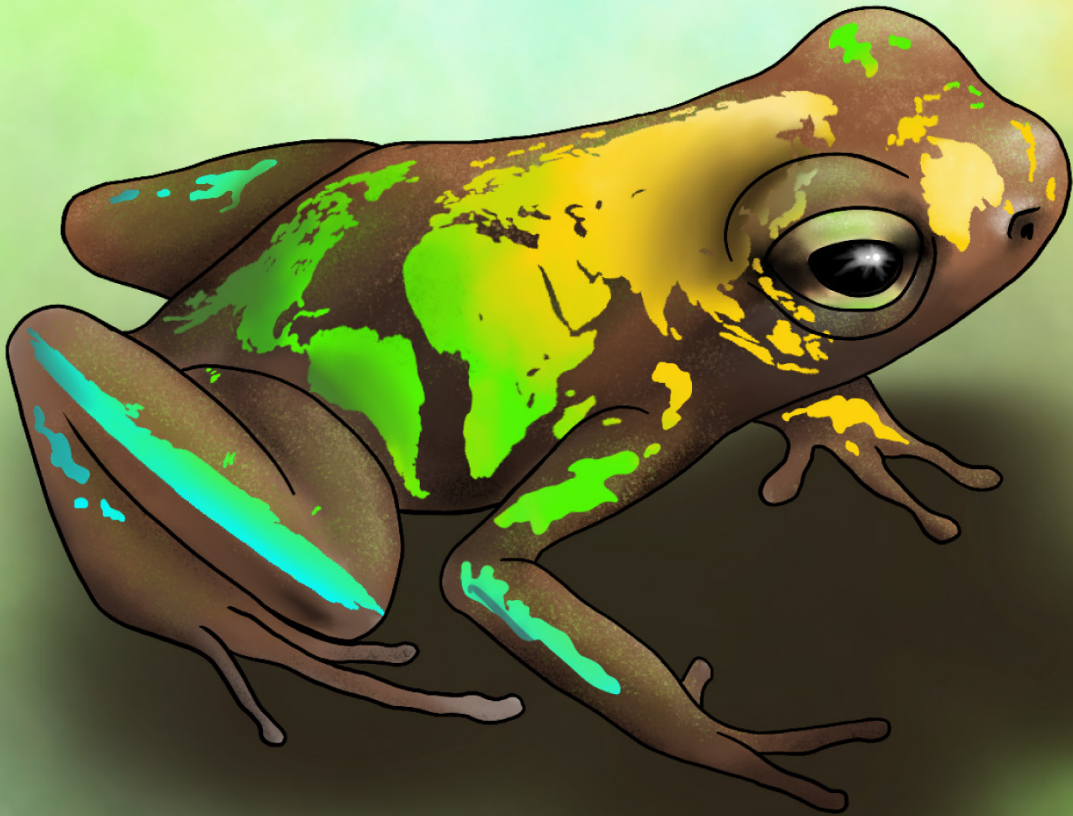


# AmphibiaWeb's Illustrated Amphibians of the Earth



Created and Illustrated by the  
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This introduction to amphibians was written by  
University of California, Berkeley AmphibiaWeb  
Undergraduate Research Apprentices for people  
who love amphibians.

Thank you to the many AmphibiaWeb apprentices  
over the last 21 years for their efforts.

Edited by members of the AmphibiaWeb Steering  
Committee

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Dedicated in loving memory of

**David B. Wake**

Founding Director of AmphibiaWeb

(8 June 1936 - 29 April 2021)

Dave Wake was a dedicated amphibian biologist who mentored and educated countless people. With the launch of AmphibiaWeb in 2000, Dave sought to bring the conservation science and basic fact-based biology of all amphibians to a single place where everyone could access the information freely. Until his last day, David remained a tirelessly dedicated scientist and ally of the amphibians of the world.

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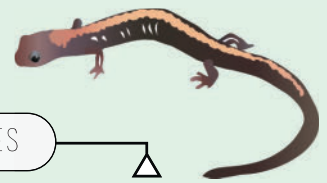
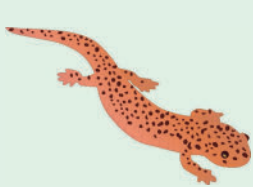
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# Amphibian or Not?



NO

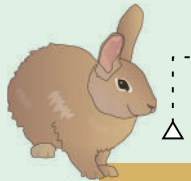
DOES IT HAVE BONES?

YES

Your animal is an **invertebrate**! Invertebrates are animals that don't have a backbone or any bones at all! Examples of invertebrates include insects, lobsters, crabs, octopi, squid, starfish and worms.



Your animal is a **vertebrate**! Vertebrates are animals with bones and a backbone. Backbones are also called vertebrates. This is how this group gets its name. Examples include fish, birds, mammals, reptiles, and (most importantly) amphibians!



WARM

IS IT WARM - BLOODED OR COLD - BLOODED?

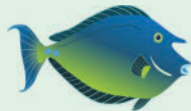
COLD



Warm-blooded animals are known as **endotherms**. They control their own body temperatures by shivering to stay warm or sweating to cool off. Only birds and mammals are endotherms.



Cold blooded animals are known as **ectotherms** and rely on the environment to regulate their body temperature. They can do this by basking in the sun to warm up or sitting in the shade to cool off. Examples of ectotherms are invertebrates, fish, reptiles, and amphibians.



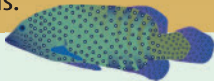
GILLS

HOW DOES IT BREATHE?

LUNGS



Your animal is a **FISH**! Fish live underwater where they use gills to breathe. Fish are the most numerous vertebrate species. Fish can be found in lakes, rivers, and oceans.



**Lungs** are elastic organs that help draw carbon dioxide out of the body and oxygen into the body.



FEATHERY

WHAT KIND OF SKIN DOES IT HAVE?

HAIRY



Your animal is a **BIRD**! All birds have feathers, wings, and a beak. They walk on two legs and lay eggs. At 2 inches long, the hummingbird is the smallest bird. The largest bird is the ostrich at 9 feet tall.



SCALY

Your animal is a **MAMMAL**! All mammals have hair, produce milk, and have highly developed brains. Mammals, especially elephants, dolphins, apes, and humans, are considered very intelligent.

Your animal is a **REPTILE**! Reptiles use lungs to breathe air, and they may live on land, in water, or both. Unlike amphibians, reptiles can survive in drier habitats since their skin does not dry out as easily.



SLICK

Your animal is an **AMPHIBIAN**! All amphibians are cold-blooded with smooth, moist skin (though some toads may have dry, bumpy skin). Amphibians dry out easily and need a moist habitat to survive. The name amphibian refers to the fact that they are amphibious, meaning most are able to live both in water and on land though some live only in water or only on land. Almost all amphibians lay eggs, but one reason amphibians are special is because they've come up with many different ways to make babies.



# What are Amphibians?

"Amphibian" comes from the Greek words "amphi-" and "bios" meaning "of both or double kinds" and "life" or "living", referring to the general life history trait of amphibians starting life in water as an aquatic larval form then metamorphosing (transforming) into a terrestrial adult. This is also called a bi-phasic life history. Many frog and salamander species have this "double" life but some amphibians stay in water or on land their entire life.

## Their Characteristics

Amphibians are animals that have a backbone and skin that doesn't have hair, feathers, or scales on it. They are ectothermic, meaning they don't control their body temperature - they have the same temperature as their environment. There are over 8,000 different species of amphibians!

## Orders of Amphibians

Amphibians include frogs, toads, salamanders, and newts. But, they also include another type of animal called caecilians (suh-si-lee-uhn). Together they are in the Class Amphibia. Amphibians are separated more into groups that we call Orders. Orders further divided into groups called families that are genetically and morphologically, or physically, similar.



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The **Order Anura** (uh-nyur-uh) includes amphibians that have arms and legs, but no tail. They are frogs and toads. They make up 88% of all amphibians. Species from this order are also called anurans, and all anurans can also be called frogs. So, what are toads?

In frogs, there are 54 families. One of those families is called Bufonidae - they are the "True Toads". In other words, all frogs in the family Bufonidae are toads. As a result, all toads are frogs, but not all frogs are toads. All true toads have special glands, called paratoid glands, that store chemicals for defense.

The **Order Caudata** (cu-da-ta or ca-da-ta) includes amphibians that have arms, legs, and tails. They are salamanders and newts, and they make up 9% of amphibians. All species in Caudata can be called caudates or salamanders. They are also sometimes called Urodeles. So, why do we call some of them newts?



There 10 salamander families. All newts are in the family Salamandridae. All newts are salamanders, but not all salamanders are newts. This is confusing because we call all species of Caudata salamanders! All newts also have paratoid glands.



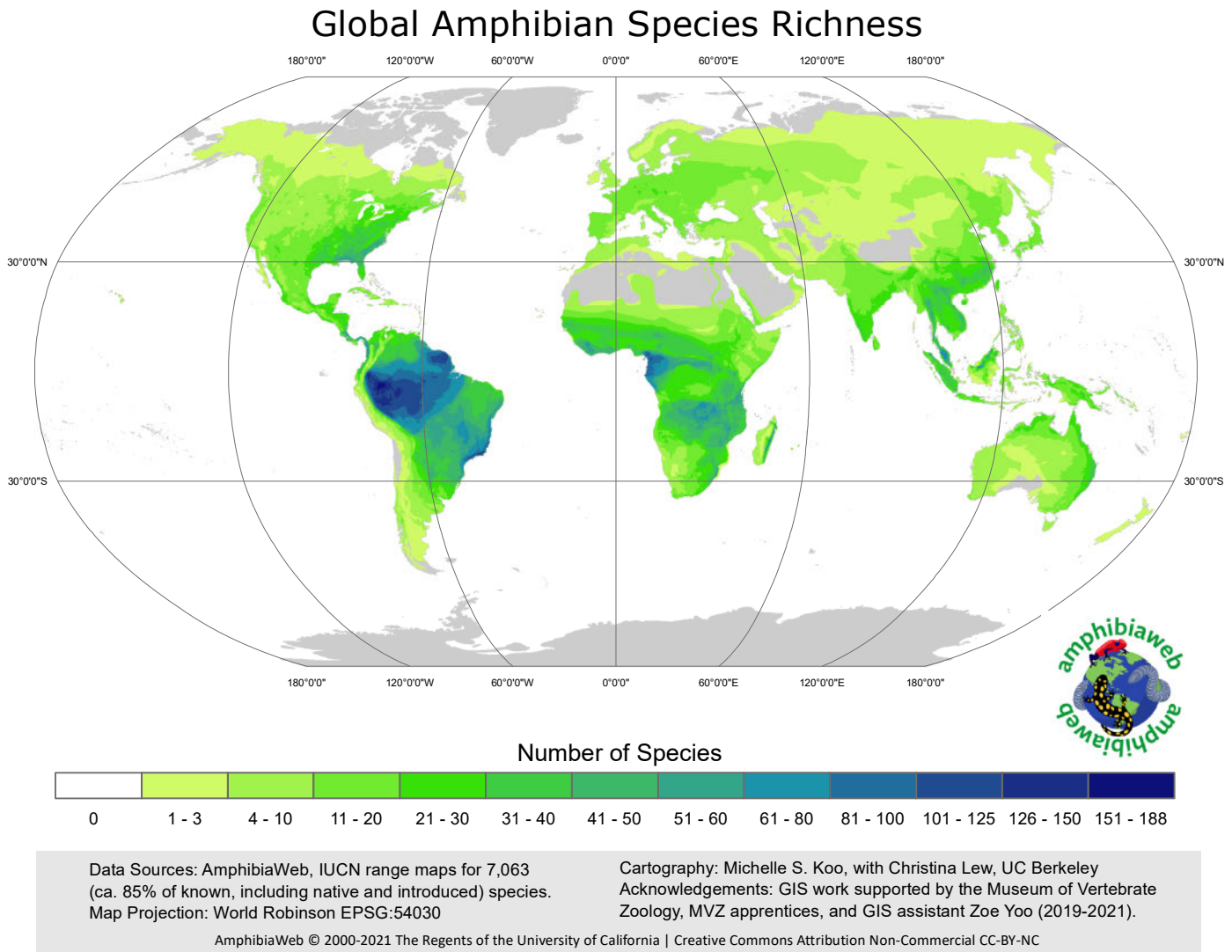
The **Order Gymnophiona** (gym-no-fee-oh-na) includes amphibians that don't have arms or legs and, most of the time, don't have tails. They are caecilians. These worm or snake-like amphibians are not known well because they are secretive and mostly live underground. Only 3% of amphibian species are in this order.

New amphibians are still being described by scientists. There are about 125 - 175 new species described every year. But their descriptions are in the same proportions, with more frogs and fewer caecilians. There are 10 families in Gymnophiona.



# Where are Amphibians?

Amphibians can be found in all sorts of habitats, on every continent except Antarctica. There are also no amphibians in Greenland and most south-Pacific islands.



The majority of frogs are found in the tropics of South America, but they can be found all over the world.

The majority of salamanders are found in the southeast of North America and in Central America. But salamanders are widely distributed around the world, and can be found in the Americas, Africa, and Eurasia. There are no native salamanders in Australia or New Zealand!

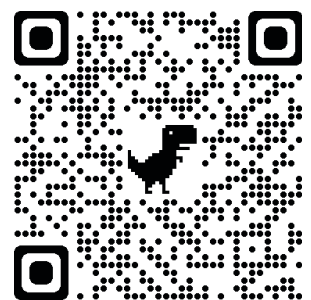
Caecilians are only found along the equator of the world and are most concentrated in South America and India. Most of them live underground, but some can be found in water.



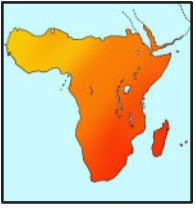
## What are Bioregions?

Surveys of many plants and animals consistently show natural boundaries of geography (for example, mountains and rivers), ecology (similar climate and food webs), and species (communities of plants and animals, which interact with each other). The area set by these boundaries are called bioregions. Bioregions can be grouped into broader categories of biogeographical realms.

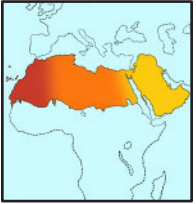
In amphibians, studies across species show repeated patterns supporting the idea of bioregions. Because of this we use the broader biogeographical realms to organize our book of amphibian diversity. We largely follow the realm definitions from [OneEarth.org](https://oneearth.org/). Here we provide a summary of the realms used in this book.



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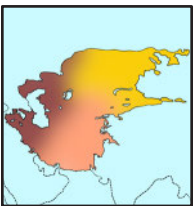
**Afrotropics** - The Afrotropics realm generally covers the African continental plate, but excludes the driest regions of the north and includes the coastal regions of southern Saudi Arabia and Yemen. This realm has many types of habitats including savannas, scrublands, brushlands, grasslands, mangroves, woodlands, and various types of temperate and tropical forests. There are 5 subrealms and 24 bioregions in the Afrotropics.



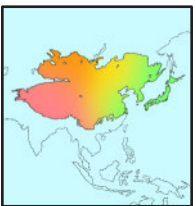
**Southern Eurasia** - The Southern Eurasian realm includes northern Africa and most of the Greater Arabian Peninsula. This realm is composed of deserts, savannas, desert marshes, salt marshes, woodlands, and temperate forests. There are 2 subrealms and 5 bioregions.



**Western Eurasia** - The Western Eurasian realm includes the western portion of the Eurasian continental plate from the British Isles to the Mediterranean and to western Russia on its eastern edge. Habitats in this realm include grasslands and various types of temperate forests. The realm is composed of 5 subrealms and 13 bioregions.



**Central Eurasia** - The Central Eurasian realm extends from the border of western Russia to the Gulf of Oman at the Greater Arabian Peninsula and from the Caspian Sea in the west to Tien Shan Mountains in China to the east. Ecosystems found here are deserts, grasslands, meadows, woodlands and temperate forests. This realm has 4 subrealms and 9 bioregions.

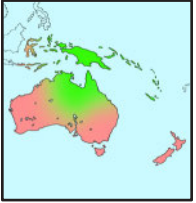


**Eastern Eurasia** - The Eastern Eurasia realm includes the eastern portion of Eurasia, but excludes the Arctic portions. The habitats in this realm include deserts, meadows, shrublands, and various types of temperate and subtropical forests. It is made up of 7 subrealms and 17 bioregions.





**Indomalaya** - The Indomalaya realm is made up of the Indian continental plate and the Southeast Asia region of the Eurasian plate. This realm has deserts, grasslands, scrublands, mangroves, and various types of tropical forests. There are 3 subrealms and 18 bioregions.



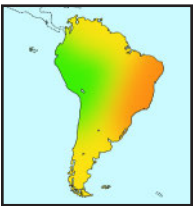
**Australasia** - The Australasia realm is made up of the Australian continental plate. This includes eastern Indonesia to the north and New Zealand to the south. Ecosystems here include deserts, savannas, shrublands, woodlands, and various types of temperate, subtropical, and tropical forests. Australasia has 3 subrealms and 15 bioregions.



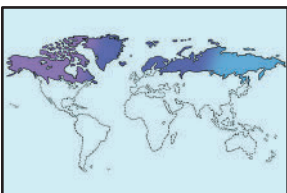
**Northern America** - The Northern American realm includes most of the North American continental plate, but excludes the coldest regions in the north and the tropical regions of Central America. This region includes deserts, grasslands, shrubland, riparian areas, and various types of temperate forests. This realm has 6 subrealms and 22 bioregions.



**Central America** - The Central American realm includes the tropical regions of Mexico south to northwestern Colombia, and includes the Caribbean islands. Habitats in this realm include various types of tropical forests. There are 2 subrealms and 6 bioregions in this realm.



**Southern America** - The Southern American realm covers all of the South American plate except for the northeastern portion of Colombia. Habitats here include deserts, savanna, shrubland, grasslands, and various types of temperate and tropical forests. It is made up of 5 subrealms and 23 bioregions.



**Subarctic America and Eurasia** - Because few amphibians can live in extremely cold conditions, we combined the realms of Subarctic America and Subarctic Eurasia. This area covers the most northern

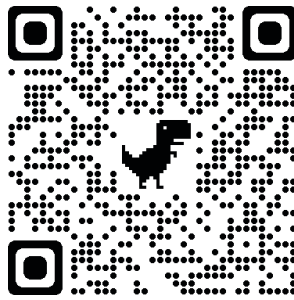
parts of the northern hemisphere and is made up of boreal forests, taiga forests, and tundras ecosystems. Subarctic America has 4 subrealms and 9 bioregions while Subarctic Eurasia has 4 subrealms and 8 bioregions.



# Conservation of Amphibians

## Why Save Amphibians?

Excerpts by Julianne Oshiro



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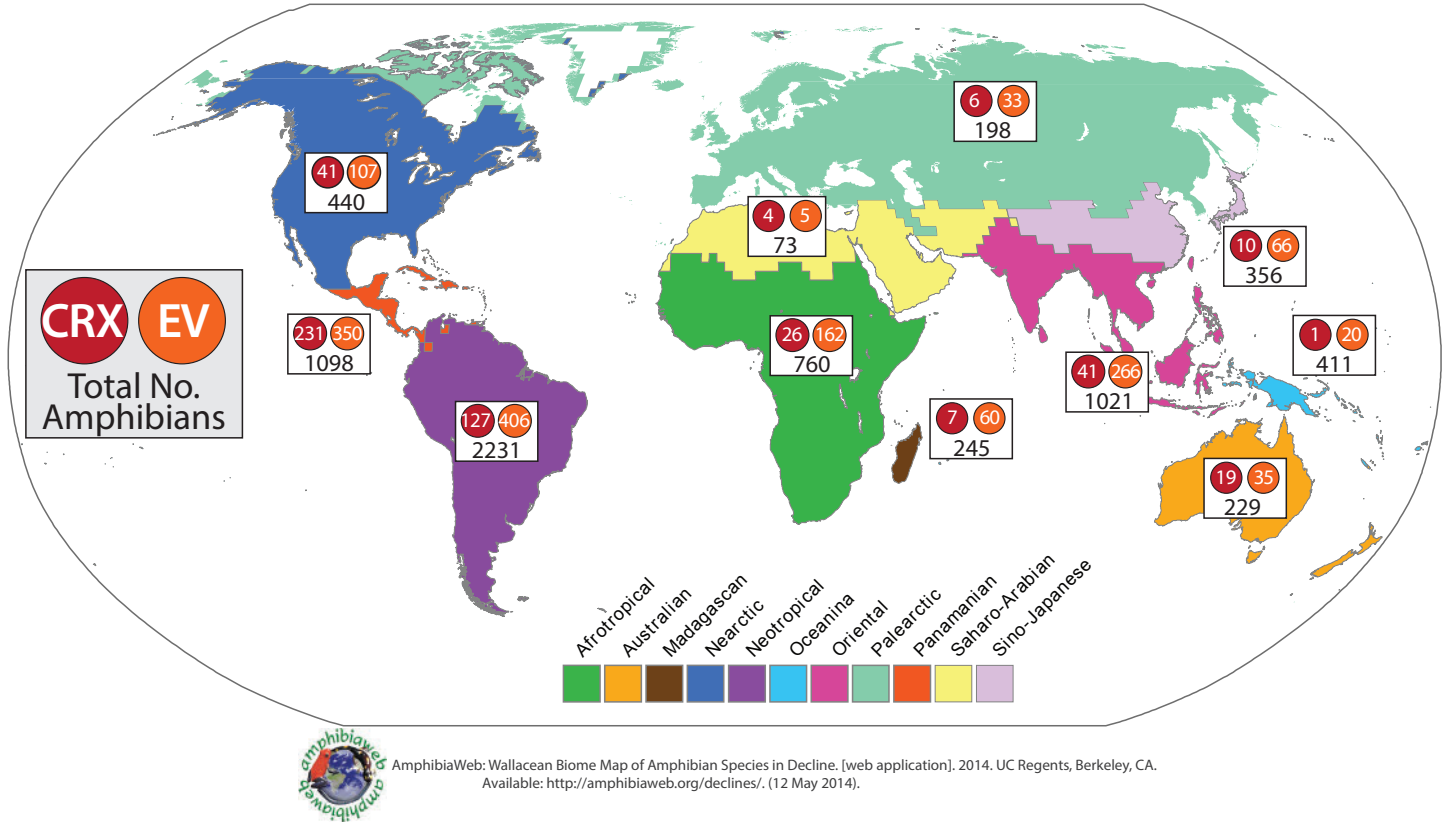
While these little creatures may go unnoticed by most of us, amphibians have greatly influenced our society and planet's ecosystems. Amphibians have helped to advance the field of medicine, are integral to the ecosystems on which we rely, and are central to many cultural stories and beliefs.

Much of the fascinating biology of amphibians have applications beyond understanding their evolution and ecology. They have valuable chemicals that they exude from their skin. These chemicals have already been used in medicine to combat drug-resistant bacteria, cardiac problems, and HIV (Song et al. 2010). In another example, amphibians are a valuable model for researchers to study regenerative tissue (Garg et al. 2007). Salamanders, such as the *Ambystoma mexicanum*, have the ability to regrow limbs, which brings hope that one day doctors will be able to help people regrow body parts (Voss et al. 2009).

Amphibians are central to maintaining a healthy and resilient ecosystem. And because of their permeable skin, amphibians are extremely vulnerable to environmental and water quality degradation. Thus, their decline is an important indicator that an entire ecosystem may be in peril.

# Why are Amphibian Populations Declining?

Excerpts from various AmphibiaWeb pages



CRX = Critically Endangered, Extinct, or Extinct in the wild, EV - Endangered and Vulnerable

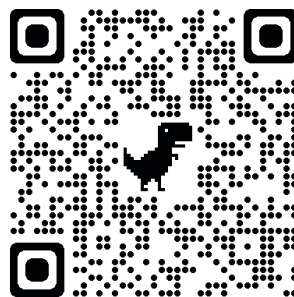
The biggest threat to amphibians is habitat destruction (Dodd and Smith 2003). Although amphibians are found in a great variety of ecosystems from tropical rainforests to arid deserts (Stebbins and Cohen 1995), people often think of amphibian habitat as being confined to wetlands and other aquatic environments. Surprisingly, a large number of species are entirely terrestrial (e.g., plethodontid salamanders and eleutherodactylid frogs; for a good overview of amphibian natural history, see Stebbins and Cohen 1995). This diversity in habitat requirements between species and even between life-stages of the same species emphasizes that we can not take a simple approach to amphibian conservation. In order to successfully conserve amphibians, we need a clear understanding of their varied life histories and habitat requirements. There are distinct differences between habitat destruction, alteration and fragmentation (see our glossary at the end of the book).

What is alarming is that there are many cases where the habitat is protected and amphibians are still disappearing. There are many causes for recent amphibian declines, but global climate change, and diseases caused by fungi, called chytridiomycota (often called chytrid), are thought to be the other big threats to amphibians.

Chytridiomycosis is a disease caused by two fungal chytrid pathogens *Batrachochytrium dendrobatidis* (Bd) and *Batrachochytrium salamandrivorans* (Bsal). Bd is associated with the global loss of hundreds of species of amphibians and represents a spectacular loss of biodiversity, some say the worst in recorded history. Bsal was identified in 2013 and caused many salamander deaths in Europe. Using lessons learned from Bd, many countries were able to prevent Bsal from entering their region.

Find out more about Bd at:

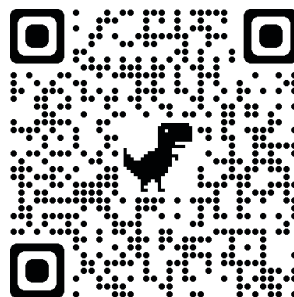
<https://amphibiaweb.org/chytrid/chytridiomycosis.html>



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Find out more about Bsal at:

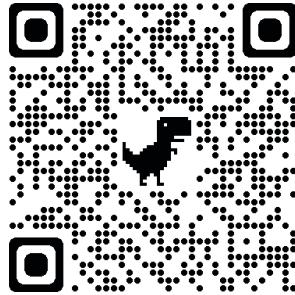
<https://amphibiaweb.org/chytrid/Bsal.html>



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# IUCN Red List of Threatened Species

The International Union for the Conservation of Nature (IUCN) system of evaluating the threat of extinction for a species is used broadly. Below we briefly define their categories. Visit <https://www.iucnredlist.org/> to learn more.



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**Data Deficient (DD)** - A taxon is Data Deficient when there isn't enough information to make a decision of a species' risk of extinction. Taxa in this category may be well studied, and have well known biology, but lack appropriate data on abundance and/or distribution in the wild. Data Deficient is therefore not a category of threat.

**Least Concern (LC)** - Taxa are considered Least Concern when they are widespread and abundant.

**Near Threatened (NT)** - A taxon is Near Threatened when it is close to qualifying for or is likely to qualify for a threatened category (Critically Endangered, Endangered, or Vulnerable) in the near future.

**Vulnerable (VU)** - A taxon listed as Vulnerable is considered to be facing a high risk of extinction in the wild.

**Endangered (EN)** - A taxon listed as Endangered is considered to be facing an very high risk of extinction in the wild.

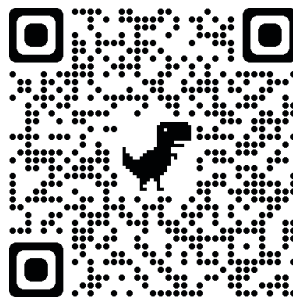
**Critically Endangered (CR)** - A taxon listed as Critically Endangered is considered to be facing an extremely high risk of extinction in the wild.

**Extinct in Wild (EW)** - A taxon is Extinct in the Wild when it is only known to survive in captivity or as a naturalized population (or populations) well outside the past range.

**Extinct (E)** - A taxon is Extinct when there is reasonable confidence that the last individual of the species has died. This status is given when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.

## CITES

The Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora protects species in international plant and animal trade. As of November 2019, 201 amphibian species have a CITES status. Find out more at their website, <https://cites.org/>



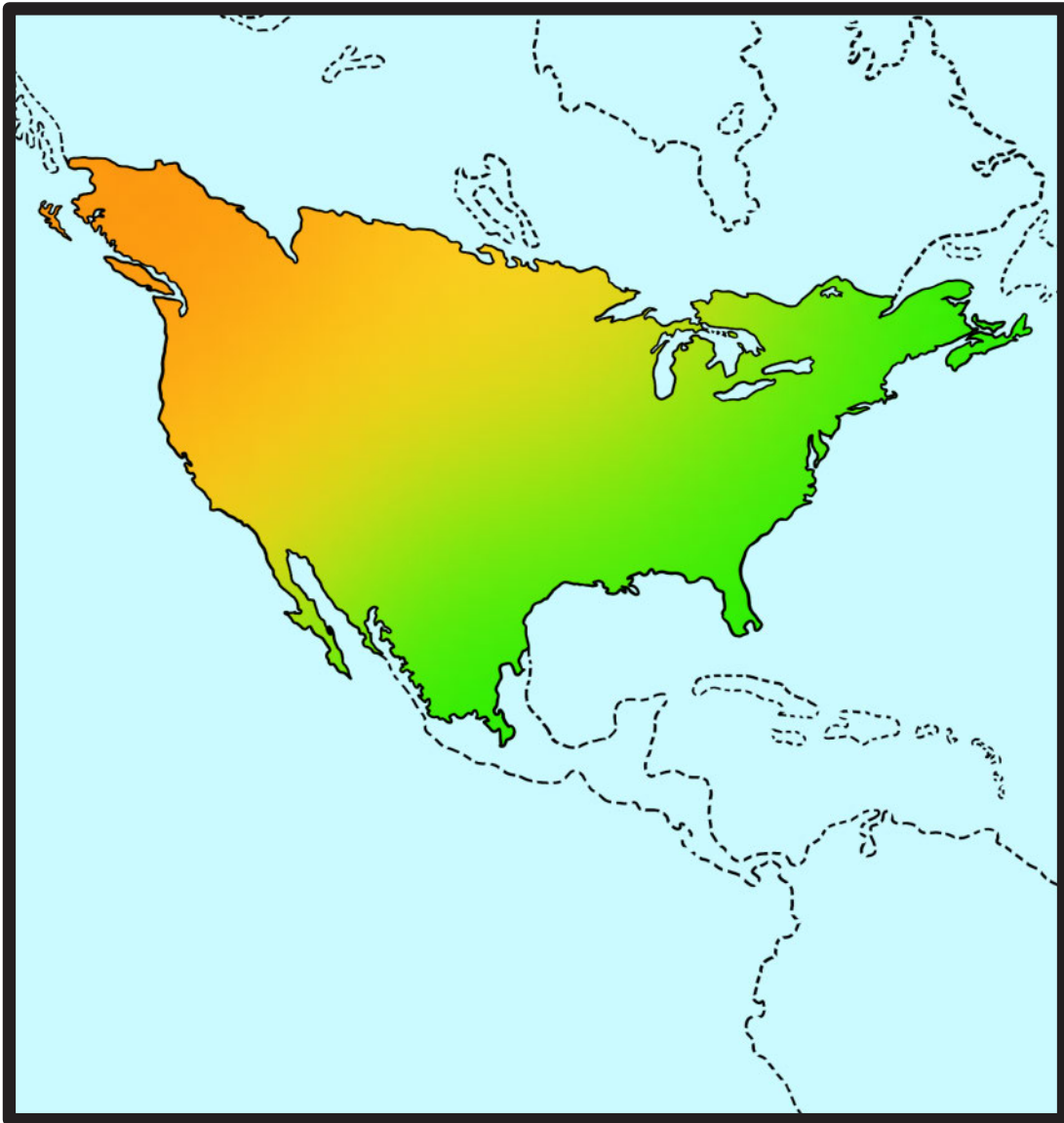
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# Illustrated Amphibians by Biogeographic Realms

Our 2020-2021 research apprentices embraced the AmphibiaWeb mission of student outreach and education by researching global amphibian biodiversity. They chose amphibians that they thought were amazing and hope that you will find these species as beautiful and unusual as they did. Enjoy!

# Northern America



Countries: 3

Includes portions of southern Canada, the continental United States of America, and northern Mexico.

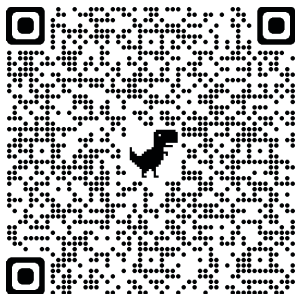
Approximate Proportion of Amphibians: 6%

# *Anaxyrus californicus*

Common Name: Arroyo Southwestern Toad

IUCN: **Endangered**

*Anaxyrus californicus*, the Arroyo toad, is a small, stocky toad found in Mexico and California. This toad can be found near “arroyos,” which are dry streams or creeks that fill with water when it rains; this is probably how the Arroyo Toad got its name! Adult toads burrow in the sand during the day and hunt for prey at night. Arroyo toad larvae are hunted by some fish, and adults are often prey to introduced bullfrogs. While these predators are threatening the Arroyo toad, habitat destruction and human collection also make this population vulnerable. The US government keeps the locations of Arroyo toad secret to protect them from collectors. Still, further limitations should be placed on urban development in order to protect the habitats of Arroyo toads.



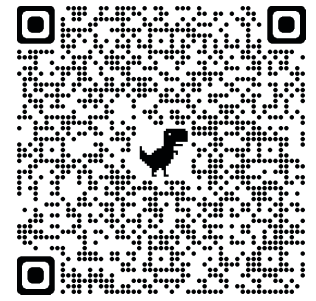
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# *Rana sevosa*

Common Name: Dusky Gopher Frog

IUCN: Critically Endangered



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*Rana sevosa*, dusky gopher frogs, are only found in the southernmost regions of Alabama, Louisiana, and Mississippi. These frogs have distinct breeding and non-breeding habitats - shallow, ephemeral lakes v.s. pine forests, respectively - so they must migrate back and forth during the breeding season. Dusky gopher frogs usually live in burrows abandoned by gopher tortoises (*Gopherus polyphemus*) or small mammals, and only leave these burrows during times of rain. They regularly forage around their burrow entrance, leaving a smooth area outside of the entrance that many individuals use as a resting place. Dusky gopher frogs are mostly threatened by habitat destruction as pine forests are being urbanized. However, captive breeding, artificial fertilization, wetland restoration, and species reintroduction to the forests have all shown promising results for conserving the dusky gopher frog population.



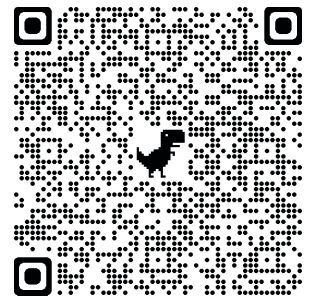


# *Siren lacertina*

Common Name: Greater Siren

IUCN: **Least Concern**

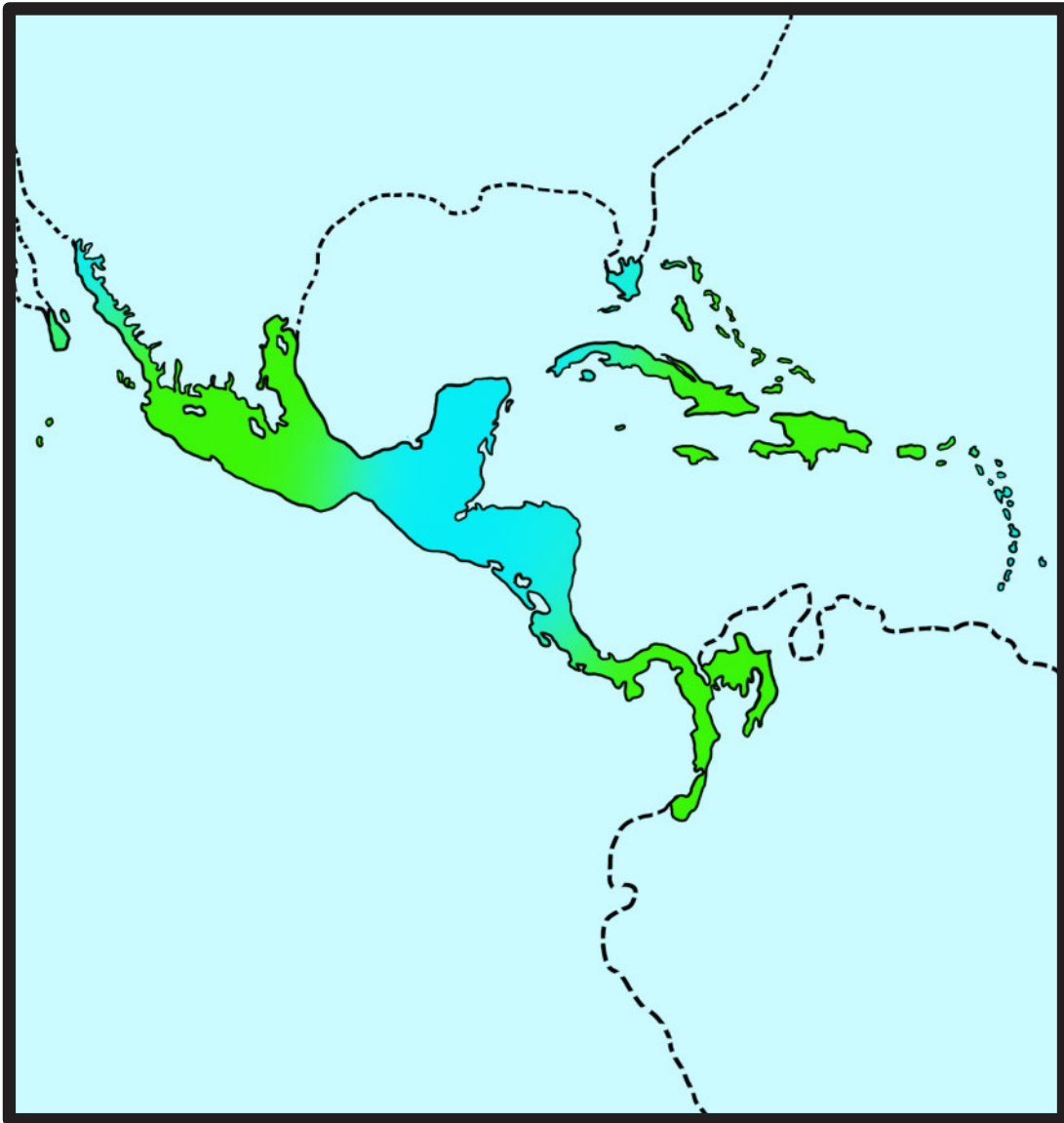
*Siren lacertina*, the greater siren is a large salamander that lives in aquatic habitats around the southeastern United States. This siren lacks hind limbs and keeps its gills throughout life. Greater sirens are opportunistic feeders, meaning they will eat what they can find, but they mostly consume mollusks, like snails and clams. They make a variety of noises when threatened, including yelping, hissing, and croaking. If their warning calls don't work, they either thrash and swim away quickly or inflict a strong bite. While they are classified as a Least Concern species, they are threatened by the destruction of wetlands. These areas must be protected in order to ensure that the greater siren has enough space to thrive.



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# Central America



Countries: 32

Southern Mexico to Northern Colombia  
and the Caribbean islands.

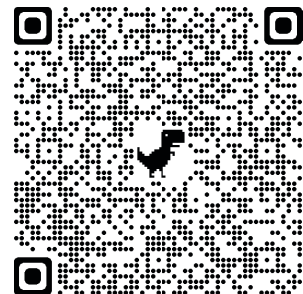
Approximate Proportion of Amphibians: 15%

# *Agalychnis lemur*

Common Name: Lemur Leaf Frog

IUCN: Critically Endangered

*Agalychnis lemur*, the lemur leaf frog, is a nocturnal and territorial species. It has faced declines due to the chytrid fungus. However, it could contribute much to human medicinal research because it has different skin-secreted peptides. These peptides include one that can prevent staph infections from *Staphylococcus aureus*, another that can stimulate insulin release, which could help treat Type 2 diabetes, and another that could be engineered as an anti-cancer agent.



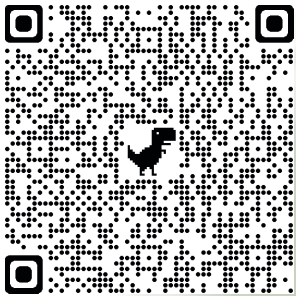
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# *Oedipina carablanca*

Common Name: None

IUCN: **Endangered**

*Oedipina carablanca* is a salamander that has been found in rotting logs and the bark of fallen trees in Costa Rica. Some think this species might climb trees. When they feel threatened, they may coil up or flip their bodies around. They are dark brown with white splotches throughout the body. They have an Endangered status due to habitat fragmentation and loss as well as low population abundance.



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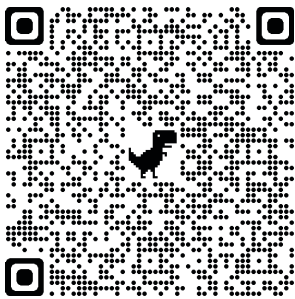


# *Sachatamia ilex*

Common Names: Ghost Glass Frog, Limon Giant Glass Frog, Holly's Glassfrog, Rana de Cristal de Holly, Rana de Cristal Fantasma

IUCN: **Least Concern**

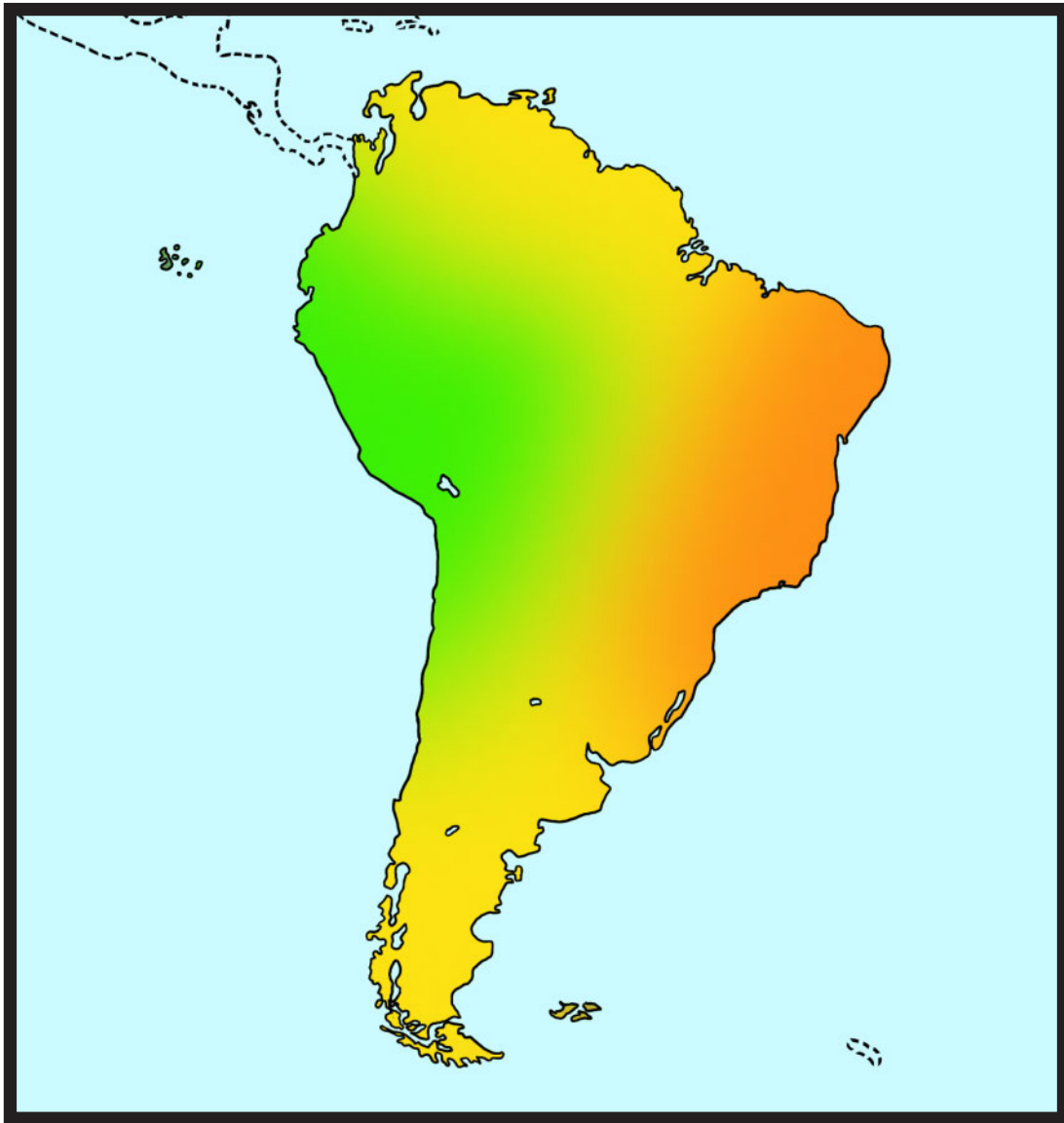
*Sachatamia ilex*, the ghost glass frog, is the largest glass frog in South America. Glass frogs have glass in their name because their bellies are usually transparent. The ghost glass frog is striking for the black reticulations in its eyes. This species has dark green bones and they can change the intensity of their green coloration to match whatever they are resting on. They are considered Least Concern because they live in protected areas. They are vulnerable to habitat loss resulting from deforestation because they need vegetative cover above streams.



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# Southern America



Countries: 14

From Colombia and Venezuela in the north extending south to the southernmost tip of South America.

Approximate Proportion of Amphibians: 31%

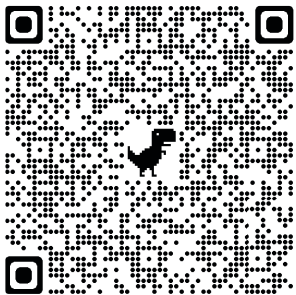


# *Atelopus barbotini*

Common Name: None

IUCN: No status, likely **Vulnerable**

*Atelopus barbotini* is a harlequin frog that lives in the primary forests of French Guiana. They have spots in the shape of red commas, rings, and curved lines on their backs. They give a prelude call before beginning a series of calls. As of 2021, this species has no IUCN status because they recognize it as a subspecies of *Atelopus spumarius*. The *Atelopus* genus is very sensitive to the chytrid fungus, *Bd*, and many species in the genus have gone extinct.



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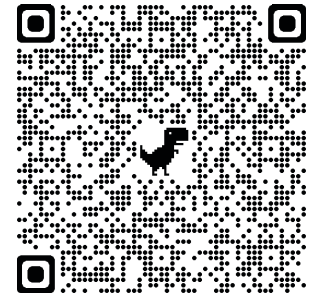


# ***Brachycephalus pitanga***

Common Name: Red Pumpkin Toadlet

IUCN: No Status

*Brachycephalus pitanga*, the red pumpkin toadlet, lives in leaf litter in the Serra do Mar of southeastern Brazil. Like other pumpkin toadlets, they are missing some fingers and toes. They have fluorescent bones on their dorsum and head. Researchers don't know why this is, but it may have to do with mating - we don't know what frogs can see! Lastly, their skin is toxic to protect them from predators. These toadlets do not go through metamorphosis, they hatch as little versions of adults. As of 2021, this species has no IUCN status, but the population could be threatened by habitat loss, climate change, and the chytrid fungus, *Bd*.



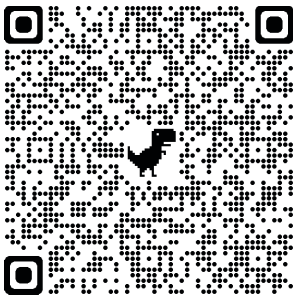
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# *Caecilia tentaculata*

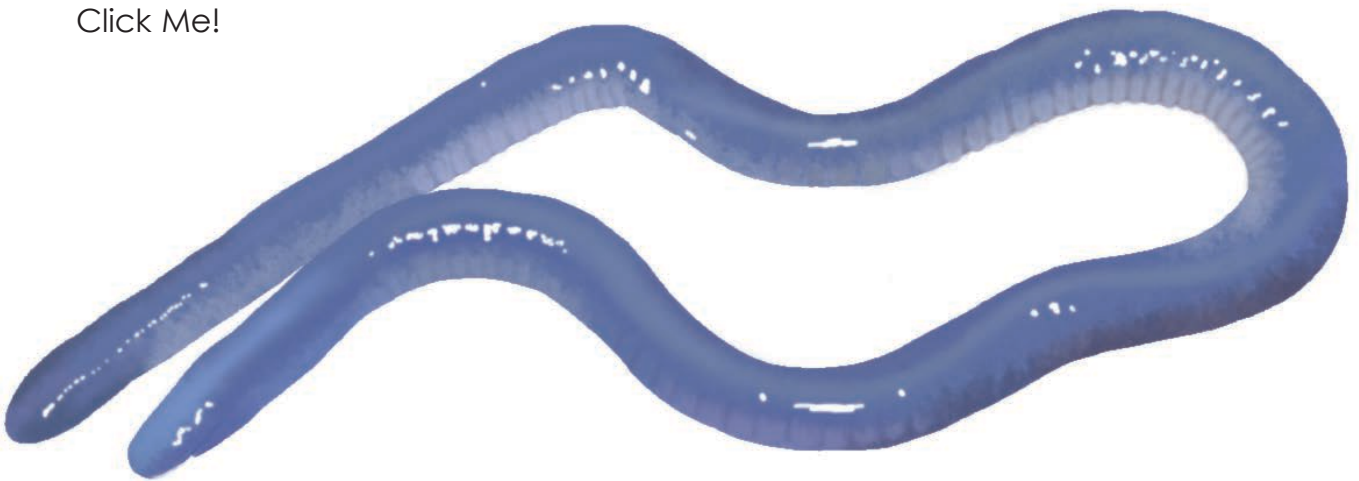
Common Name: None

IUCN: **Least Concern**

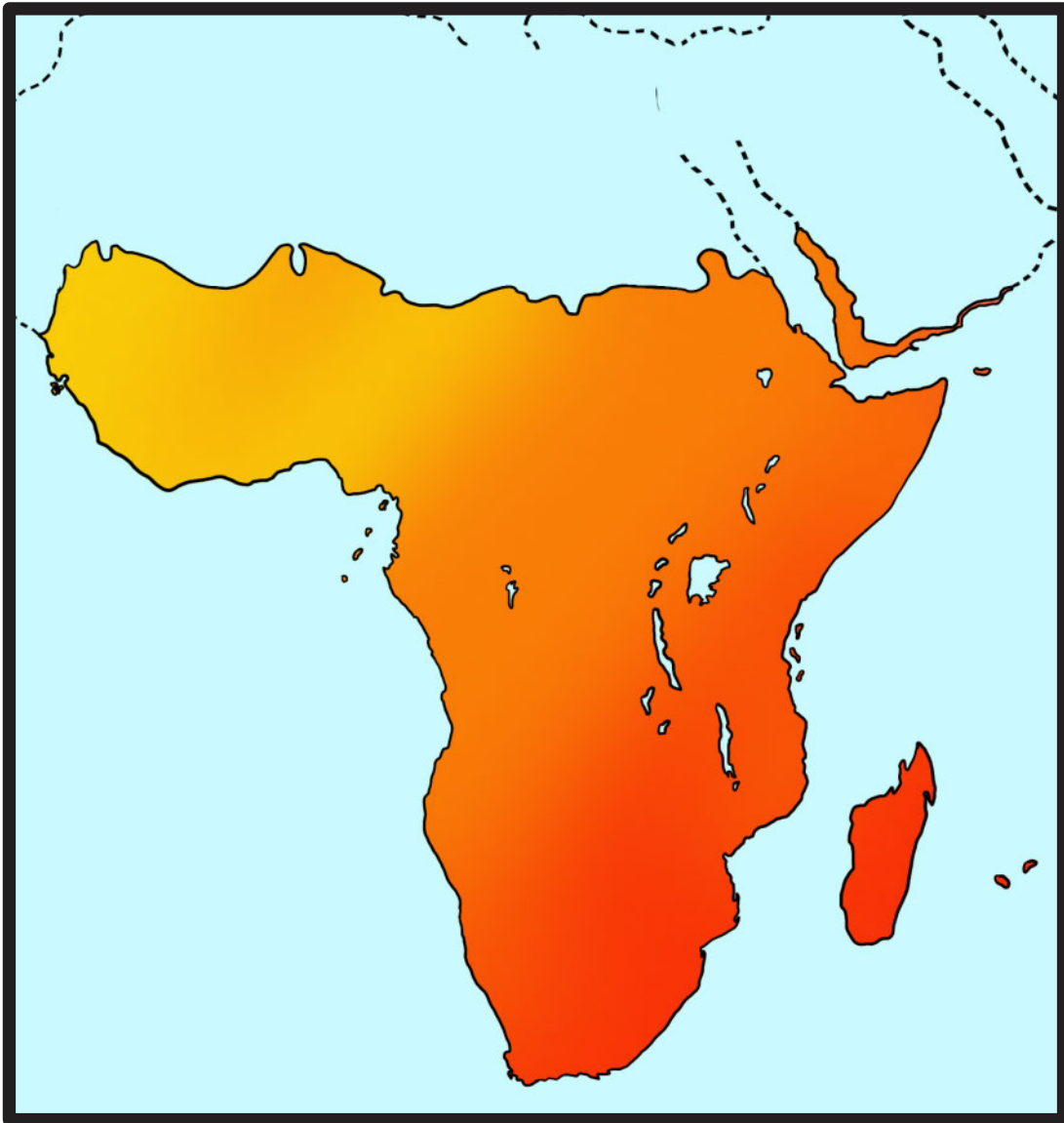
*Caecilia tentaculata* is a bluish gray cylindrical caecilian that can be found in loose soil in lowland forests of the Amazon basin. The short-eared dog (*Atelocynus microtis*) may prey on this species. *Caecilia tentaculata* eyes are dark spots under the skin. While their population numbers are unknown, they are considered Least Concern because they have a wide range and many parts of that range are in protected areas. There is still a lot of confusion if this is one or many species!



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# Afrotropics



Countries: 53

All African countries excluding the desert countries in the north, but also including the coastal region of southern Saudi Arabia and Yemen.

Approximate Proportion of Amphibians: 14%

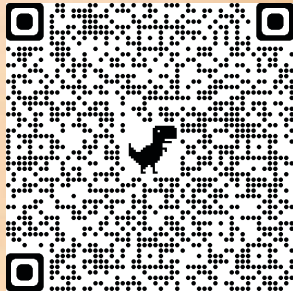


# *Breviceps macrops*

Common Name: Desert Rain Frog

IUCN: **Vulnerable**

*Breviceps macrops*, the desert rain frog, has a balloon-shaped body and huge protruding eyes, which help it to find food in the dark. These frogs are nocturnal and buries themselves under sand dunes to sleep during the day. Their feet are webbed to help them walk on the sand. When they are feeling threatened they let out a scream-like call. *Breviceps macrops* is native to a strip of coastal land in Namibia that is rich in diamonds and copper, and so it is threatened by mining and habitat loss.



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# *Conraua goliath* and *Sechellophryne gardineri*

Common Names: Goliath Frog and  
Gardiner's Seychelles Frog

IUCN: Both **Endangered**

*Conraua goliath*, the Goliath frog, is the largest frog in the world, growing over a foot in length. They live in large rivers and rapids in the tropical forests of Cameroon. Due to their size, the Goliath frog is hunted for food. They are also threatened by deforestation and other habitat loss.

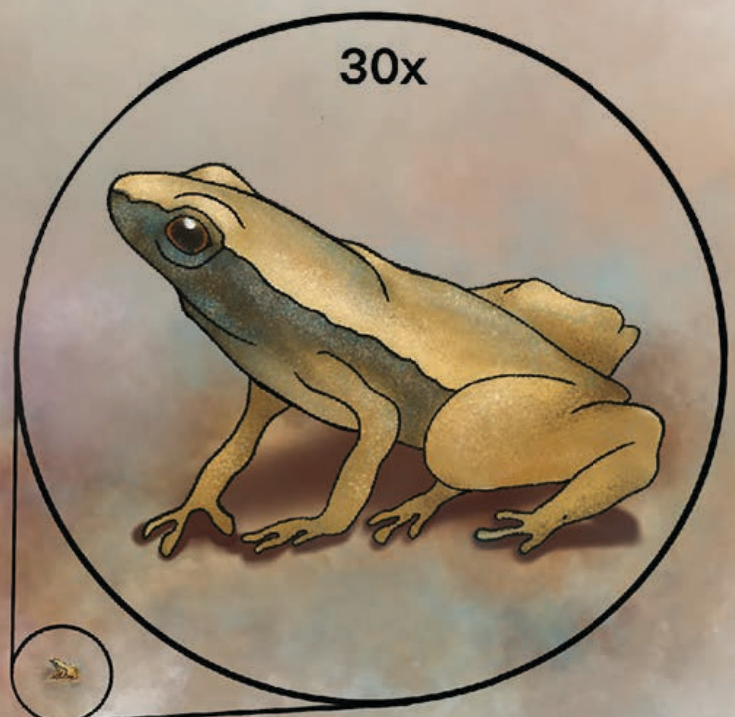


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*Sechellophryne gardineri*, Gardiner's Seychelles frog, is one of the smallest frogs alive with a maximum length of just over a centimeter. These tiny frogs makes their advertisement calls with a high-pitched squeak, similar to a cricket. They are threatened by climate change and loss of habitat due to frequent wildfires.



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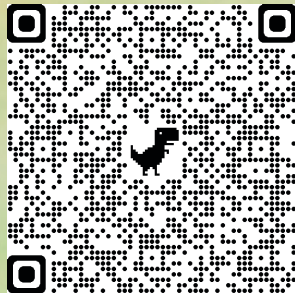


# *Schistometopum thomense*

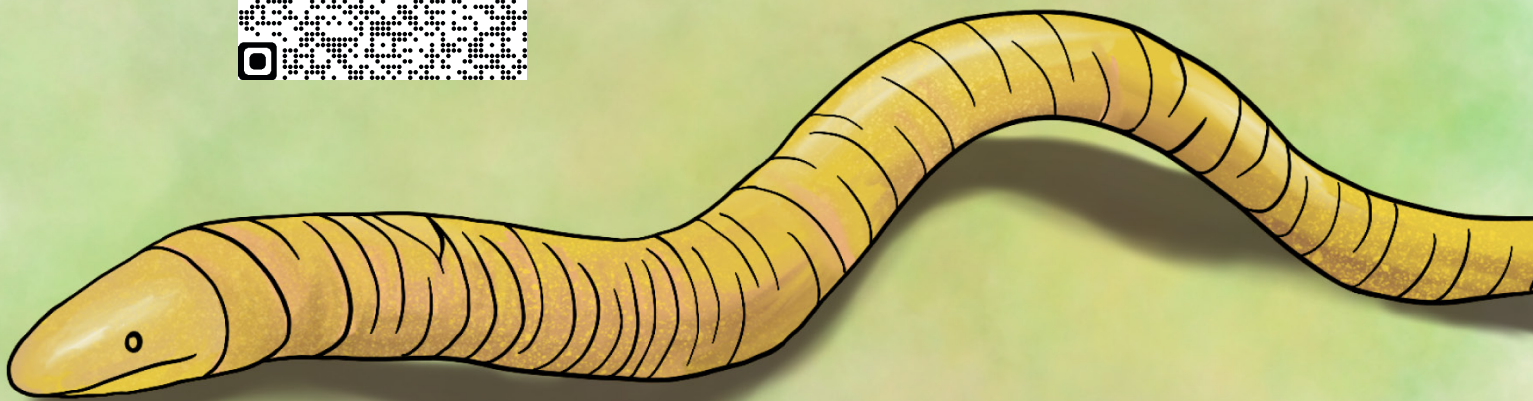
Common Name: Cobra bobo

IUCN: **Least Concern**

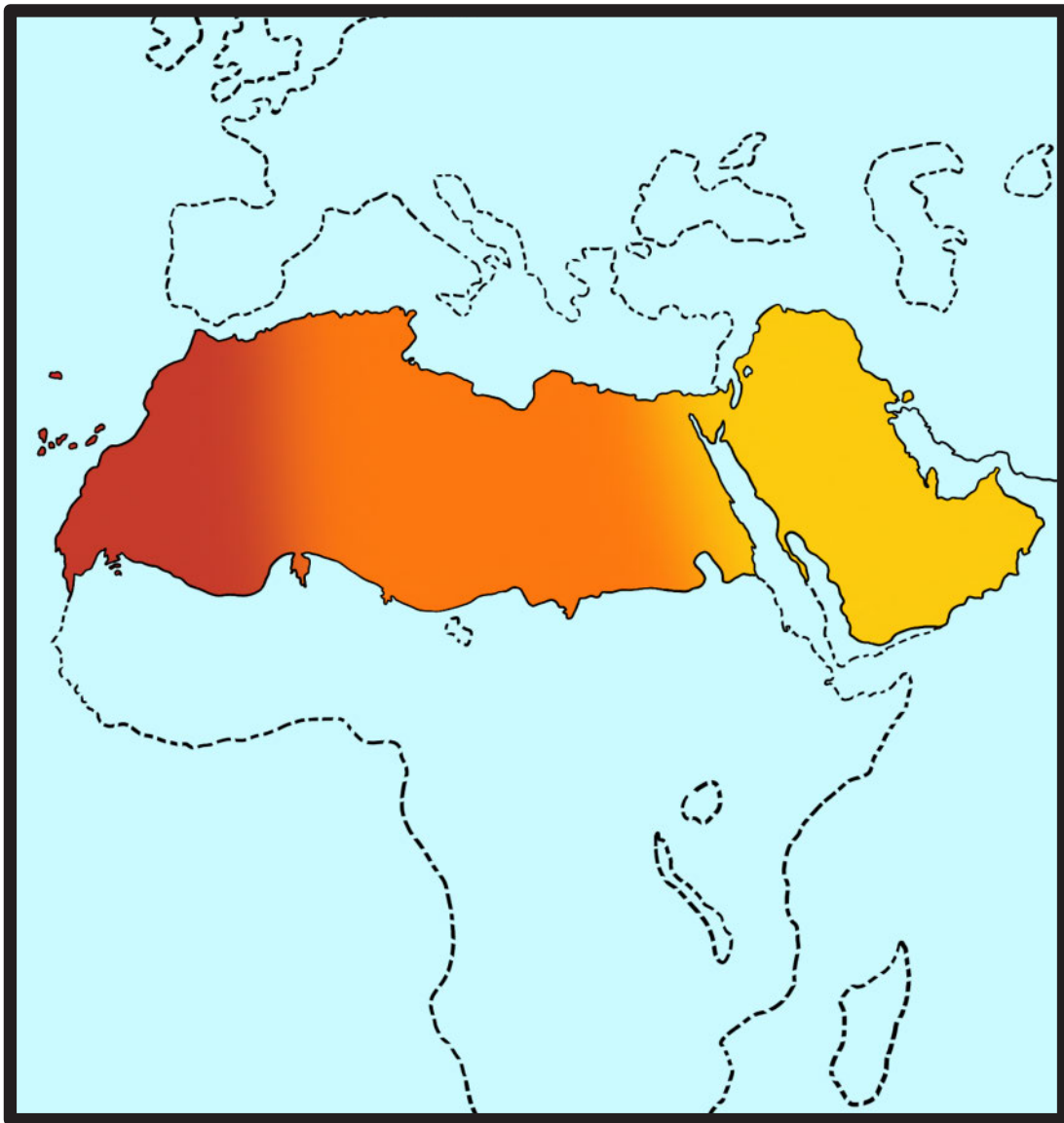
*Schistometopum thomense* is one of the rare caecelians endemic to an island. This amphibian is found on São Tomé Island, and is commonly called Cobra bobo by people living on the island. They build huge networks of tunnels and usually live underground. However, unlike most caecelians, this species is easy to study because of their high activity levels above ground. In 2021, researchers (O'Connell et al. 2021) found out that *Schistometopum thomense* is actually two species, one in the north and one in the south. In the middle, where those species meet they mate to make hybrids! To find out more about this species, read our species account using the QR-code on this page.



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# Southern Eurasia



Countries: 16

Includes the deserts of northern Africa and the peninsular Middle East, excluding the coastal region of southern Saudi Arabia and Yemen.

Approximate Proportion of Amphibians: 1%

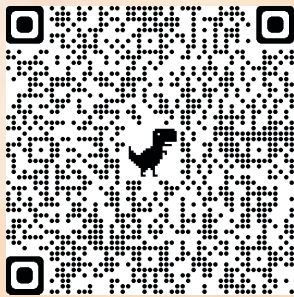


# *Pelobates varaldii*

Common Name: Moroccan Spadefoot

IUCN: **Endangered**

*Pelobates varaldii* is a small frog that is covered in irregular brown spots and red warts in some regions. These frogs can be found in northwestern Morocco and live in sandy areas to protect themselves from the sun. They are active in the night and hunt for food in the safety of the night. *Pelobates varaldii* is threatened by loss and drainage of habitat, as well as pollutants and pesticides. They are also the prey of the Eastern mosquitofish, *Gambusia holbrooki*.



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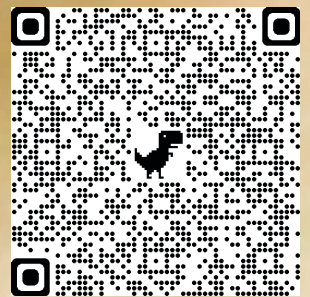


# *Pelophylax saharicus*

Common Name: Sahara Frog

IUCN: **Least Concern**

*Pelophylax saharicus* can be found across Northern Africa, including Tunisia, Algeria, and Morocco. These frogs are an extremely versatile amphibian, and can tolerate vastly different climates, from the alpine forests, to the Sahara desert. *Pelophylax saharicus* lives in and around water, and as such, they feed on aquatic prey like fish eggs, frog eggs, and more. Their population is threatened by climate change, especially droughts.



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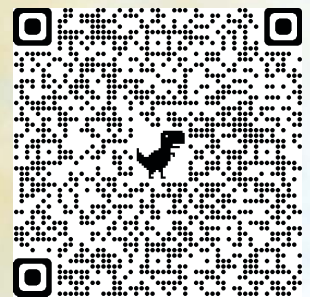


# *Salamandra algira*

Common Names: Algerian Salamander, North African Fire Salamander, Arous Chta

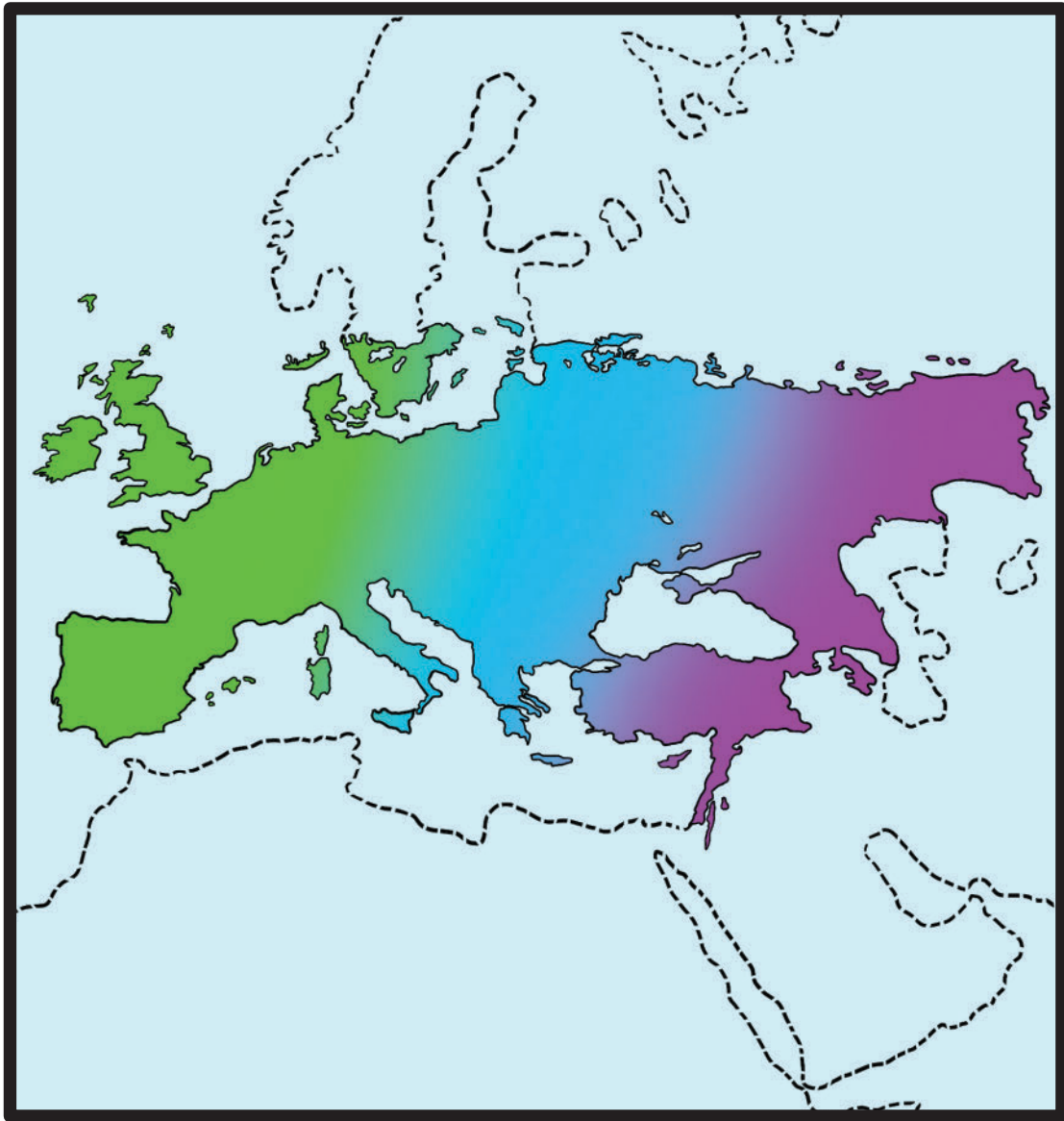
IUCN: **Vulnerable**

*Salamandra algira* refers to five subspecies that make up the fire salamanders of North Africa. These salamanders are covered in all kinds of yellow and red spots, and in all different patterns. These fire salamander lives in forests, caves, and rivers. In the summer, *Salamandra algira* stops its activity and rests until the fall when the rain comes. Unfortunately, this salamander's population is threatened by deforestation, habitat loss, and water pollution.



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# Western Eurasia



Countries: 51

Extends from the British Isles south to the Mediterranean and east to western Russia.

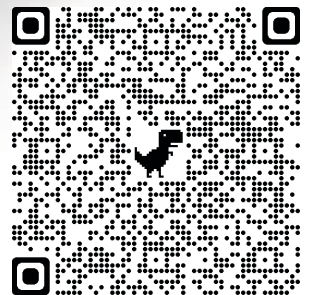
Approximate Proportion of Amphibians: 3%

# *Alytes muletensis*

Common Name: Mallorcan Midwife Toad

IUCN: **Endangered**

*Alytes muletensis*, the Mallorcan midwife toad, is a small frog that lives on the island Mallorca off the coast of Spain. Males carry eggs around their ankles until the tadpoles hatch to protect them. They are Endangered due to urbanization, habitat drainage for water usage, introduced predators including the natricine water snake (*Natrix maura*), and the competitor Perez's frog (*Rana perezii*).



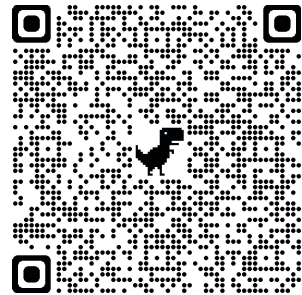
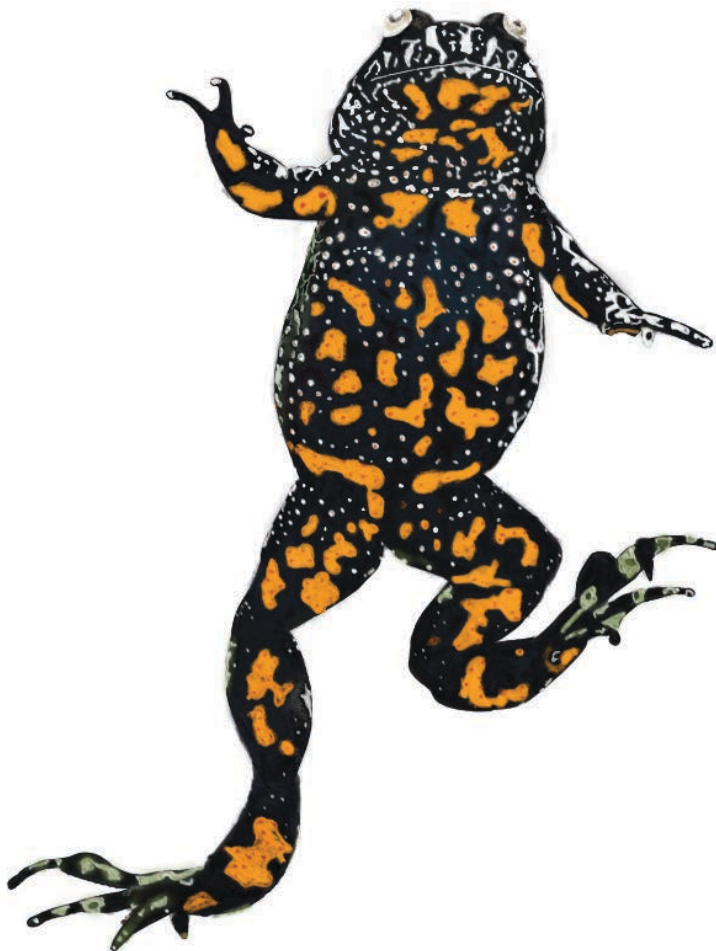
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# ***Bombina bombina***

Common Name: Fire-Bellied Toad

IUCN: **Least Concern**

*Bombina bombina*, the fire-bellied toad, lives across central and eastern Europe. Their belly can be red or orange with blue-black spots and white points. When there is a predator nearby, they turn onto their belly and cover their eyes with its palms to show their warning colors. They have venomous skin secretions. They are a Least Concern species, but wetland destruction and pollution are threats to this species.



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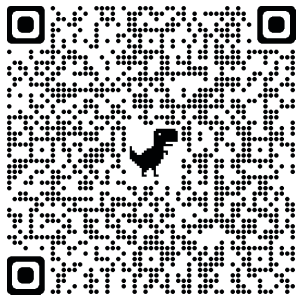


# *Proteus anguinus*

Common Name: Olm

IUCN: **Vulnerable**

*Proteus anguinus*, the olm, is a slender salamander that lives in water systems underneath karst formations in southern Europe. The maximum lifespan of an olm is likely over a century, making them the longest living amphibian species. These blind salamanders use various sensory receptors to navigate dark environments. The olm is the only European vertebrate adapted to living in caves. It is Vulnerable due to tourism, pollution, habitat alteration, and overcollection.

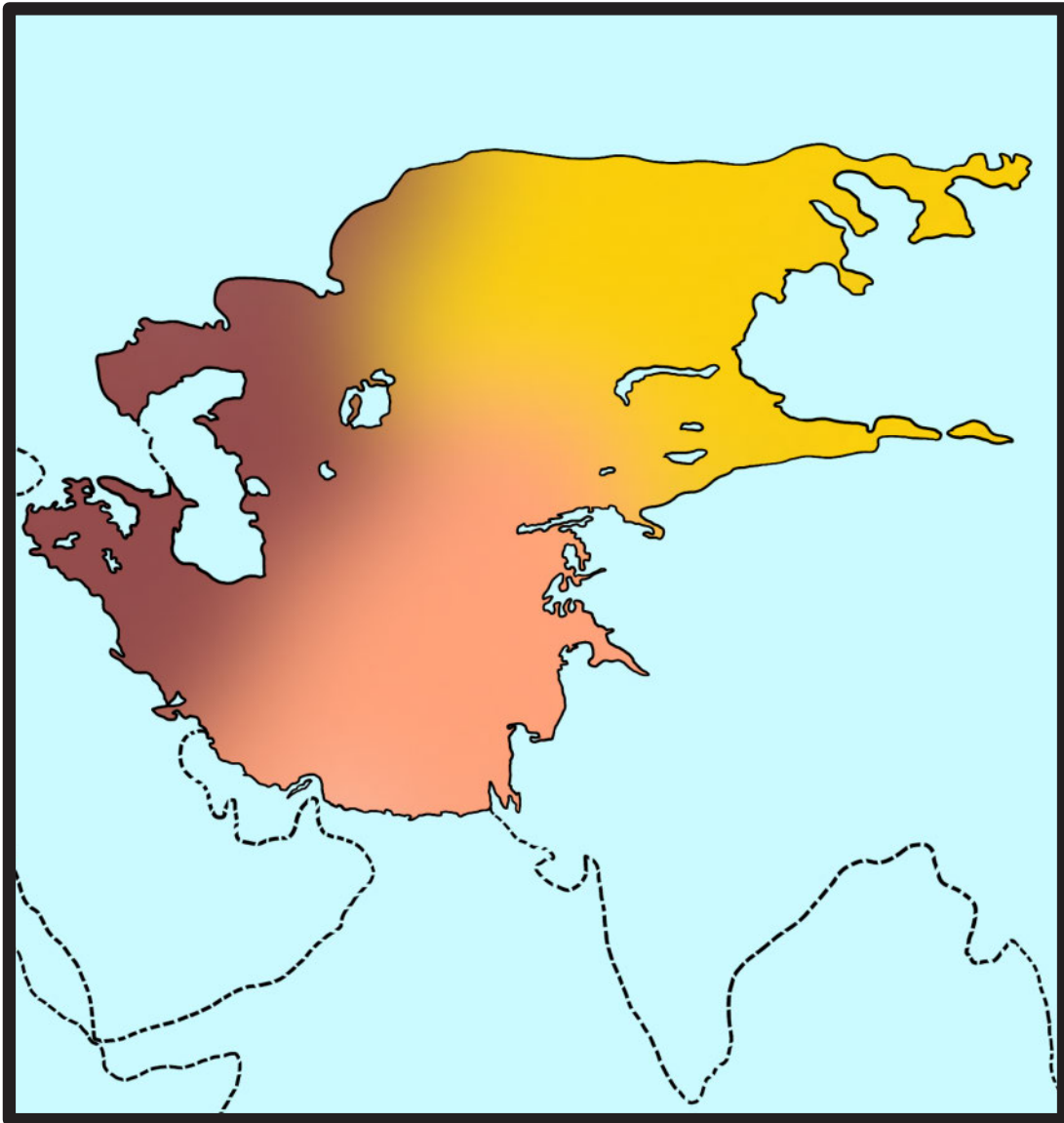


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# Central Eurasia



Countries: 8

Extends from the Russian boarder to the Gulf of Oman and from the Caspian Sea in the west to Tien Shan Mountains in the east.

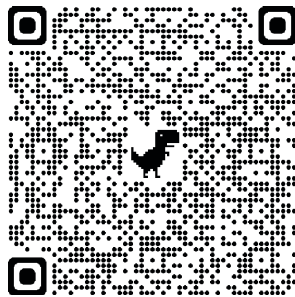
Approximate Proportion of Amphibians: 3%

# *Paradactylodon mustersi*

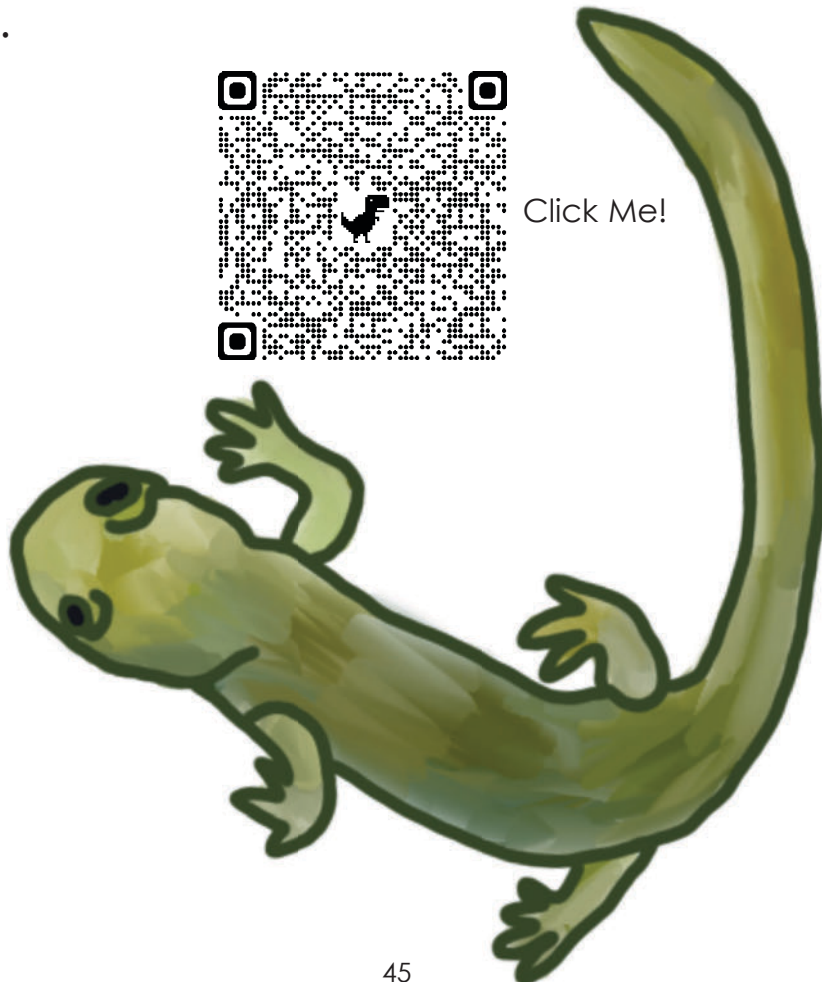
Common Names: Afghanistan/ Paghman  
Mountain Salamander

IUCN: **Critically Endangered**

*Paradactylodon mustersi*, the Afghanistan/ Paghman mountain salamander, is found in the Paghman Mountains of Paghman County, Afghanistan. These salamanders live in cool highland streams fed by glaciers, where the adult species stay near the fast-running water. They are Critically Endangered because their ecological niche is physically disturbed by humans. Additionally, constant irrigation and changing water temperature also limits this species. These salamanders are completely aquatic, meaning that it spends little to no time on land.



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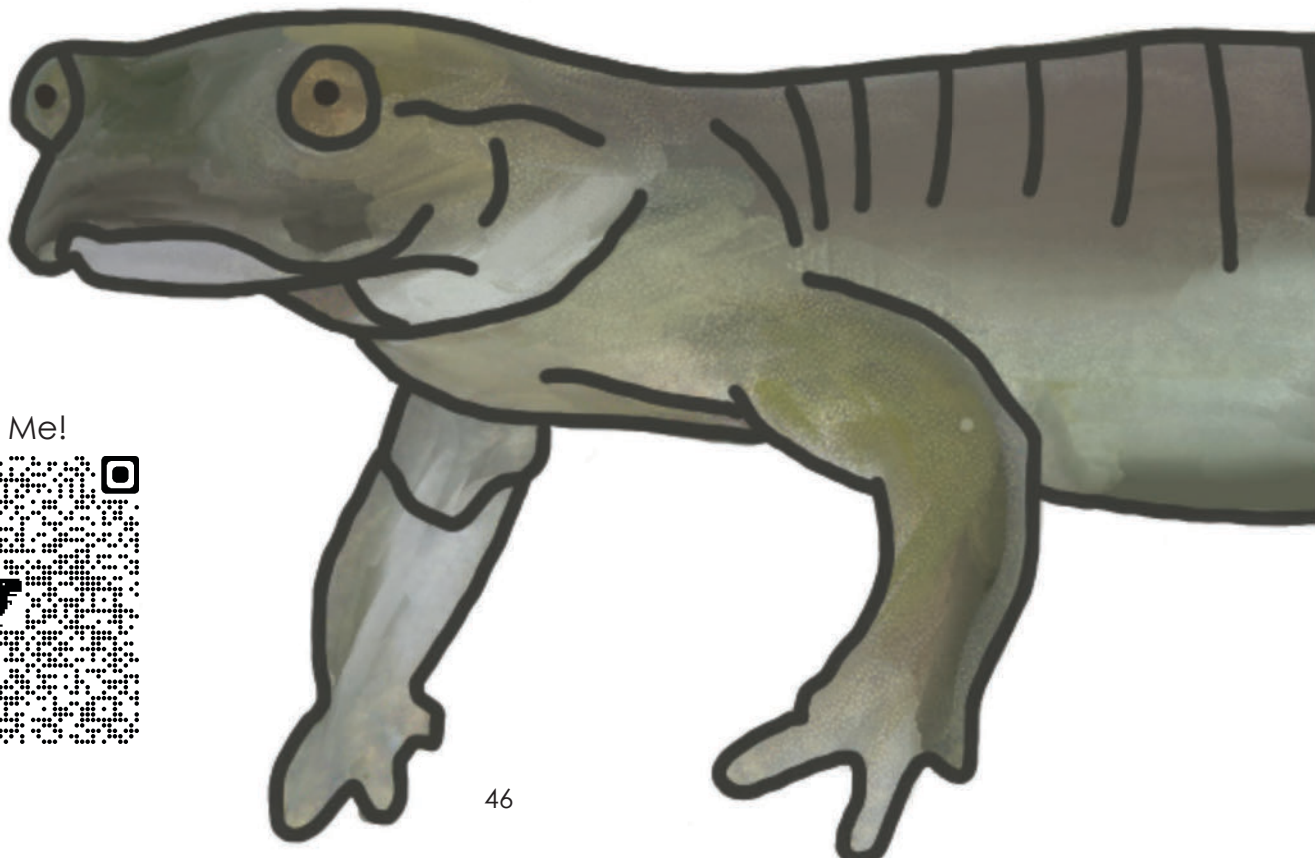


# *Ranodon sibiricus*

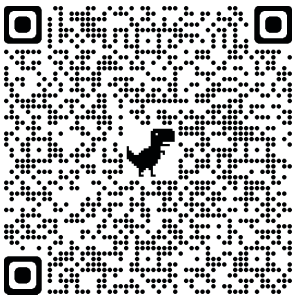
Common Names: Semirechensk Salamander,  
Central Asian Salamander

IUCN: **Endangered**

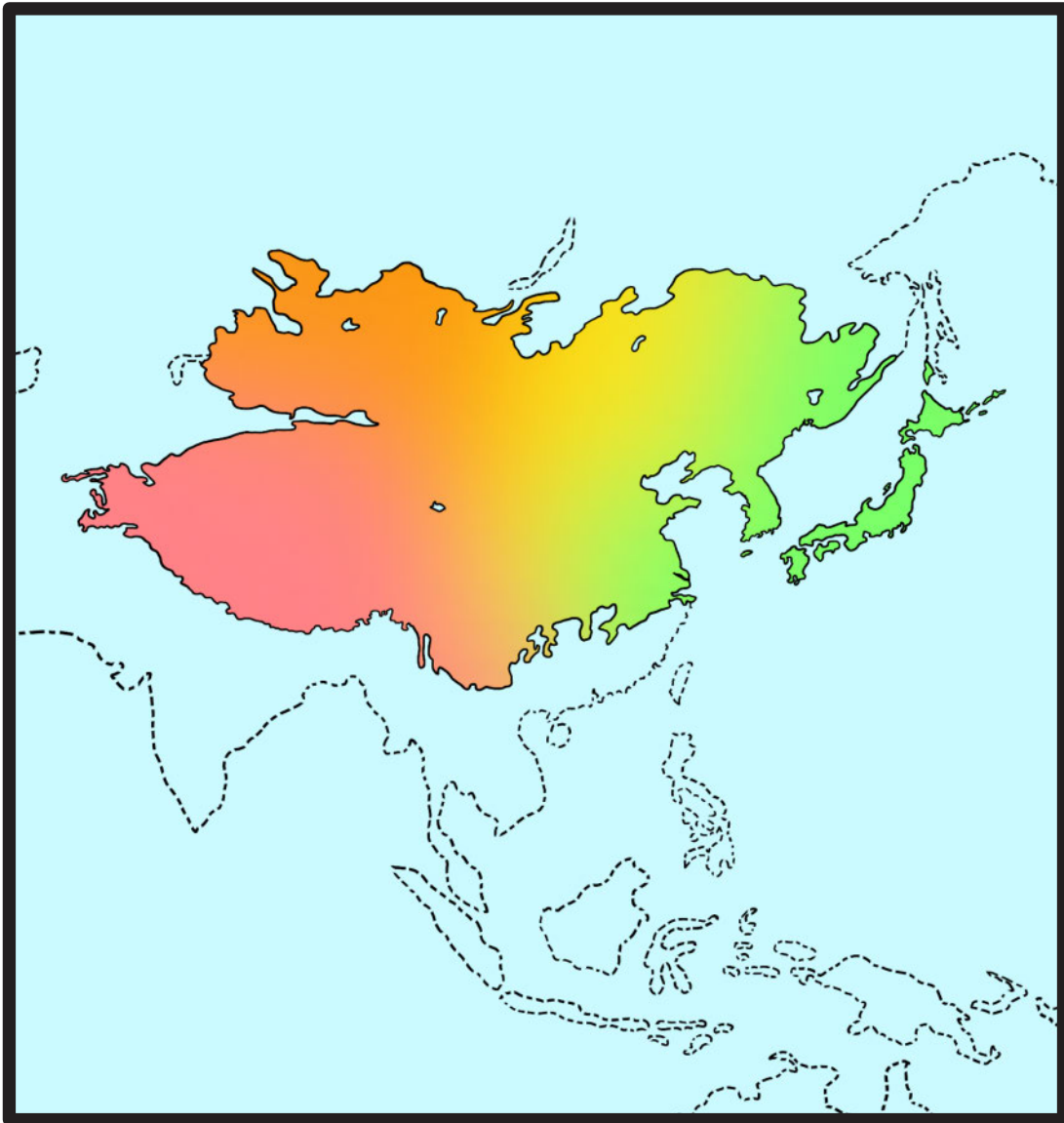
*Ranodon sibiricus*, also known as the central Asian salamander, is found in a small range in the mountainous ranges of southern Kazakhstan and northwestern China. Despite only being found in a small region, this salamander has a very diverse range of habitats. They can be found in alpine, subalpine, forest-meadow and forest-meadow-steppe belts. *Ranodon sibiricus* is Endangered because of habitat loss to deforestation and land conversion to urban and agricultural development.



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# Eastern Eurasia



Countries: 5

Extends from Mongolia to the Korean peninsula, thru Japan and northern and central China.

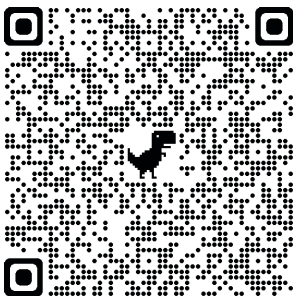
Approximate Proportion of Amphibians: 5%

# *Andrias japonicus*

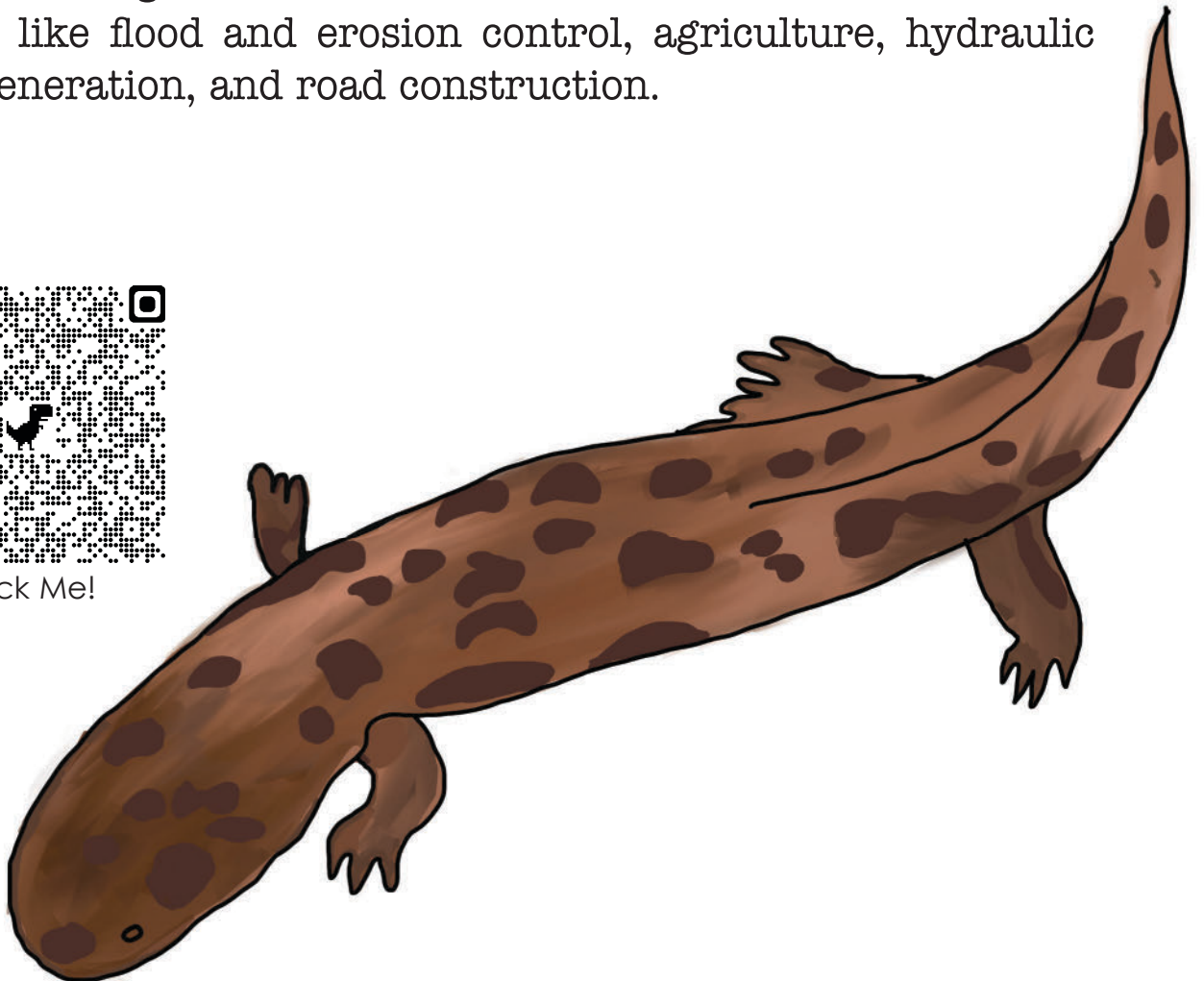
Common Name: Japanese Giant Salamander

IUCN: **Near Threatened**

*Andrias japonicus*, or the Japanese giant salamander, is one of the largest species of amphibian. This species is endemic to Japan, but has sister species in China. As their common name suggests, this species is huge. They can range from 30 to 150 cm (11.8 - 58 inches) in length. The heaviest recorded individual was a whopping 26.3 kg (58 lbs). Japanese giant salamanders are classified as Near Threatened because of the severe fragmentation of their habitat from urbanization projects like flood and erosion control, agriculture, hydraulic power generation, and road construction.



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# *Hyla japonica*

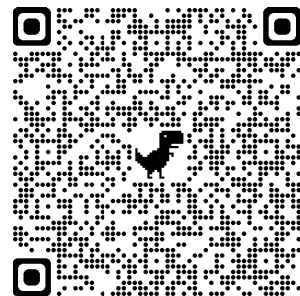
Common Name: Japanese Tree Frog

IUCN: **Least Concern**

*Hyla japonica*, or the Japanese Tree Frog is found in many parts of Eastern Europe and Asia, but is known for their populations in Japan. The species lives in a variety of habitats including mixed and deciduous broad-leafed forests, bushlands, forest steppes, meadows, and swamps. In forestless areas, the tree frog primarily inhabits river valleys with shrubs. Male *Hyla japonica* are sometimes found to be infected with *Batrachochytrium dendrobatidis* (Bd) causing their mating calls to differ. These differing mating calls may sometimes attract female frogs more effectively, therefore transmitting the infection faster. This species has some declining populations in the northern edge of their range, but no anthropogenic problems have been studied enough to know whether it has impacted their range or not.



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# Indomalaya



Countries: 22

Southern (below the equator) Asian countries from India to most of Indonesia and the Philippines.

Approximate Proportion of Amphibians: 14%

# *Ichthyophis bannanicus*

Common Name: Banna Caecilian

IUCN: **Least Concern**

*Ichthyophis bannanicus*, also referred to as the Banna Caecilian, is mostly found in southern China, but their distribution may extend into Vietnam as well. Locally, this caecilian can be found in loose soil around streams, or in the land adjacent to rice-fields. This species is listed as Least Concern on IUCN; however, China's national rating of this species is Endangered. Populations of this species in China are at high risk of decline because of human activities including cultivation of the land, destruction of forest, and pollution, but more studies are need to create an effective conservation plan.



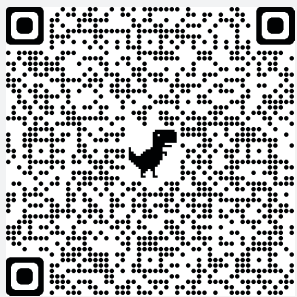
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# *Melanobatrachus indicus*

Common Name: Black Microhylid Frog

IUCN: **Endangered**

*Melanobatrachus indicus*, or the black microhylid frog, is endemic to the Western Ghats of south-western India. This species was thought to be super rare, but was found by researchers again in 1997. The black microhylid frog is considered Endangered because their range is fragmented from loss of habitat due to urbanization. This frog is known for its beautiful display of blue dots and a red underbelly. When the black microhylid frog feels threatened, they retract their limbs and arches their back to "contract" themselves!



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# *Nasikabatrachus* *sahyadrensis*

Common Names: Purple Frog, Pig-nosed Frog

IUCN: **Endangered**

*Nasikabatrachus sahyadrensis* is endemic to the Western Ghat Mountain range of Southern India. This species is known for their distinctive skull and unusual appearance. Locals didn't realize they were frogs until researchers identified them! This species is Endangered because of crop farming and dam projects taking place in the Western Ghats. They are known for burrowing beneath the ground and can be spotted from far away by their "bloated" and purplish appearance.



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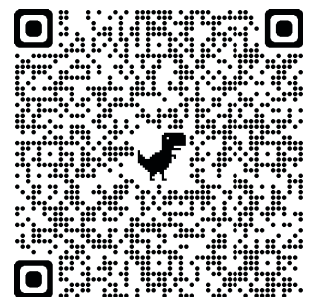


# *Rhacophorus pardalis*

Common Name: Harlequin Treefrog

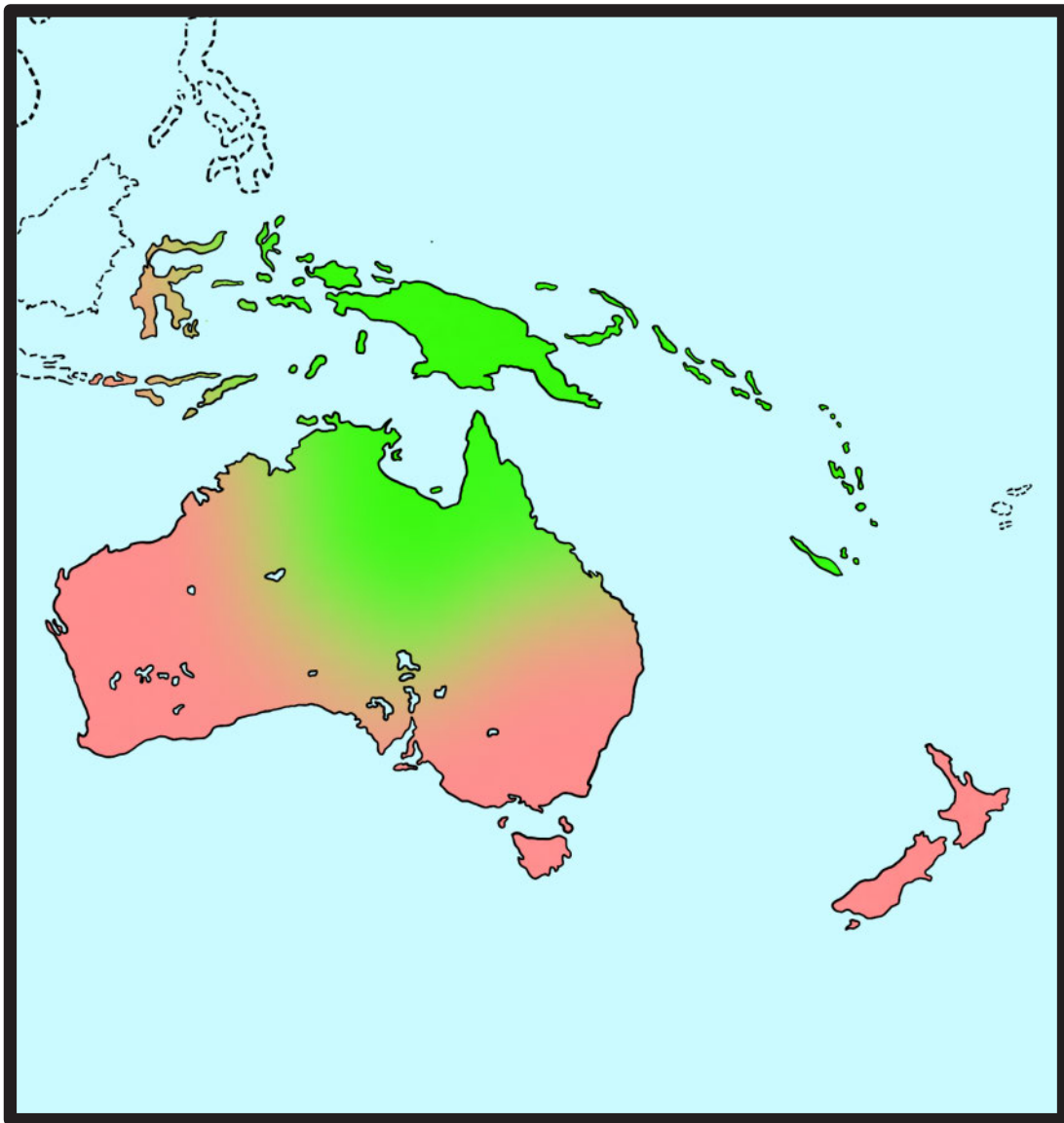
IUCN: **Least Concern**

*Rhacophorus pardalis*, or the Harlequin treefrog is found in Indonesia, Malaysia, and the Philippines. The Harlequin treefrog is most well known for their webbed hands and feet, which help them glide in the canopies of the forests. This species is commonly found in the dense forests of the Indomalayan contries, but recent surveys suggests that this species' range is being impacted by deforestation and logging.



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# Australasia



Countries: 10

Includes parts of Indonesia, the New Guinea island, Australia, Tasmania, and New Zealand.

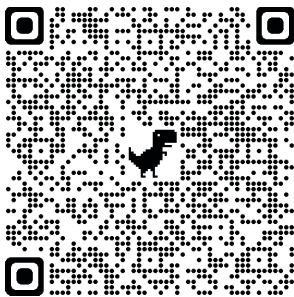
Approximate Proportion of Amphibians: 9%

# *Leiopelma archeyi*

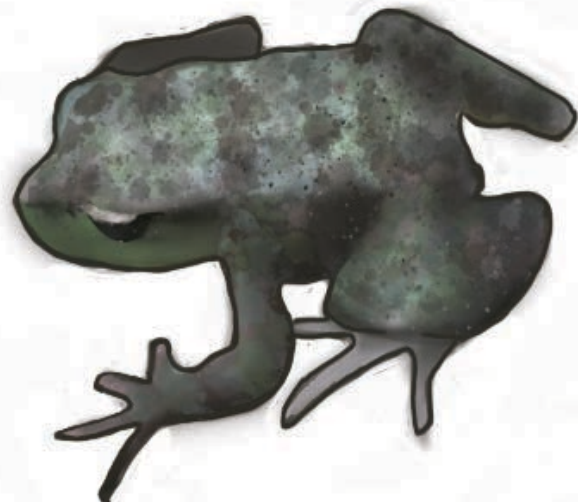
Common Name: Archey's Frog

IUCN: Critically Endangered

*Leiopelma archeyi*, or Archey's frog, can be found in the grassy, moist forests of New Zealand. Archey's frog is small and usually brown or green, which helps them to blend in with their leafy surroundings. Despite having no true voicebox, Archey's frog can make chirps and squeaks using resonance frequencies. Archey's frog also has muscles for wagging a tail despite the fact that they have no tail. Introduced rats are one of the main predators of Archey's frogs, making the species Critically Endangered. New Zealand's Department of Conservation has dropped thousands of rat traps in the local forests to curb the rat population and help the Archey's frog population flourish.



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# *Myobatrachus gouldii*

Common Name: Turtle Frog

IUCN: **Least Concern**



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*Myobatrachus gouldii*, also called the turtle frog, is found in the dry, sandy regions of Western Australia. This species is called the turtle frog because of their short turtle-like limbs and the way that they dig forward through sand to build underground burrows, where they spend most of their lives. Turtle frogs are never tadpoles; instead, they fully develop in the egg and hatch as small adults. There are very few threats currently facing the turtle frog, but habitat alteration and a changing climate can decrease the size of their habitat.



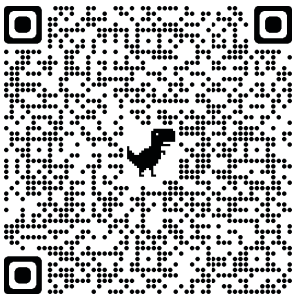


# *Pseudophryne covacevichae*

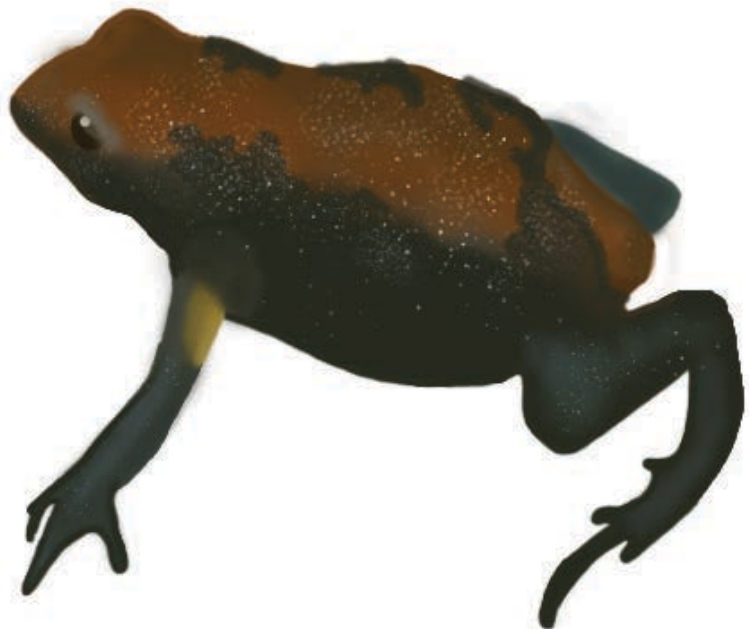
Common Name: Magnificent Brood Frog

IUCN: **Endangered**

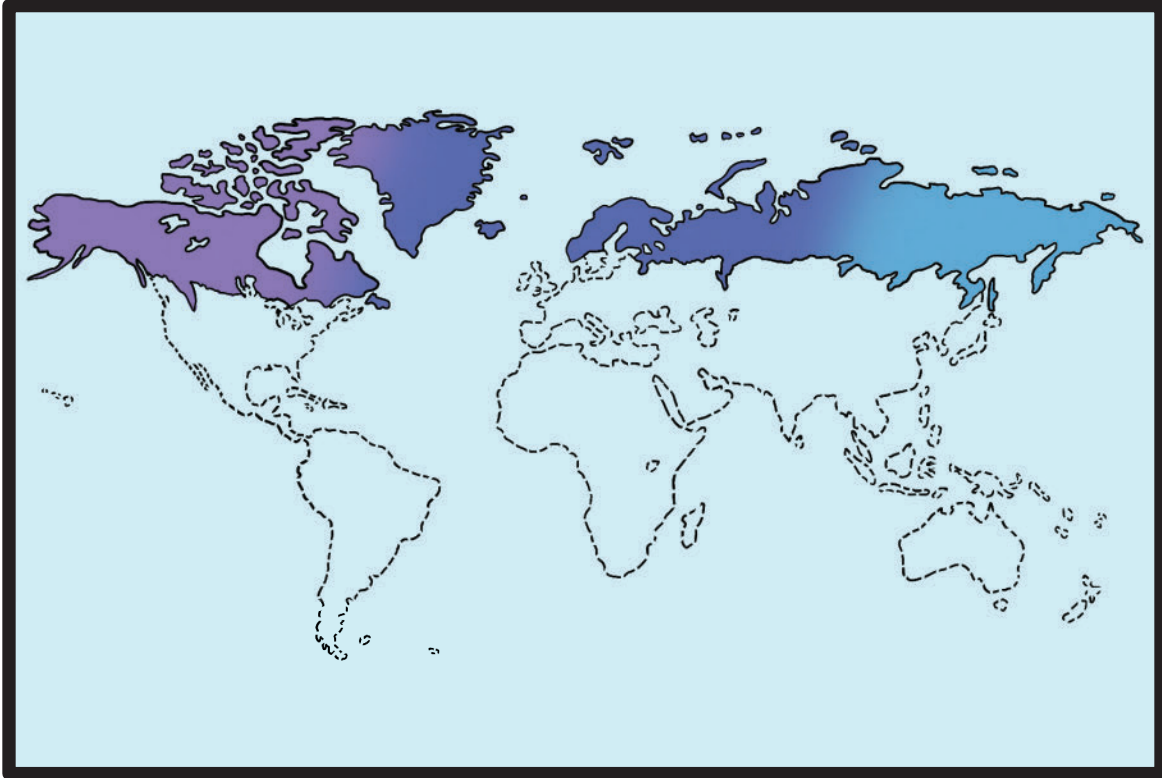
*Pseudophryne covacevichae*, the magnificent brood frog, is endemic to Australia and can be found only in small areas near Ravenshoe in the state of Queensland. They are usually found in the understory of eucalyptus forests and among leaf litter in grasslands. The magnificent brood frog is nocturnal, meaning it's most active at night, but they are also active on overcast days. This species is threatened by massive habitat loss to cattle grazing and logging. While some of these frogs live on protected land, like national parks, most do not. Further protections should be enforced to protect this Endangered species.



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# Subarctic America and Eurasia



Countries: 9

Includes the arctic regions of the North American and Eurasian continental plates.

Approximate Proportion of Amphibians: 0.5%

# *Ambystoma laterale*

Common Name: Blue-spotted Salamander

IUCN: **Least Concern**

*Ambystoma laterale*, the blue-spotted salamander, calls deciduous forests their home and can be found around the Great Lakes or along the Atlantic coast between Quebec and New Jersey. This species hides underground during the day, and will aggressively defend their burrows when needed. They also have aggressive anti-predator mechanisms; when threatened, they will lash their tail around and curl up their bodies. Approximately one-quarter of *Ambystoma laterale* individuals may be infected with *Trypanosoma* protozoans in any given year. Some *Trypanosoma* protozoans are carried by Tsetse fleas and can cause “sleeping sickness” in humans. Habitat destruction is the biggest threat facing the blue-spotted salamander; there are no current conservation efforts underway, but limiting the destruction of wetlands and forests is critical to ensuring their survival.

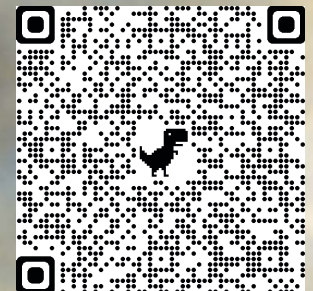


# *Rana arvalis*

Common Name: Moor Frog

IUCN: **Least Concern**

*Rana arvalis* is a frog that lives in the moors of northern Eurasia. During the year, they have brown coloration with wide stripes on their legs, but during mating season (March through June), the males turn bright blue to attract the females. Although the population of *Rana arvalis* is relatively stable, industrial pollution and radiation from the Ural Mountains sometimes causes mutations in offspring, including developmental and morphological differences.



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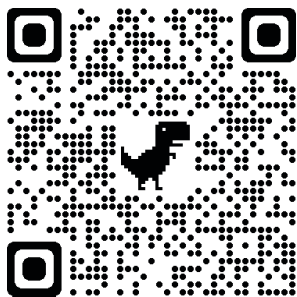


# *Rana clamitans*

Common Name: Green Frog

IUCN: **Least Concern**

*Rana clamitans*, the green frog or the bronze frog, is found throughout most of North America. They prefer to live in wetlands, and they are never more than one meter away from a water source, unless it's raining. When it isn't breeding season, green frogs are solitary and defend their individual territory. Green frogs aren't picky -- they'll eat anything from insects to crustaceans to other frogs! Their unique call sounds like the low snapping of rubber bands. Green frogs may be classified as a Least Concern species, but they are threatened by vehicular traffic, habitat destruction, and game hunters. To ensure this species' survival, further restrictions should be placed on hunting them and the shoreline development of their habitats.



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# *Rana temporaria*

Common Name: Common Frog

IUCN: **Least Concern**

*Rana temporaria* is a very common frog throughout northwestern Europe, and lives in ponds, other damp areas, or in long grass. They hibernate in the winter, and wake up in the spring just in time for the mating season. This frog is quite resilient, and can withstand much change to their environment. In certain areas, habitat loss or drying ponds have caused small populations to migrate. Alarmingly, *Batrachochytrium salamandrivoran* (Bsal), a pathogenic fungus affecting amphibians, has been found in laboratory populations of *Rana temporaria*, meaning this species could be a carrier of the pathogen that is lethal to salamanders.



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# Illustration Inspirations

<b>Species</b>	<b>Illustrator</b>	<b>Based on Photos by:</b>	<b>Pg</b>
<i>Agalychnis lemur</i>	Kira Wiesinger	Rob Schell, permission granted in honor of David Wake	25
<i>Alytes muletensis</i>	Kira Wiesinger	David Daversa	41
<i>Ambystoma laterale</i>	Ash Reining	Dr. John P. Clare	60
<i>Anaxyrus californicus</i>	Ash Reining	William Flaxington	21
<i>Andrias japonicus</i>	Arjun Mehta	Danté B Fenolio	48
<i>Atelopus barbotini</i>	Kira Wiesinger	Henk Wallays	29
<i>Bombina bombina</i>	Kira Wiesinger	Boris I. Timofeev	42
<i>Brachycephalus pitanga</i>	Kira Wiesinger	Alberto López-Torres	30
<i>Breviceps macrops</i>	Alice Drozd	Robert C. Drewes	33
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<i>Conraua goliath</i>	Alice Drozd	Marvin Schäfer and Frogs & Friends e.V.	34
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<i>Rhacophorus pardalis</i>	Arjun Mehta	Dr. Peter Janzen	54
<i>Sachatamia ilex</i>	Kira Wiesinger	Twan Leenders	27
<i>Salamandra algira</i>	Alice Drozd	Henk Wallays	39
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<i>Siren lacertina</i>	Ash Reining	Todd Pierson	23
World Map	none	Thomas Kitchin - Wiki Commons	10



# Words to Know

## Taxonomy

**Anura** - frogs and toads, see page 7.

**Caudata** - salamanders and newts, see page 7.

**Gymnophiona** - caecilians, see page 8.

**Taxon, Taxa** - A group of similar living things. This could be at the species level or different species that share an evolutionary history. Taxon is singular, Taxa is plural.

**Taxonomy** - grouping living things together to reflect a shared evolutionary history. Scientists use hierarchical taxonomy, meaning we group things, then split each group further until we get to individual species. Those levels are (from biggest group to smallest): Kingdom, Phylum, Class, Order, Family, Genus, and Species.

## Conservation

***Batrachochytrium dendrobatidis* (Bd)** - A species of chytrid fungus that has caused global amphibian declines and extinctions. Also see page 16.

***Batrachochytrium salamandrivorans* (Bsal)** - A species of chytrid fungus, identified in 2013, that caused large die-offs of salamanders in Europe. Also see page 16

**Chytridiomycota** - the group of fungi that make up chytrid fungi.

**Chytridiomycosis** - disease or diseases caused by chytrid fungi.

**Climate change** - the change in our average environmental conditions (for example temperature and rain or snowfall) over a long period of time.

**Deforestation** - clearing large areas of trees.

**Endemic** - local and restricted to a specific place.

**Habitat** - environment or natural home to a living being.

**Alteration** - to change an environment such as adding pollution, exotic species or to overharvest species in that environment.

**Destruction** - to change an environment so much that the species that once lived there are no longer able to.

**Drainage** - to remove the water in the area.

**Fragmentation** - to destroy portions of an environment so that it splits the environment into two or more pieces.

**Loss** - the result of habitat destruction.

**Pollution** - the addition of a harmful substance to an environment.

**Industrial** - the addition of harmful substances to an environment from the large-scale creation of products to sell.

## Natural History

**Advertisement calls** - sounds created to attract another individual and define their territory.

**Bi-phasic** - two forms or phases of life.

**Diurnal** - active during the day.

**Larva, Larvae** - the immature, or young, form of an animal that looks noticeably different from the adult. Larva is singular, Larvae is plural.

**Nocturnal** - active at night.

**Mating season** - the time of year when individuals gather to make babies.

**Tadpole** - the immature, or young, form of a frog that looks noticeably different from the adult.

## Developmental

**Metamorphosis** - The process of changing from one form to another during development. In amphibians it is usually associated with a switch from an aquatic larval stage to a terrestrial adult phase.

**Mutation** - change in DNA sequence. This happens to individuals and can happen during reproduction. Some of these changes result in no change to the plant or animal. Other changes can cause big differences that help or harm the individual.

**Developmental** - change in DNA sequence that causes changes in the growth or natural process of the body.

**Morphological** - change in the DNA sequence that causes changes in how a living organism looks.

For more terms check out AmphibiaWeb's Glossary at:  
<https://amphibiaweb.org/education/glossary.html>

