

## Unit 1: Ecosystems and Human Activity

### 1.1 Disappearing Frogs

Frogs can be found in most ecosystems that include water. They've been around for more than 400 million years, and even survived the disaster that killed off the dinosaurs 65 million years ago. Unfortunately, scientists have noticed recently that frogs and other amphibians are disappearing rapidly. About 30% of North America's frogs and toads are in trouble. There is evidence to suggest that frogs are being affected mainly by the growth of the human population.

#### Why Should We Be Concerned?

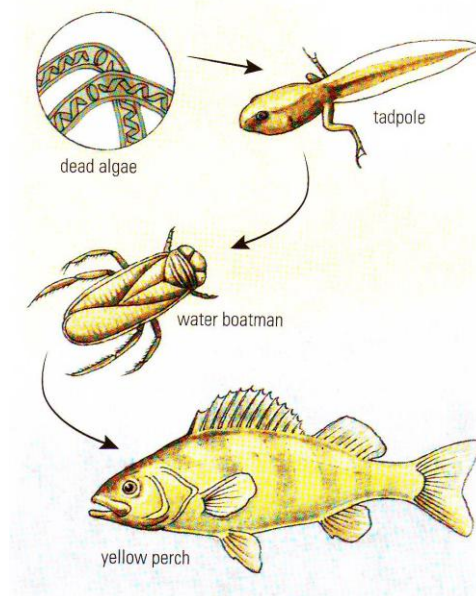
While they are as important as any other organism in an ecosystem, many scientists believe that frogs are indicators of the health of the ecosystem they live in.

Frogs have two lives. They begin as eggs and grow to tadpoles in ponds, and then enter the second stage of their life as adults in forest and grassland areas. A change in either of these ecosystems will have an impact on the frogs.

#### Frogs in Their Ecosystems

Frogs are also part of two very different food chains. A **food chain** is a step-by-step sequence linking organisms that feed on each other, starting with a food source such as plants (**producers**), and continuing with animals and other living things that feed on the plants and on each other (**consumers**).

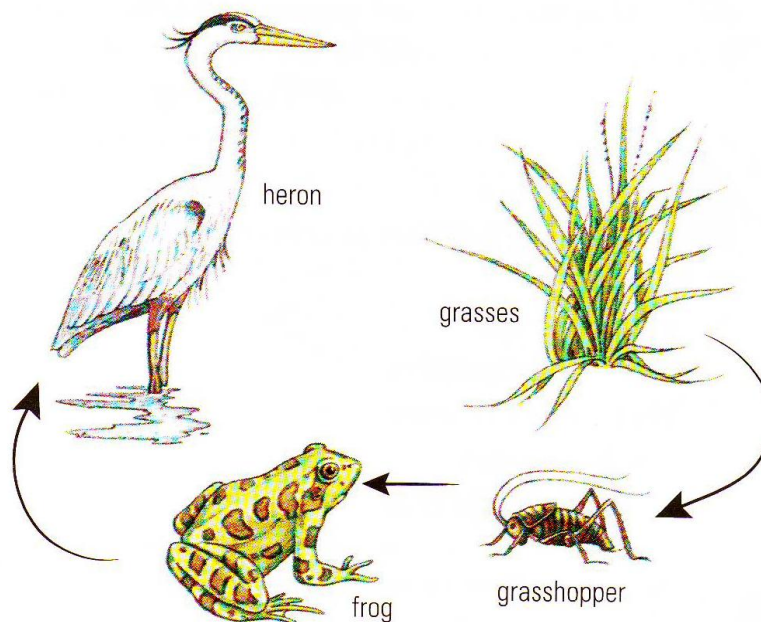
During the tadpole stage of their lives, frogs are **herbivores** or plant eaters in one type of food chain.



## SNC1P

They eat large amounts of both living and dead algae (small plant-like organisms). This type of food chain includes **decomposers** such as bacteria and is essential in the recycling of matter in ecosystems. Decomposers are organisms that break down the waste from living and dead organisms to get nutrients for their own use. As they break down the wastes, the **nutrients** also become available for plants and algae.

During their adult life, frogs are **carnivores**, or animals that feed on other animals. Their main diet is insects, but they may also eat small fish.



If frogs were completely wiped out, insect populations would certainly increase.

Aside: In Bangladesh, east of India, the frog populations have been nearly eliminated to supply restaurants with delicacies. The result: a rise in the mosquito population and an increase in number of cases of malaria among humans. Malaria is a disease that is transmitted by mosquitoes. It reduces the ability for red blood cells to carry oxygen, often leaving the infected person fatigued and lethargic.

### Why are Frogs Disappearing?

Scientists do not really know what is causing the problem but in some areas they have identified the following:

SNC1P

## **Loss of Habitat**

The most important factor in frog survival (and all other organisms) is an appropriate place to live, or a **habitat**. Frogs need wetlands, ponds, or lakes with clean water that they can breed and lay their eggs in. As adults they need a place such as a forest or a field where they can catch insects. Human activities such as farming, forestry, road construction, and the growth of towns and cities take away valuable habitat from the frogs.

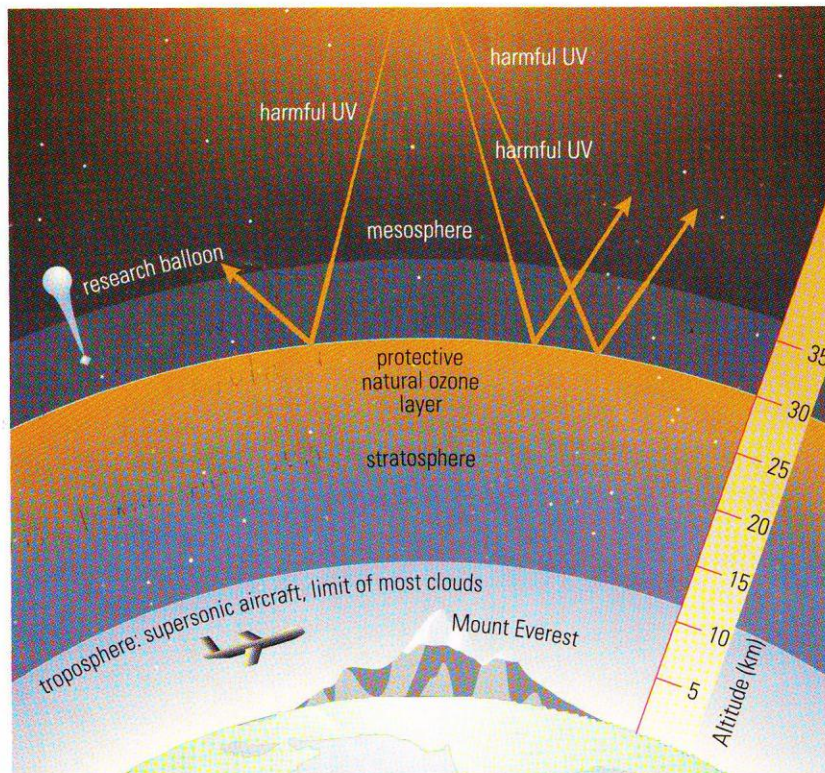
## **Air and Water Quality – Pollution**

Frogs have lungs, but they also absorb oxygen through their skin. Since their skin is so thin, it is easy for pollutants to pass through.

Acid rain is the most common pollution problem. An increase in the acidity of the water causes reproductive and growth problems for tadpoles. Fewer eggs are fertilized, embryos develop more slowly, and some tadpoles develop deformed limbs.

## **Ultraviolet Radiation**

The thin skin of the frog is also sensitive to the ultraviolet (UV) radiation from the Sun. The amount of radiation reaching Earth's surface is increasing because of the damage to the protective ozone layer.



SNC1P

Aside: The rate of human skin cancer has also increased because of the increase in UV rays.

### **Climate Change**

Human activities, such as those that use fossil fuels, contribute to global warming, which in turn causes climate changes. Frogs are affected by climate changes in local ecosystems. For example, if the climate becomes drier, frogs will likely lose some of their wetland habitat.

SNC1P

### **Worksheet 1.1: Disappearing Frogs**

1. Choose one of the possible causes of frog population decline and, in your own words, explain how it affects frogs.
2. In a small paragraph, explain the difference between the two food chains we looked at. Explain the role of the frog in each food chain.
3. Explain why the skin of the frog makes it a good indicator species if you want to determine the health of local ecosystems.
4. A decline in the number of frogs would affect other species. Using the term “food chain”, explain how the decline would affect
  - a. Insects
  - b. algae
5. Make a list of things that you could do, or avoid doing, that might help frogs to survive.