The Ten Percent Rule

How much energy is lost from one level to the next? Scientists say that on average 90% of the available energy is used for life processes such as respiration, photosynthesis, and reproduction and transformed to heat energy before an organism is consumed. This means **only about 10% of the original energy is left to feed the next level.** This 10% is stored in the tissues (leaves, stem, muscles, organs, fat, etc.) of the organism. To understand this more clearly, let's look at the wetland example on the Pyramid of Energy 3D Model. Here producers such as phytoplankton are producing 500,000 calories of energy from sunlight each day. If you gathered all of this phytoplankton into one spot, they might fill a space the size of a room. Since only about 10% of this energy reaches the zooplankton, this leaves about 50,000 calories of energy to support the zooplankton each day. If you gathered all of these zooplankton into one spot, they might fill a space the size of a school dumpster. Since only about 10% of this energy reaches the sunfish, this leaves about 5,000 calories of energy to support the sunfish each day. If you gathered all of these sunfish into one spot, they might fill a space the size of a trash can. Since only about 10% of this energy reaches the great blue herons, this leaves about 500 calories of energy to support herons each day. If you gathered all of the herons into one spot, **you would have only one!** Fortunately, animals don't just depend on one type of consumer to meet their energy needs. But in essence it takes the energy of a room full of phytoplankton just to support one great blue heron. This is why we have so much plant life at the bottom of each food chain yet so few consumers at the top of each food chain.

So the next time you take a car ride, you'll know why there's so much green and so few animals. **It's all about energy!**