

I am a **snowy plover**, and I live on the Oregon beach. You see me running in and out of the water, searching for little invertebrates, like sand fleas. I lay my eggs in a nest that my mate digs in the sand.

The number of snowy plovers is getting less and less for two reasons. One, we need a beach with unstable sand and pebbles for our nests, but a non-native European beach grass is taking over and stabilizing the sand. That means we don't have as much land for nest building.

Two, there are more people visiting beaches and walking on our nests. Sometimes we abandon our nest, because there are just too many people around.

So our numbers are declining, and now we have a new problem coming up. The ocean level is starting to rise, due to global warming melting the polar ice, which means there will be less beach for us to live on, making it even harder to nest and lay eggs.

I am a **sockeye salmon**, the most endangered salmon on earth. I was born in a tributary of the Snake River in Northeastern Oregon, and after spending a couple of years in a lake, growing bigger, I swam down the Snake River to the ocean, where I am now.

One year soon I will swim back up the Snake River to where I was born, a trip that is about 900 miles long. There I will spawn (to make baby sockeye salmon) and die. Last year 90% of my brothers and sisters who made this trip died before finishing the trip because the water was too warm. This was caused by low water and an extended heat wave, which pushed water temperatures past 70 degrees.

Low water in rivers, due to low snowpack, and high water temperatures, due to heat waves, will become more common as global warming gets worse. This year very cold water from a dam will be released to mix with the warm river water, bringing the temperature below 68 degrees.

I'm an **American pika**, and I live in California's Sierra Nevada Mountains. On mountains, the temperature gets colder as you go higher. The snow pack in the high regions of mountains is very important to the plants and animals that live on the mountain. I am just one of a great diversity of plants and animals that live in the many different mountain ecosystems, such as forests, meadows, creeks, and rocky areas. Because of the higher temperatures of global warming, the snow pack is melting earlier, which threatens many plants and animals.

I like cold alpine conditions, and I don't like high temperatures. I get really stressed by the summer heat, when I'm trying to find food. But I also have a hard time in the winter when I lose the snow pack, because it insulates me from cold snaps.

This means that I keep moving my home higher and higher to avoid the heat in the summer and so I can live where the snow pack might last longer in the winter. The trouble is, someday I won't be able to go any higher, because I'll already be at the top of the mountain. What then?

I am a **Fender's Blue Butterfly**, and I live in the Willamette Valley in Oregon. I like to live on prairies that are surrounded by forests, because that is where I find the plants I need and I also get protection from the wind. Many kinds of butterflies, including my own, are threatened by human activities, and our populations have really shrunk. One of the main threats is that our habitat is shrinking as people build houses, business parks, and shopping malls where we like to live.

A second threat is invasive species. I have some favorite flowers that I get nectar from, but many of these are losing the competition with non-native species of flowers.

The third threat is the wildfire policy we've had for years. A good way to keep prairies open so they don't become forests is to let wildfires burn. But we have had a no-burn policy for many years, always putting them out. That way, trees were able to take over.

Now that our population has already shrunk so far, another problem is starting to show up, and that is global warming. As temperatures go up, it affects my rate of development. The stages going from pupa to adult can speed up, so that when I become a larva, the plants I like to eat might be too young or too old. What will happen to us then?

I am an **Allen's Hummingbird**, and in the summer, I nest and lay eggs on the coast in Southwest Oregon. Some of my relatives nest on the coast in California. In the winter I migrate to southern Mexico.

When the temperatures rise, I migrate from Mexico to Oregon earlier. That means when I get to Oregon, the flowers that give me nectar may not be blooming yet, so I go hungry.

I am a **Jeffrey pine**, and I live in a forest with other trees like me, along with other species, like ponderosa pine, lodgepole pine, and white fir. My forest is in Southern Oregon, but right now there is a lot of damage going on in forests in Central and Southern California, and the problems are moving north, so I'm afraid it may come to my forest eventually.

Global warming has caused very bad drought conditions in California. The trees there are very stressed because they haven't been getting enough water. These stressed trees are being attacked by a bark beetle, which has an easy time attacking a thirsty tree. Healthy trees can often fight off a bark beetle attack, because the first beetles who chew

into the tree meet up with sap flowing through the tree, and they drown in it. But there's not much sap flowing in a thirsty tree, so the beetles take over. The dead trees turn a rust color, and there are now large areas of rust colored trees. So far the epidemic has killed an estimated 40 million trees since 2010.

If drought conditions in Oregon get even worse than they are now, the bark beetle epidemic could take over here too.

I am a **Brewer's spruce** tree, and I live in a number of isolated spots in the Klamath Mountains in southwest Oregon and northwest California. I don't live anywhere else in the whole world. I like to live on ridgetops, where there is heavy winter snow, which provides a steady source of meltwater through the spring, and then has dry summers. I grow very slowly, about 8" per year. The harsh ridgetop conditions minimize competition from faster-growing trees like Douglas fir.

As temperatures rise with global warming, there is less snow in the summer, and sometimes I don't get all the meltwater I need in the spring. Because of the higher temperatures, trees that like colder temperatures are climbing into my ridgetops, giving me too much competition. For me to get into an area with more snow in the winter and no other competition, I'd have to climb higher also, but I'm already at the top.

Scientists used computer models to figure out where I could live in the future. I would have to move north, to British Columbia, the Yukon Territory, and southeastern Alaska. I could only do this with the help of humans moving my seedlings, and I would die out in the Klamath Mountains.

I am a **fisherman**, and I live and work on the Oregon coast. We fishermen are used to this difficult job, where catches are sometimes small and storms are sometimes strong. However, global warming is bringing new problems.

Global warming will alter the distribution and abundance of marine species and ecosystems. Water temperatures and oxygen levels are changing, which in turn changes the migration, spawning and feeding patterns of fish and shellfish, as well as their abundance and distribution.

Fisheries along the West Coast are already experiencing some of these effects. First, our oceans are becoming more acid, which happens when carbon dioxide (CO<sub>2</sub>) in the air mixes with ocean water (H<sub>2</sub>O) to make carbonic acid. Second, there is an increase in upwelling, which is when cold water from the ocean depths rises to the surface. Third, there are more areas in the ocean with low or no oxygen levels.

Here on the West coast, species such as salmon would move northward by an average of 30 kilometers per decade. Some species would move as far as the Gulf of Alaska and

Bering Sea. Some of these would disappear from the Oregon and California coasts altogether.

Some species shifts are already occurring. Because predatory Humboldt squid from Central and South America have invaded West Coast waters during the past few years, albacore tuna have moved northward, and smelt have disappeared at the southern edge of their range.