Very day you get up and decide what to wear or do based on the weather. Weather is the state of the atmosphere at any time, including things like temperature, precipitation, air pressure and cloud cover. Winds and storms can cause day-to-day changes in the weather. Seasonal changes happen because of the Earth’s position as it rotates around the sun. Weather conditions can change from one year to the next. For example, one year we might have a snowy winter and the next year very little snow. Weather doesn’t just affect you – it has a big impact on wildlife, too.

What is Climate?

When weather is averaged over at least thirty years, it is called “climate.” For example, the winter climate in New Hampshire is cold and snowy compared to the warm, humid climate in Florida at that time of year. Climate scientists (climatologists) have sorted the Earth’s regional climates into categories or zones based on average temperature and precipitation. These determine whether a region is called a tundra, desert, prairie, forest or rainforest, all of which support different types of wildlife.

Now for the big picture. The average climate around the world is called the global climate. The Earth’s air, water and land are all related to one another. This means a change in temperature or precipitation in one place can lead to other changes somewhere else. For example, when air temperatures rise, the oceans absorb more heat from the atmosphere and become warmer. Warmer oceans, in turn, can cause stronger storms. Stronger storms affect streams, rivers and forests. These impacts can change wildlife habitat and the animals found in them.
Understanding how weather affects animals is important to fisheries and wildlife biologists. Temperature and precipitation (rain and snow) can have an impact on how many animals survive in a particular year. Biologists collect weather data and use it to help predict wildlife populations.

Warm, dry weather in May and June means more young turkeys (poults).

Heavy snow cover and cold temperatures through March and April often decrease white-tailed deer populations.

Hot summer weather can make surface water temperatures too warm for brook trout to survive.
Over the past 110 years, the average New Hampshire temperature increased by 3.5°F. That might not sound like much, but this change has resulted in a decrease in the number of days we have snow on the ground and ice covering our lakes. Our weather is not just warmer, it’s wilder, too. During the past fifteen years, New Hampshire has experienced severe ice and rain storms.

How does this affect wildlife? Habitats that have narrow temperature and water requirements may be the first to be impacted. In New Hampshire, these include the alpine zone (the top of mountains where there are no trees), high- and low-elevation spruce-fir forests, coastal islands, vernal pools (temporary water) and aquatic habitats. If the warming trends continue, we don’t know what will happen to the trees that thrive in cold weather – like spruce, fir and sugar maple – and the animals that depend on them. We do know that if you change the habitat, you will change the animals that live there.

Warming trends are good for some animals. Turkey vultures, once thought of as a southern bird, are now seen throughout New Hampshire.

Alpine butterflies like White Mountain fritillary may be the first to disappear as warmer temperatures change their habitat.
The endangered marbled salamander may increase its numbers with warming temperatures.

Moose are perfectly adapted for extreme cold, but have a tough time handling the heat.

Purple finch, our State Bird, is shifting further northward, and may not be able to nest in the state if average temperatures get too warm.
Clouds play a complex role in climate. They are the source of precipitation, affect the amount of energy from the sun that reaches the Earth’s surface, and insulate the Earth’s surface and lower atmosphere. Conditions on Earth affect the amount and types of clouds that form overhead. This helps shape the local climate.

Clouds come in three altitude ranges:
- High clouds are over 6,000 meters and have the prefix “cirrus” or “cirro.”
- Middle clouds are between 2,000-6,000 meters and have the prefix “alto.”
- Low clouds are below 2,000 meters.

The types of clouds you see often depends on the weather conditions. By paying attention to the clouds, you can predict the weather!

**Cumulus**
- Fluffy white clouds (heaped and puffy), with dark bases, usually mean fair weather.

**Cirrus**
- Commonly referred to as “mares’ tails,” wispy cirrus clouds are created by tiny beads of ice and are often seen before a cold front.

**Stratocumulus**
- Low, water-carrying clouds mean that it is probably raining, snowing or drizzling.

**Stratus**
- These layered clouds look like a gray layered blanket and can bring rain or snow.

**Altostratus**
- Gray or blue gray, these clouds cover the whole sky and usually form ahead of a storm. The sun or moon may shine through them, but will appear fuzzy.

**Cumulonimbus**
- Sometimes called “thunderheads,” these towering clouds may rise to 75,000 feet and often bring thunderstorms.

**Nimbostratus**
- Heavy dark clouds that usually appear before rain or snow; common in winter.
Snow is formed when the weather is cold and tiny amounts (molecules) of water from cloud droplets are attracted to dust particles. This creates ice crystals, or snowflakes, which become larger as more water molecules are added. The type of crystals determines whether the snow is dry, powdery and easy to shovel, or heavy, wet snow that’s great for building snowmen.

**TYPES OF SNOW CRYSTALS**

**STELLAR (star-shaped) CRYSTALS** are shaped like a star, with six points coming from the center. Often seen as a snowstorm begins.

**SPATIAL DENDRITES** are feathery stellar crystals with other points projecting from each of the six original points.

**CAPPED COLUMNS** are a combination of a column crystal with a hexagonal plate crystal at either end.

**COLUMN CRYSTALS** are very small six-sided columns with flat or pointed ends.

**NEEDLES** are long, slender six-sided columns with fine points projecting from either end. These are extremely common and can account for much of the accumulation.

**HEXAGONAL PLATE CRYSTALS** are six-sided, flat crystals with varying degrees of design. Seen less often.

**IRREGULAR CRYSTALS** are plate-like crystals that are joined together, sometimes forming large flakes.

**EXAMINING SNOWFLAKES**

**MATERIALS:**
- black paper or black fabric
- magnifying glass

**PROCESS:**
- Place the black paper or fabric in the freezer for a couple hours.
- Take the black paper or fabric out of the freezer and put it outside when it’s snowing.
- Let some snowflakes land on the paper or fabric.
- Use the magnifying glass to see the beautiful shapes.

To learn more about snow crystals and snowflakes and how they are created, log onto Professor Kenneth G. Libbrecht’s website at: www.snowcrystals.com

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