Birds of Winter

Centennial Valley is a hotspot for birds of all sorts during the spring and summer months, with early mornings filled with bird songs. Winter is a much different story. Many of these bird species are now long gone, driven to warmer climates by the threat of frigid temperatures and snow. Those who stay behind must rely on a variety of physiological and behavioral tactics to survive the cold.

Birds, like mammals, are endotherms – they regulate their body temperature by producing their own heat. The average body temperature for birds is quite a bit higher than that of mammals, and more energy is required to maintain that temperature. Good insulation can help keep these energy costs down. For birds, this comes in the form of down feathers. These soft feathers lack the rigid structure seen in more typical feathers. Barbs, the smaller projections that make up a feather, are loose and soft on down feathers. They form a tangled net that traps warm air around a bird’s body. Some birds like waterfowl grow extra down in preparation for winter.

Small birds will frequently fluff their feathers to trap air for even more insulation, resulting in a very warm, puffyball of a bird. As anyone with a down jacket knows, down feathers are only effective if they are dry. Contour feathers, or the feathers that cover most of a bird’s body and protect down feathers, play an important role in keeping birds warm. Their barbs zip together, creating a tight structure with minuscule air spaces in between which causes water to form droplets that then roll right off the bird’s body. Preening birds also spread oil from their uropygial gland across their feathers, making them even more waterproof.

Another challenge is keeping bare legs and beaks warm. Many birds will simply tuck them under their feathers. It’s common to see birds balancing on one leg or tucking beaks under their wings during cold weather. Some that are especially well adapted to cold conditions such as grouse, have feathers covering their legs. Counter-current heat exchange further reduces heat lost through these extremities. Veins traveling back to the heart from these cold body parts carry warm blood. Arteries transporting blood from the heart to the rest of the body carry cold blood. With counter-current heat exchange, these blood vessels run right next to each other, allowing for heat to be exchanged from the warm arterial blood to the cold blood in the veins. This allows warm blood to be brought right back to the body, preventing cold blood from circulating around vital organs. Because arterial blood is cooled as it reaches extremities, less heat is lost to the environment through the feet. This process is particularly important for waterfowl and other birds who spend a lot of time in frigid water.

Birds don’t have nearly as many muscles or nerves in their feet and legs as humans, and they can endure these cold temperatures for longer periods of time without much damage.

Small, but tough

Large birds generally have an advantage when it comes to tolerating cold weather. As size increases, relative surface area and metabolic rate generally decrease. This means the larger the bird, the less heat is lost to the environment. Because of their small size and high metabolic rates, chickadees require a lot of food, eating up to 35% of their body weight in a day. To manage this in the winter when their main food source is in short supply, their insect-heavy diet switches to mostly consisting of seeds and berries. They will also eat animal fat, in the form of a carcass or a suet block. Chickadees will prepare for the winter by stashing food while it is still plentiful in the fall. They have the incredible ability to remember where their food caches are months later, with a relatively large hippocampus, which is used for memory storage. Studies have shown that Black-capped Chickadees regenerate neurons every autumn, which allows old information to be replaced by the new locations of their food caches.

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