

BOREAL BITS

PHIL BURKE



*“...the closed buds,
That lay along the boughs, instinct with life,
Patient, and waiting the soft breath of Spring,
Feared not the piercing spirit of the North.”*

A Winter Piece, William Cullen Bryant, 1821

WINTER SURVIVAL Part 3

On a fine summer day a few of us stood quietly beside a pond marveling at a huge snapper that was sunning itself on the shore of the pond along with a dozen much smaller painted turtles. The snapper was so huge that a painted turtle was standing on one of its feet. This behaviour is unusual for a snapper because normally they don't leave the water except to lay eggs, preferring to sun by floating on the surface. Obviously this snapper didn't know that, as the soft, gentle morning breezes and the deliciously warm rays of the sun caressed their shells and us.

Now, six months later we are standing on that same pond, our boots sunk shin-deep in snow on ice that is at least 33 cm (1 ft.) thick. The summer-scape is barely recognizable in this world of white. The deciduous trees stand naked, their leaf buds prepared for the spring thaw. The skirts of the spruce are layered in snow, bearing the burden of winter snow and cold. Where is the life that brimmed this community not so long ago? Where

are the insects that pestered us relentlessly, the frogs that peeped and chirped, the turtles that sunned themselves on that fine July day? A raven croaked in the frigid distance calling us back to winter; not all life was gone.



(P Burke)

The turtles were under our feet, tucked cosily into the mud at the bottom of the pond although I can't imagine that this could possibly be cosy. For six months or more these lung breathers magically go to sleep. Their bodily functions slow to almost a stop and whatever little oxygen they need is acquired by osmosis through their skin. When the shallow ponds that are their hibernacula thaw, the turtles resume the easy life that has sustained the species for millions of years.

The danger of freezing lies more in the physics of cold than in the cold itself. Cold creates ice, ice is made of crystals and it is these crystals that can cause irreparable damage to animal cells. The trick is then to minimize the creation of ice crystals or to avoid them altogether through a system known as super cooling that is defined as "cooling a liquid solution below its freezing point without causing solidification." We have all witnessed hoar frost and its vast array of beautiful ice crystals that cling to branches, twigs and blades of grass. These same shaped ice crystals rupture cells and cause certain death in animals' bodies. In humans, they cause frostbite, which, without proper debridement, can result in gangrene. In smaller animals, they spell death. Insects deal with the cold in different ways. Supercooling is used by some. Others produce antifreeze. Woodpeckers that regularly hunt grubs of tree burrowing beetles and

other insects have a sweet treat when they find wintering grubs. That so many life forms have successfully adapted to our brutal winters is among the wonders of Mom Nature.



(Wm Burke)

We cannot leave this topic without discussing why birds' feet don't freeze solid. In mid-January on a bitterly cold day, a flock of three dozen goldeneye ducks frolicked happily in a local bay. One was roosting on the edge of the ice. The water that was around 0 degrees Celsius—supercooling would allow it to be below zero and still maintain its liquid form—should have wicked so much (body) heat through the feet of these ducks, that the birds would suffer hypothermia. It didn't happen because of a unique adaptation that evolved. The arteries in the legs and feet are surrounded with a network of veins that heats the venous blood returning to the body. Cooled blood continues to the exposed feet so not as much body heat is lost. When the legs and feet reach the temperature where they are in danger of freezing the arteries dilate momentarily allowing more blood to pass through and freezing is prevented. Thus the bird's feet, although very cold in comparison with the rest of its body, do not become cold enough to do damage to the tissue or to the temperature of the bird.

Our February discussion of cold weather adaptations may be compared to a bumblebee flitting from flower to flower and missing most. We have mentioned only a few highlights of the research in this most fascinating area of study, but regardless of how the animals and plants adapt, we humans who share this winter world are fortunate that they do.