



PLAY

Winter
2014

Pennsylvania • League • of • Angling • Youth

by Kristi Niekamp and Miranda Smith

WHERE DO THEY GO IN WINTER?

Most of us know how groundhogs spend the winter. They find a cozy den and go into **hibernation**. What about the critters under the Pennsylvania Fish & Boat Commission's jurisdiction? How do reptiles, amphibians and fish survive the winter? Snakes, turtles, frogs, toads and fish are often called "cold-blooded," but the technical term is ectothermic. Humans are **endotherms** and burn much energy to keep their body heat within a narrow range. We sweat when it is hot and shiver when it is cold. **Ectotherms** do not do these things and use less energy since they can function in a much wider range of temperatures. They have physical or behavioral adaptations that allow them to survive these extremes. Let's explore how these animals survive the cold winter months.



VOCABULARY

(Watch for these words!)

- **Ectotherms** - also known as cold-blooded, body temperature varies with the environment
- **Endotherms** - also known as warm-blooded, metabolism used to maintain body temperature
- **Freeze tolerant** - species that can survive freezing
- **Freezing point** - the temperature at which a liquid freezes. The freezing point of water is 32-degrees F (0-degrees C).
- **Frost line** - maximum depth of ground where the soil freezes in the winter
- **Hibernaculum** - place where an animal hibernates during the winter
- **Hibernation** - the practice of certain animals to remain dormant (or inactive) throughout the winter, metabolism slows down
- **Hypothermia** - lowering of body temperature
- **Metabolism** - the processes occurring within an organism that are necessary for life (some substances are broken down or converted to energy)



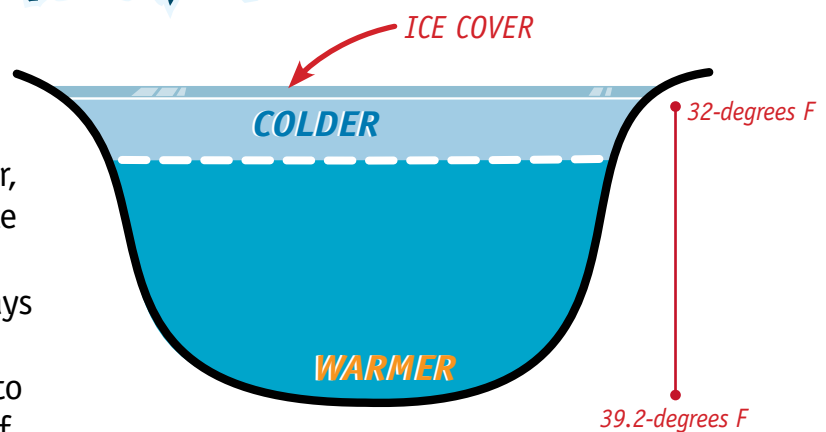
FINDING FISH UNDER THE FROZEN WATER

PONDS AND LAKES

Water freezes at 32-degrees F, but it is most dense at 39.2-degrees F. During winter, and before ice forms, the entire pond or lake may be at this temperature. As the surface waters cool more, the colder water layer stays at the surface. If the surface water remains calm and stays at 32-degrees F, ice begins to form. The layer of ice is “floating” on top of the lake—like an ice cube floating in a cold drink. The ice forms from the surface down, the colder the weather, the thicker the ice. The water beneath the ice is insulated from the cold and often remains at 39.2-degrees F.

Under the ice, the level of activity and **metabolism** of fish is less than during other times of the year. Using less energy means fish can eat less. Fish may sometimes use their stored energy reserves over the winter. Other times, they may eat but do not use much energy to find food. Bluegills eat plankton and other invertebrates that remain active during the winter. Small ice fishing lures and flies imitate these food items. If you know anything about ice fishing, you know that fish don't move far or fast.

Fish may also move to deeper water where temperatures are slightly warmer.



Young fish find refuge among vegetation or other cover. Carp and bullhead catfish lie still on the bottom or may bury themselves in the mud. Sunken logs or human-made fish structures offer protection for others.

Small increases in water temperature may result in an increase of activity. A clear, sunny day can warm the water just a few degrees. The water entering a lake or pond may also be warmer. Fish will move to the warmer water. The fish and things they eat will be gathered at these spots. Activity is higher at these spots than other places due to the warmer water and abundance of food. Finding these places is the key to ice fishing success. The opposite also is true, and a small decrease in water temperature causes fish to slow down. When this happens, anglers say the fish are “turned off.”

STREAMS AND RIVERS

Unlike the deep water in a pond or a lake, the moving water in streams, creeks and rivers is exposed to winter weather. The water temperature in many of these waters changes with the weather. It may be cold enough to form ice along the water's edge. During the winter months, fish move to calm, deeper water. They find shelter near things that block the current. Fish use less energy remaining in these spots, compared to where you find them in summer. Fish may also gather where springs or other warm water enters. These places can be fishing hot spots.

Fish like Walleyes, Muskellunge, Smallmouth Bass, trout and pike remain active during the winter months. Look for them in places sheltered from current. They will not chase your bait as they do in summer. Your presentation needs to be precise and slow. Bites are gentle, because fish will not move far for food when the water is cold. Fish like catfish and carp are less active.



*Yellow
Breeches
Creek,
Cumberland
County*

FISHING CAN BE GREAT WHEN IT'S COLD OUTSIDE

Fish become more active during warm and sunny days. Even then, fish do not move far or very fast, so slow down. Safety is also important when fishing in winter. **Hypothermia** can happen quickly. That's when your body temperature drops below 95-degrees F. Wear clothing that will protect you from the cold. Bring a change of clothes in case you get wet. Most important, wear a life jacket, and never go fishing alone. For more information on ice fishing and safety, visit our website at www.fishandboat.com/ice.htm.



Bluegill

A WARM PLACE FOR WINTER



The Eastern American Toad digs into loose soil before the first frost.

ON LAND

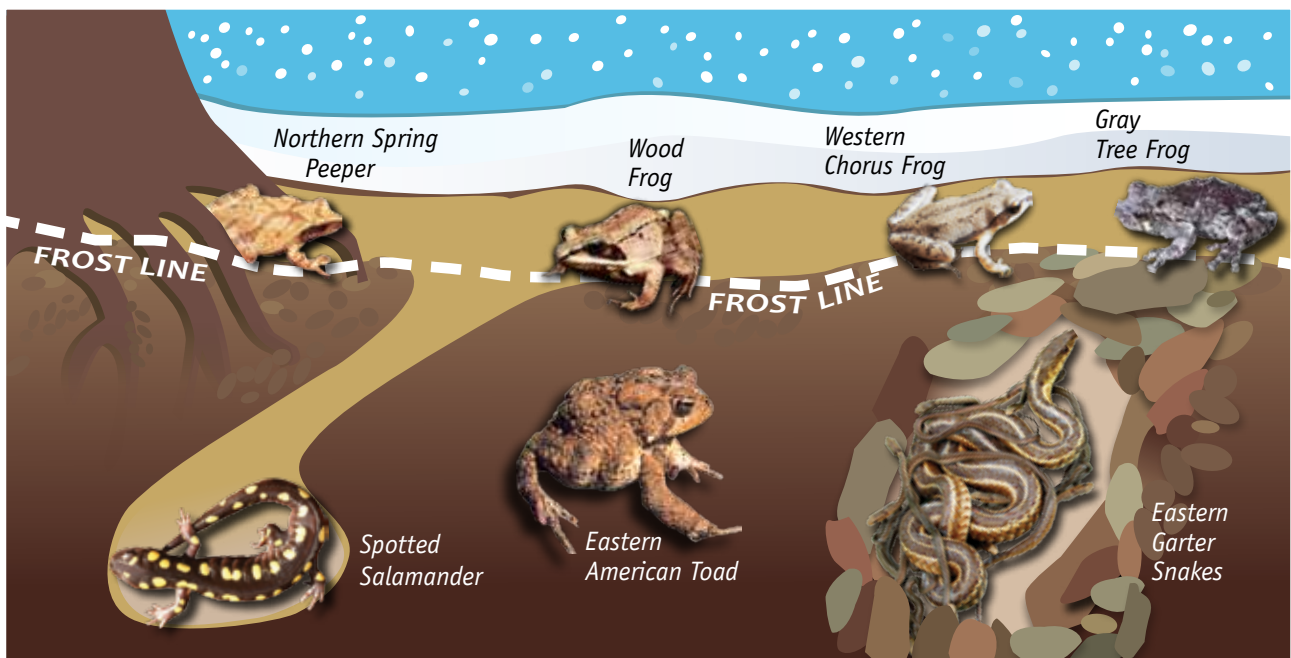
Reptiles and amphibians find shelter and protection during colder months in their **hibernaculum**. This is a protected spot that shelters them from harsh weather.

Reptiles and amphibians that live on land often hibernate underground. Toads dig their own burrows. Salamanders, snakes and lizards may use burrows, dens or tunnels made by small mammals.

Snakes usually move from a summer habitat to a winter den. Dens are often caverns or crevices of rock formations.

Other den sites include underground tunnels and burrows of wildlife. Many different species may hibernate together, and one den may contain hundreds of snakes. Non-venomous snakes will hibernate with venomous species.

Many hibernating amphibians and reptiles stay below the **frost line**. The ground above the frost line freezes, while the ground below the **frost line** does not freeze. The **frost line** will be deeper in extremely cold weather. It may be closer to the surface in mild winters.





Snapping Turtles hibernate in shallow water, buried in mud in places which do not freeze to the bottom. Its hibernation ends in April when it emerges from a mud bank, muskrat hole or from under a collection of vegetative debris.

LIVING IN COLD WATER

Many aquatic reptiles and amphibians hibernate underwater during the winter. These animals burrow into soft mud along the banks or at the bottom. Some turtles will use an underwater muskrat den as a **hibernaculum**. If the water is not frozen, many salamanders remain active throughout the winter.

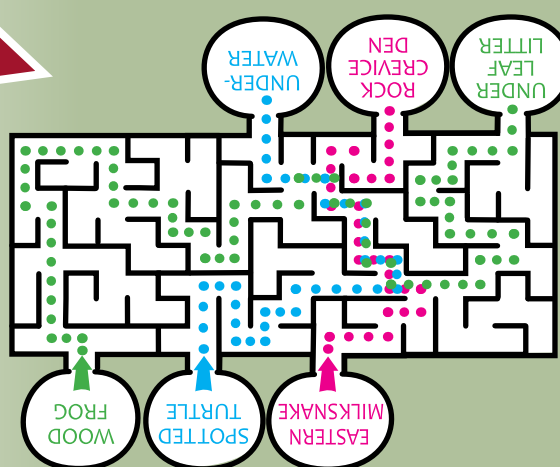
Turtles, salamanders and frogs have to breathe under frozen water during the winter. Their slow **metabolism** requires little oxygen. Oxygen from the water and mud is absorbed across their skin.

Aquatic turtles can obtain only a tiny amount of oxygen from the water and mud

through their skin. During the winter, their bodies also get oxygen by breaking down stored energy. The stored energy is in the form of sugars and proteins within their bodies. The gathering of byproducts of this process can be dangerous. However, turtles also have a natural antacid. The calcium carbonate in their shells neutralizes the lactic acid.

Turtles are very sluggish during **hibernation**. Painted turtles can have a heartbeat as low as one beat every 10 minutes. Their normal heartbeat during the summer is 30 to 40 beats per minute.

ANSWERS
to A-mazing
Winter Survival.



FROZEN ALIVE!

Did you ever say that you were freezing on a cold winter day? You are not freezing, just cold. The **freezing point** of water is 32-degrees F (or 0-degrees C). Your shivering generates heat and that helps to keep your temperature stable. While you do not freeze, some animals do. Several species of frogs hibernate just under leaf litter or rotting logs, above the **frost line**. These frogs are able to survive episodes of freezing. Their bodies actually freeze. They are **freeze tolerant**. The

Checklist: Frogs that Freeze



Wood Frog



Northern Spring Peeper



Gray Tree Frog



Western Chorus Frog

amphibian best known for freezing is the Wood Frog. Once frozen, the frog doesn't breathe,

and its heart doesn't beat. When spring arrives, it defrosts and heads off to find a mate.

FROZEN REPTILES

While all other Pennsylvania turtles hibernate underwater, the Eastern Box Turtle digs a shallow burrow in the ground. It is the largest known **freeze tolerant** reptile. Painted turtles are **freeze tolerant** but only as hatchlings. After hatching, painted turtle babies remain in their underground nest during the winter. Most Pennsylvania turtles emerge from their nests in time to head to the water to hibernate.



Eastern Box Turtle

Midland Painted Turtle

A-MAZING WINTER SURVIVAL



Temperatures are falling! Animals across Pennsylvania are preparing for winter. Help these **ectotherms** find their way to the correct **hibernaculum**. Use the descriptions under the habitat pictures to assist you in making your decision.

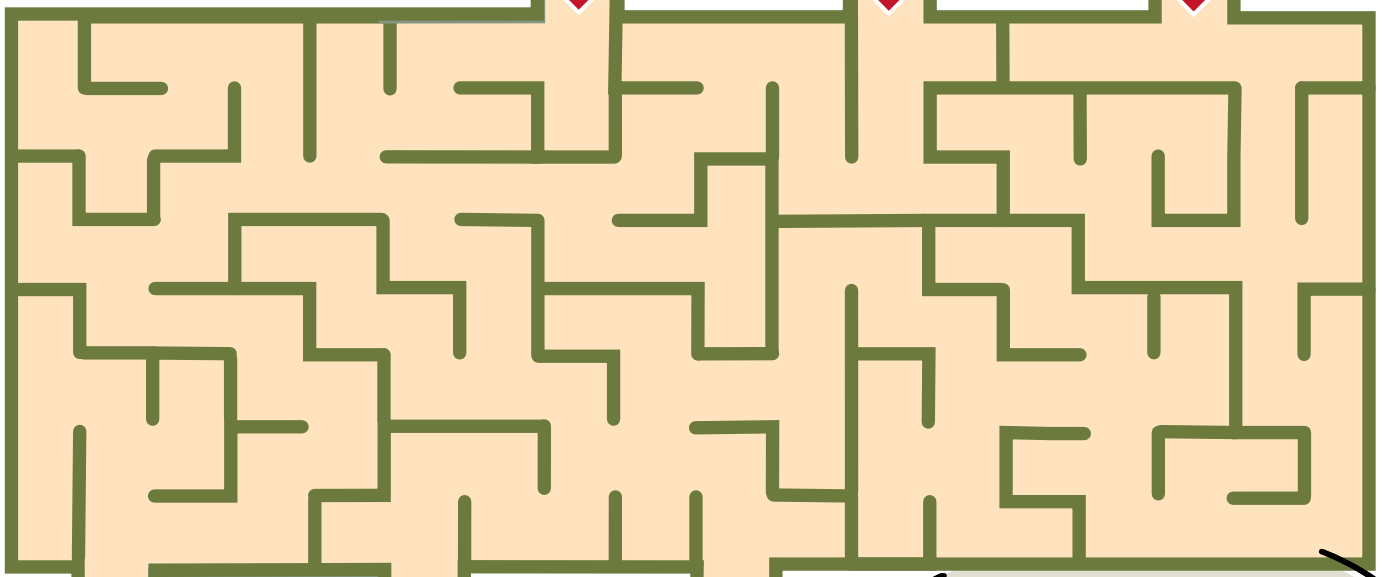
EASTERN MILKSNAKE



SPOTTED TURTLE



WOOD FROG



UNDER LEAF LITTER

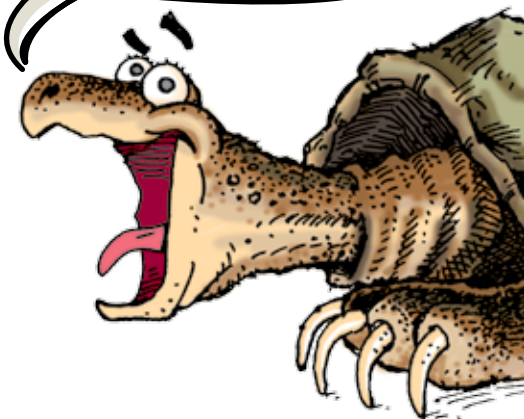


ROCK CREVICE DEN



UNDERWATER

The solution to the maze can be found on the "Living in Cold Water" page of this *PLAY* newsletter



PLAY

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