

Providing Structure for Fish in Private Ponds



Providing structures can be important for private pond management. Structure creates long-term habitat for fish and other aquatic species that may be lacking natural habitat. In addition to benefiting fish, providing habitat can reduce losses of fish to predators, like river otter, and can help congregate fish to improve angling opportunities.

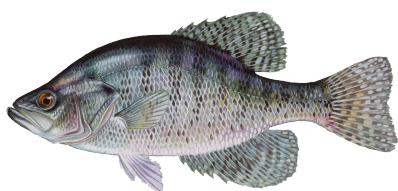
What is a private pond?

A private pond does not just mean the land around the pond or lake is privately owned. Many lakes, especially natural lakes, are considered public even if there is no public access to them. These guidelines are primarily designed for small ponds legally dug by private individuals. They do not apply to the numerous lakes throughout the state that are typically considered natural waterbodies, such as impounded waterways and public freshwater lakes. A list of the public freshwater lakes is available at on.IN.gov/where2fish.

Habitat improvements or changes to these lakes may require special permits. Always check for recent rules, laws, and local ordinances before you make any changes to your pond. For more information regarding state permitting, visit IN.gov/dnr/water.

What is structure?

Structure provides surface area for organisms like macroinvertebrates and algae to grow on in addition to providing cover for fish. Structure also provides places for fish to hide, eat, or spawn. Structure can occur naturally when trees fall into ponds, or when stumps or other materials are left when a pond is filled, or by natural aquatic vegetation growing in the ponds. However, some ponds don't have naturally occurring structure, so providing man-made versions can be important for creating and/or maintaining healthy fish populations and better fishing opportunities.



General Considerations

Many types of man-made structures are available, as outlined below, but it is important to never use potentially toxic materials such as tires to try to create habitat, which can do more harm than good in the long-term. Using materials that can withstand long-term submersion in water is also important. Some of the structures outlined here list plastic buckles for assembly because metal buckles will rust and split apart. Any plastic used needs to be safe for water. For instance, plastics that are used to transport drinking water are preferred because they do not leach.

The bottom surface of the pond is another important consideration. The structures discussed below generally need flat surfaces to rest upon and function correctly. If your pond is sloped and meets at a point, your pond may not be the best fit for habitat structures because they will shift and move too much to function properly.

Another potential consideration is pond depth. Most ponds 12 feet deep or less can have structure placed almost anywhere that won't impede navigation; however, some ponds more than 12 feet deep develop a bottom layer of water with no oxygen in the summer. Fish won't live in the oxygen-deprived water layer, so placing structures at those depths won't be helpful. If your pond is deeper than 15 feet, contact your local fisheries biologist for guidance on habitat structures at fishing.IN.gov.

The following is not a comprehensive list of potential types of structure, but gives examples of common ones that could be deployed in private ponds. Some companies make pre-fabricated structure options that may be purchased. Pond owners may explore these options too, but they are not outlined here.

Always check the public freshwater lakes list and any relevant local laws before proceeding with any changes.



DNR Photo



DNR Photo



Pennsylvania Fish and Boat Commission

Rock Piles (or Reefs)

Purpose:

- Provide foraging habitat for aquatic insects, crustaceans, and bait fish.
- Attract fish to forage for food or spawn.

Considerations:

- Generally placed on flat areas or shoals, which are naturally occurring ridges underwater.
- Generally must be installed before filling ponds or when water level is extremely low.
- Heavy machinery required for placement.

Construction:

- Rock or concrete piles between 1 and 3 cubic yards (less than 2.5 tons).
- Suitable rocks include sandstone, limestone, or broken concrete blocks (make sure there is no rebar present in concrete as that is illegal and can harm water quality in your pond).

Density:

- Typically 20 1-ton humps per acre.



DNR Photo

Felled Shoreline Trees

Purpose:

- Attract fish for spawning, foraging, and hiding in shallow areas.

Considerations:

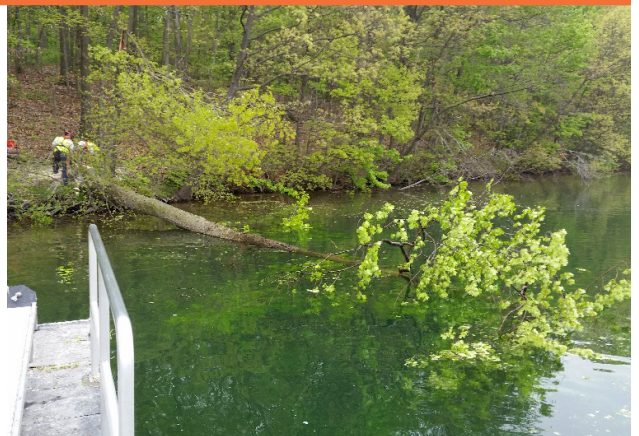
- Trees may need to be cabled or hinged cut to keep from migrating during high flow. Hinge cutting involves cutting a tree halfway and then pushing it over so it is horizontal.

Construction:

- Younger trees work best as older trees may break when felled.
- Large, spreading hardwoods are best because complex branches create complex habitat.
- Cable tree to stumps with ¼ inch galvanized wire rope and cable clamps or hinge cut trees.

Density:

- Recommend ~5 trees per acre.



Pennsylvania Fish and Boat Commission



Pennsylvania Fish and Boat Commission

Brush Piles, Log Piles, or Stumps

Purpose:

- Provide predation protection.
- Hardwood and cedar piles may help attract black bass, crappies, and juvenile sunfish.

Considerations:

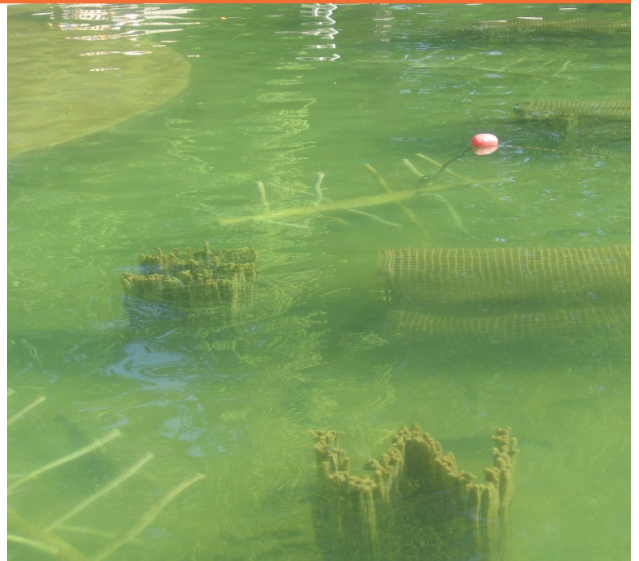
- Cost-effective structures.
- Christmas trees tend to be easy to acquire and provide habitat, but don't last as long as some other species (3–5 years).
- Groups of cedar or pine 6–10 feet in height work well.
- Hardwoods like oaks last longer but are more likely to snag lures.
- Small fish prefer dense cover such as cedar, while large fish tend to congregate around less-dense trees like oaks.

Construction:

- Trees should be secured with weight (cinder blocks, cement in a bucket, or similar) and placed upright to create a three-dimensional structure, when possible.

Density:

- Clusters of 20 or more trees placed in a cluster shape are more effective. Create a cluster shape by placing trees in a circle, minimizing the amount of edge.



DNR Photo

Aquatic Vegetation

Purpose:

- Aquatic plants support higher fish densities, help reduce predation, and provide habitat.
- Man-made ponds and reservoirs can lack basic aquatic vegetation.

Considerations:

- Native plants after establishment will self-propagate.
- Some plants can snag lures.
- Must avoid invasive species.

Construction:

- Always plant native Indiana species to prevent spread of invasive species that will take over small ponds and spread to other waters.
- Generally, a variety is better than merely planting one species.
- Good candidates might include small pondweed, Stoneworts (*Chara* species), Naiads (*Najas* species), or American eelgrass.
- Starting plants in fenced-in enclosures may help them get established.



DNR Photo

Pallet Structure

Purpose:

- Provide cover for fish.

Considerations:

- Cost effective if cheap or free pallets are available.
- Avoid treated or painted lumber in ponds.

Construction:

- Use five standard sized pallets joined with 1/2 pound countersinking-head polymer-coated 2.5-inch deck screws.
- Anchor by putting eight cinder blocks inside the structure.

Density:

- Recommended density is ~20 per acre.



DNR Photo

Pennsylvania Porcupine Crib

Purpose:

- Provides refuge habitat for juvenile fish and improve sportfish recruitment in ponds that lack deep-water submerged vegetation.

Considerations:

- Long-lasting, deep-water, complex structures.
- Heavy and hard to move.

Construction:

- Made of rough-cut green (fresh cut) hemlock or poplar.
- Requires 50 pieces of 2 inch x 2 inch x 4 foot green wood and one pound countersinking-head polymer-coated 3.5-inch deck screws.
- Use a 14-foot piece of nylon security banding and one plastic buckle to wrap around the structure vertically to help hold structure together.
- Anchor with eight concrete blocks (minimum 35 pounds each).

Density:

- If done during drawdowns or pre-water filling, structures are placed in a row or alternative pattern, 4–8 feet between each structure with ~20 structures per acre.



DNR Photo



DNR Photo

Pennsylvania Porcupine Crib Junior

Purpose:

- Designed to mimic stump habitat.
- Provides cover for fish pre- and post-spawning and refuge cover for juvenile fish.

Considerations:

- May be dropped by specialty watercraft, placed before a pond is filled, or built in place during a drawdown.
- Shallow water version of the Pennsylvania porcupine crib.

Construction:

- Rough-cut, green (fresh cut) hemlock or poplar.
- Requires 38 pieces of 2 inch x 2 inch x 4 foot green wood, (minimum 35 pounds each) and 1/2 pound countersinking-head polymer-coated 3.5-inch deck screws.
- Anchor with eight concrete blocks.
- Use one 10-foot piece of nylon security banding and one plastic buckle to wrap vertically around structure to help hold together.
- Generally placed randomly in depths between 6 and 10 feet with varied distances between each crib.

Density:

- Recommended density is 30 structures per acre.



DNR Photo

Pennsylvania Post Cluster Structure

Purpose:

- Provide simple microhabitat for aquatic invertebrates that many fish eat.
- Provide camouflage benefits to fish and ambush cover for black bass.

Considerations:

- Uses common agricultural fence posts that are driven into the pond or lake bottom in a cluster patterns.
- Generally placed in 3–4 foot depths at slight angles to the water surface.
- Must be done during drawdowns or before pond is filled.

Construction:

- Uses 8 foot long by 6 inch wide posts driven down 3–3.5 feet with 25 posts to a cluster and clusters spaced 6–8 feet apart.

Density:

- Typical density is four clusters of 25 posts per acre.



Pennsylvania Fish and Boat Commission



Pennsylvania Fish and Boat Commission

Hoosier Cube

Purpose:

- Structure accumulates periphyton, which is a mix of algae, fungi, and bacteria that attracts insects and fish.

Considerations:

- Cost-effective.
- A variant of the Georgia cube.
- Made of PVC pipe and last much longer than wooden structures without impairing water quality.
- Less likely to snag lures.

Construction:

- Generally cubes of PVC 3 feet tall, 4 feet wide, and 4 feet deep.
- Join PVC pipes with T-connectors and screws to form cubes.
- Use sections of 4 inch diameter corrugated drain line and attach to cube with zip ties.
- Clusters or individual placement work.

Density:

- Typical density is 20 cubes per acre.

Note: When building Hoosier cubes, PVC rated for drinking water and HDPE rated corrugated drainage tile are recommended. These are not known to leach into the water and therefore are unlikely to be detrimental to the environment.



DNR Photo



Texas Parks and Wildlife

Pennsylvania Largemouth Bass Nesting Structure

Purpose:

- Provides spawning, nesting, and nursery habitat for largemouth bass.
- Provides shallow-water (less than 10 feet) cover for bass

Considerations:

- Doesn't create navigation hazards.
- Can be built in place or deployed from boats.

Construction:

- Use 20 pieces of 2 in x 2 in x 4 feet and 5 pieces of 1 in x 8 in x 8 feet rough-cut, green (fresh cut) hemlock or poplar, countersinking-head polymer-coated 3.5-inch deck screws.
- Anchor with eight concrete blocks.
- Use a 10 foot piece of ½ inch nylon security banding and one plastic buckle to wrap vertically around structure to help hold it together.

Density:

- Normally place 5–10 nesting structures at one site in alternating rows at depths of 5–10 feet.
- Typical density is 10 structures per acre.



Pennsylvania Fish and Boat Commission

Pennsylvania Turtle Basking Habitat Platform

Purpose:

- Gives turtles a place to get out of the water to help regulate their body temperature.

Considerations:

- Allows for healthy turtle populations in ponds.
- Can reduce disease in ponds.
- Generally placed where they will receive less human attention.

Construction:

- Made of rough-cut, true-dimensional hemlock or yellow poplar on floats of capped PVC pipes.
- Leave two openings inside structure for escape options.
- Anchor with two 8 inch x 8 inch x 16 inch concrete blocks and ¼ inch stainless steel wire rope.

Density:

- Typical density is five structures per acre.



Pennsylvania Fish and Boat Commission

Artificial Shrubs

Purpose:

- Mimic natural brush/vegetation clumps fish want to use for cover.

Considerations:

- Simple to build.
- Come in various forms.
- Can break down over time.

Construction:

- Several options exist for creating artificial shrubs.
 - › Take utility pipe, which is rated the same as PVC, and stick in concrete to create random arms sticking up and allow to dry.
 - › Use buckets, fill with concrete, and insert sticks into the wet concrete at various angles and allow to dry.
 - › Take a cinderblock, place bamboo stakes or PVC pipe at various lengths and angles in cinderblock opening, then fill with quick-set concrete.
 - › Consider putting a small nail or screw into stakes, pipes, or sticks to prevent them from pulling out of dried concrete.



DNR Photo