

on the cool side. They may also do better than largemouth bass in new or renovated ponds that haven't yet developed much forage. Smallmouths often don't spawn successfully, because they need gravel and the young require more dissolved oxygen than largemouth fry.

Bass with forage minnows. Stock minnows before the bass or wait to see if they're really needed. **Fathead minnows** are generally best, since they don't grow larger than 3 inches. **Bluntnose minnows** can also be used. **Golden shiners** usually work well, but sometimes grow too big for bass to eat, if large bass aren't maintained in the pond as recommended in this bulletin. Should golden shiners become too large, they compete with bass for food. If the bass deplete the minnow population in a few years, simply stock more, scattering well to reduce immediate predation. A moderate amount of rooted plants in the pond gives minnows some shelter from bass and allows enough to survive and reproduce for an ongoing population. Installing tile pipes or raised "spawning boards" may also aid minnow reproduction.

Channel catfish and minnows. Channel catfish grow slowly and seldom reproduce in Michigan ponds. They usually must be restocked for continued fishing. If shelters such as milk cans, kegs, or closed pipe are provided, they may occasionally breed. Use the same kinds of minnows as for bass forage.

Sometimes, for variety, channel catfish are added to a pond having bass and/or panfish. If adult bass are present, use catfish larger than 7 inches (17 cm) to minimize predation. Bass and panfish will prey on any catfish fry produced.

Largemouth bass and bluegills. BEWARE of this combination! It's a favorite in the South, where it can work, but it has been oversold in the North. Bass are supposed to control bluegills by predation, but it doesn't work that way in our climate. The bluegills overpopulate the pond, and then both bass and bluegills have stunted growth. If you want bass and bluegills anyway, give the bass 1-2 years head start in growth

Table 7.1. Stocking guide for Michigan warmwater ponds.

Kind of fish	Number to stock per surface acre	Length (inches)	Time of year
Largemouth or smallmouth bass alone	*100 fingerlings OR 25-50 yearlings OR 6-8 adults (both sexes)	2-4 6-10 12+	July-August April-October October OR May
Bass with minnows	500 adult minnows, then, after minnows spawn, stock bass as above	2-3	April-May
Channel catfish with minnows	500 adult minnows, then, after minnows spawn *100 fingerling catfish	2-3 2-4	April-May July-August
Largemouth** bass with bluegills	Stock bass as above, then, after 1 or 2 years 500 fingerling bluegills	1-2	July-August
Bluegill or other panfish with NO bass	500 fingerlings THIS ALTERNATIVE IS NOT RECOMMENDED!	1-2	July-August
Hybrid sunfish	400-800 fingerlings	1-3	July-October

*Reduce by half if water alkalinity under 50 ppm.

**Don't use smallmouth bass, as they eat very few bluegills.

and spawning. Then they may have more effect on the bluegills.

Bluegills or other panfish without bass. This results in overpopulation and stunting even sooner than with the bass-bluegill combination. If a bluegill-only pond is desired, consider stocking only fingerlings. This delays the onset of stunting by giving the initial population some time to grow before they have offspring which will then compete with them for food.

Hybrid sunfish with or without bass. Artificial crosses between various species of sunfish (bluegill, green sunfish, pumpkinseed, etc.) may have advantages of hybrid vigor and sexual infertility. This makes them fast-growing and manageable. Without reproduction, food supply and room to grow are maintained, and the energy of the fish goes into body growth rather than into producing eggs and milt and carrying on the intense activity of spawning. However, beware—**purebred** sunfish are almost always among the hybrid fingerlings stocked. These purebreds mature, spawn and start the pond on its way to overpopulation. Still, the number of fertile "mistakes" is usually so low

that the onset of crowding is delayed for several years—with excellent fishing for panfish in the meantime. Sunfish hybrids have been expensive and hard to get. If you pay for hybrids, get a legally binding guarantee that they are genuine. **Hybrids are of little or no value when stocked in presence of existing panfish populations.**

Exotic fishes. Fishes not native to Michigan are sometimes desired by pond owners. Most of these, such as grass carp, tench and Japanese weatherfish, are inadvisable and illegal. See discussion in Chapter 5.

Angling Harvest

Bass

The harvest of bass should be delayed until they have spawned once. This insures that they will become well established before other fishes (especially panfish) disrupt the food supply. It may mean waiting 2-3 years if you stock fingerlings, 1-2 years if you stock yearlings, or until the next mid-June if you stock adults.

If you stock 100 bass fingerlings per acre, expect to have 25-30 adults per acre after 2 full summers in the