Feeding the North American Paddlefish, a Filter Feeder, in a Large Multi-Taxa Exhibit

Nick Zarlinga
Aquarium Biologist, Cleveland Metroparks Zoo, 3900 Wildlife Way, Cleveland, OH 44109-3132
njz@clevelandmetroparks.com

"*Mommy, what's that ugly thing?*" This has to be the one of the most frequently asked questions in the Wolf Wilderness exhibit at the Cleveland Metroparks Zoo. The parent stumbles to find a suitable answer so as not to disappoint the inquisitive child. "Oh, that's a shark honey." Or "That's what a swordfish looks like." Both popular answers, but unfortunately incorrect. It's a bit funny to see the all mighty fishermen (and fisherwomen) take a few steps back and scratch their heads in wonderment: "I don't ever remember catching one of these!"

Not many people in Ohio would believe a story about one of these fish anyhow. That's because the paddlefish (*Polyodon spathula*) is not normally found in northern Ohio. This distinctive looking fish is primarily a southern U.S. species, although it is common in the northern tributaries of the Mississippi River such as the Ohio and Missouri River systems. There are documented findings of paddlefish in Ohio—in western Lake Erie and Summit County. However, these animals could have been released after being caught somewhere else, or perhaps they migrated up manmade canals to these locations.

One look at a paddlefish brings a legitimate question to mind: "What's that long nose for?" Well, technically speaking, it isn't a nose at all (its nostrils are located just above its mouth). The proper term is *rostrum*. The paddlefish's rostrum is truly a peculiar feature. Originally it was thought to be used to root out food items such as small fish or crustaceans from weeds or a muddy riverbed. Now scientists believe that the rostrum acts as sort of an antenna in sensing direction and large blooms of plankton (free floating minute plants and animals) on which paddlefish feed. Since paddlefish live mostly in slow-moving, turbid waters, they don't need large eyes, and any non-visual sensing device is greatly advantageous.

In the wild, paddlefish feed via a technique called basking. Their huge, cavernous mouths are loaded with tiny gill rakers, or comblike projections, which collect food particles as water passes through the gills. Since a paddlefish is always moving, all it has to do is open its mouth and filter out a meal. (Imagine walking through a room full of pizza with your mouth open!) Biologists have estimated that it takes a large paddlefish between 12,000 and 36,000 gallons of water to filter out a decent meal.

Because of their unique eating habits, special care must be taken when housing paddlefish with other, more aggressive species of fish to ensure that they receive enough food. In 1998 we introduced six 24-inch paddlefish into our new Wolf Wilderness exhibit. In addition to showcasing timber wolves, beavers, and various northern species of birds, reptiles and amphibians, the exhibit contains a 65,000-gallon outdoor pond with an underwater viewing area. It's stocked with various native fishes such as large- and smallmouth basses, crappie, longnose gar, channel catfish, flathead catfish, yellow perch, walleye, bluegill, pumpkinseed sunfish, and bowfin.

It took a while for the paddlefish to get used to the larger swimming space and feel comfortable, and feeding them proved to be a challenge. Although paddlefish are primarily filter feeders in the wild, in captivity they readily accept larger pieces of food. But because the other inhabitants of the pond feed so aggressively, there was little food left over for the paddlefish to eat. So we had to devise a way to get enough food to the paddlefish.

Trying to take advantage of their filter-feeding habits, we decided to make frozen feeding blocks containing brine shrimp, flake food, chopped smelt, and shrimp. These items

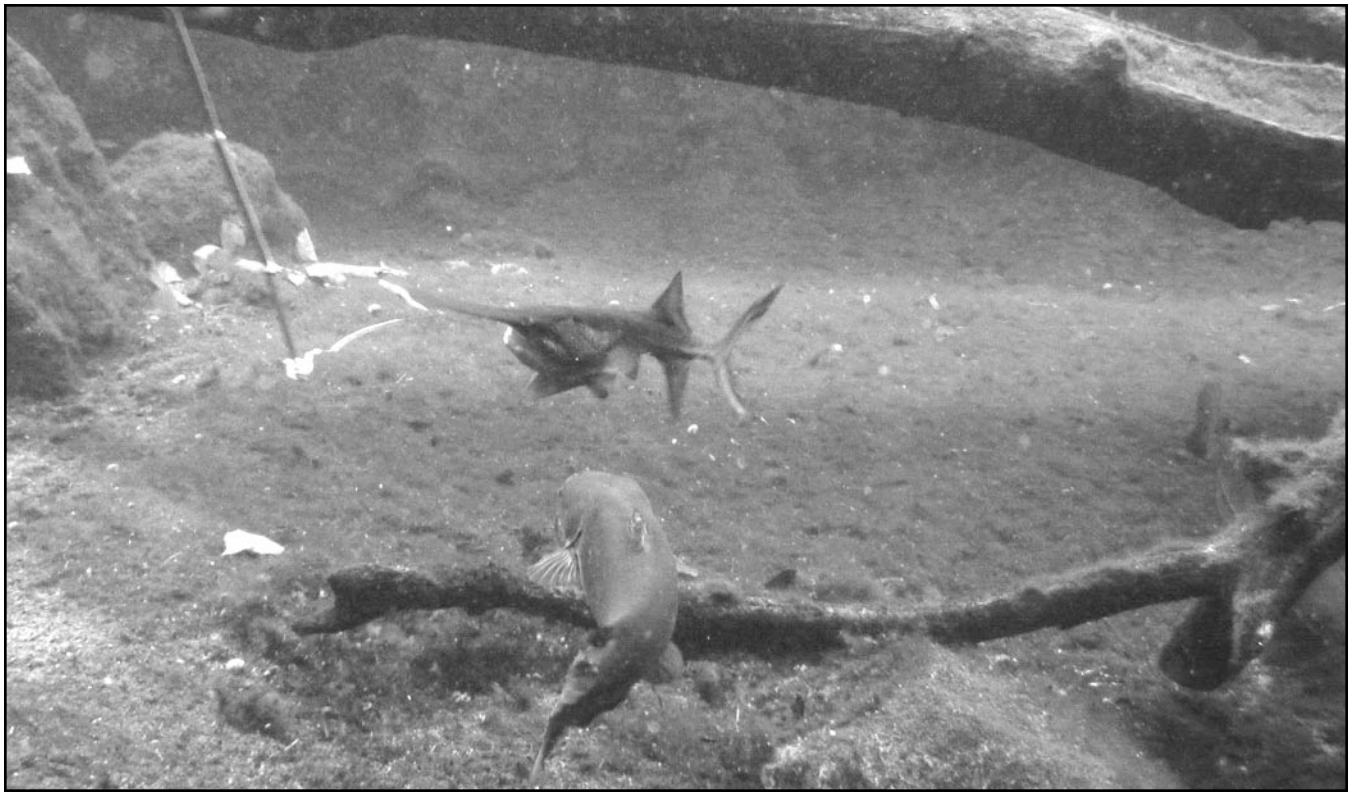

Fig. 1.
Pole-feeding a paddlefish at Cleveland Metroparks Zoo. Photo by the author.

were processed to the right size, then put into a one-gallon bucket that was then filled with water and frozen. A string attached to the block allowed it to be attached to a log so that it would not get swept into the skimmer. This effort seemed to work somewhat, but combined with filter design flaws, the paddlefish still could not compete with the more aggressive eaters and soon perished. Within the next couple of years, we were able to make some necessary improvements in the filter design and, with some renewed interest, we were prepared to try the species again.

We figured that the only way to make sure our paddlefish got enough food was to feed it to them directly, so we decided to experiment in a controlled environment—a 6,000-gallon off-exhibit holding tank. In this reserve tank we housed five 36-inch paddlefish. The only other animals in the tank were seven Australian lungfish (*Neoceratodus forsteri*), which are also very passive feeders and posed little competition for the paddlefish. As the paddlefish swam their normal patterns, we could easily introduce a smelt under their rostrum by hand. At first the paddlefish were a bit wary of anything near them, but soon they got the hang of the game. A quick wiggle of the smelt near their mouth and the paddlefish eagerly accepted the food. (Good thing they don't have teeth!) Then we worked towards pole feeding and attached a paperclip to a plastic rod. The paperclip, however, was too short and the paddlefish bit down on the rod and immediately let go. We solved this problem by using a longer heavy gauge wire attached to the rod. This way we could be at a given distance and still get food to them. Eventually the paddlefish seemed to know that we were coming with food and continuously swam past us, almost as if they were "begging."

After several months of pole feeding them in the controlled environment, it was time to introduce the paddlefish into the exhibit. To give them a bit of a head start, we removed about 30 of the 50 or so bluegill and about eight of the 15 channel catfish before introducing three specimens in June 2001. The paddlefish quickly adapted to the larger swimming space and, to our surprise, accepted food from the pole on the first try.

Currently we are pole feeding them about three times a week (Fig. 1) and using the frozen blocks the other days during the active months. We also hand-feed the paddlefish when we dive in the exhibit for cleaning. This makes a great show during the zoo's open hours. In the fall we try to feed them a bit extra to get them through the winter.

We're optimistic that this technique will allow us to keep these fascinating animals with other, more aggressive, native species. The "oohs" and "aahs" from the public make the more labor-intensive feeding regimen worth the effort.