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Natural History Notes

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Why Spawning Habitat Is Important

Within the past 75 years the northern pike has invaded many musky lakes. In most lakes the musky has declined as northern pike numbers have increased. In some lakes the northern pike has completely taken over. This is the fourth in a series of five "Natural History Notes" that reviews the biology of these fishes and reasons why northern pike have displaced muskies in many waters.

The spawning behavior of the musky and northern pike is very similar. Northern pike migrate to their spawning grounds in early spring immediately after ice-out and spawning begins when water temperatures reach 40° F. Muskies spawn about 2-3 weeks later when the water has warmed to about 50° F and peak spawning occurs at 55° F. In both species the larger female is attended by 1-3 smaller males. The group swims rapidly about the spawning area and just before spawning they slow down. The males swiftly slap the side of the female and 5-60 eggs are shed as sperm is released from the males. This process is repeated many times over the course of several hours when all the female's eggs have been spent. Spawning is a very stressful time on these fish. Gashes and frayed fins are common and some die after spawning.

High quality spawning habitat is a critical need for a fish's life cycle since highest mortalities occur at the earliest life stages. Both muskies and northern pike deposit their eggs as they swim around selected areas. They typically spawn in waters six inches to three feet deep and seem to prefer marshy areas, submerged wood and tree tops, often in shallow weedy bays and sometimes near or in streams or rivers. The spawning areas often have muddy bottoms and very dense vegetation. This presents a big problem, especially for the musky. Eggs that settle into or onto the muddy bottom die from lack of oxygen. This mud is an accumulation of organic material on the lake bottom and is slowly decomposing. The decomposition process requires oxygen, and during calm periods when there is no water circulation the layer of water an inch or two above the muddy bottom loses its oxygen to the mud. If there is dense vegetation, as there often is, the problem becomes more serious because the plants that produce oxygen through photosynthesis during the day use oxygen in respiration at night. It is important to understand that I am not saying that entire bays or lakes lose all their oxygen, but I am referring to the first inch or two of water above the bottom. This is the area where fish eggs develop.

Here are some of the ways fish species deal with this problem. The bluegill, largemouth bass, and many others construct nests. The male fans the mud and debris to end up with a clean sand or gravel-bottom nest. Next, the female bluegill comes and deposits her eggs in this clean nest. The male stays over the nest, protecting the eggs from predators and removing any debris that might drift into it. When you catch a brightly colored bluegill off a spawning bed, this is a male. He most likely didn't bite because he was hungry but he simply wanted to move your bait away from his nest. Additionally, as the male hovers over the nest guarding it he is continually circulating oxygen rich water over the eggs. Walleyes, trout, and many other species spawn over clean rock or gravel where there is no mud to create a low oxygen problem. These species do not guard their eggs, and it isn't necessary because the tiny eggs fall into the crevices between the rocks where they develop, safe from most predators.

The northern pike also has it over on the musky in this regard even though the two often spawn in similar habitat. Northern pike eggs are very sticky when laid and many stick to vegetation and debris above the muddy bottom. After hatching, the tiny northern pike are attracted to light and swim up and attach to vegetation by means of a sucker-like gland on their heads. They remain attached until the yolk is used up, when they are strong enough to feed on their own. In contrast, musky eggs are not sticky and the fry do not swim up and attach to vegetation before the yolk is used up. Instead, musky eggs and youngest fry remain in contact with the bottom and if the bottom is not clean they do not survive. Successful natural musky reproduction is dependent upon clean bottom spawning areas. So, as lakes age and muck accumulates, the tables are turned against the musky. Stabilization of water levels by dams and addition of nutrients from agricultural runoff or sewage cause increased accumulation of muck. Historical records indicate that the musky was one of the first species to disappear from much of the southern portion of its range; most likely this was due to spawning habitat deterioration as a result of intense agriculture and human development of lakes. The musky has very specific needs for successful spawning and is more sensitive than the northern pike or other fishes at this early stage of life. For these reasons it is imperative that we protect the shorelines, wetlands, and remaining musky spawning habitat here in the heart of musky country.