Program: Aquatic Habitat: What Is It and Why Does It Matter?
Speaker: Thomas Lauer, PhD, Professor of Biology Emeritus, Ball State University, Scientech member
Introduced by: Thomas Lauer
Guests: Nicholas Haunert, Mike Kostruena, Richard Peine, Teresa Sherow, Artie Wolfe
Attendance: 129
Scribe: Thomas Lauer
Editor: Carl Warner

Dr. Lauer is a Scientech member and is retired from Ball State University where he was the George and Frances Ball Distinguished Professor of Biology. He has been honored with several academic awards including the Ball State University Researcher of the Year and the Outstanding Faculty Member. His research interests are in aquatic ecology, invasive species, fisheries, and the Great Lakes.

A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism. Habitat has four major components: places to eat, rest, hide, and reproduce.

Stream habitat components may include such things as streamflow discharge, water quality, energy (food) sources, physical structure, and riparian influence. Using Pacific salmon and their lifecycle – egg, alevin, fry, smolt, adult, spawner, post-spawner as an example, each individual life cycle aspect requires specific habitat components. Eggs need fresh flowing water, yet need to be covered in order to not be eaten until they develop (2-3 months); fry need small insects as food; adults need large quantities of food; and spawners need shallow bottoms with gravel as spawning nests. A disruption or change in these habitat components can be devastating to an organism and can break the life cycle ultimately resulting in a reduction or loss of the species. A problem Pacific salmon face is the large number of hydro-electric dams (e.g., the Columbia River Basin). These dams block access to spawning areas for adults and change flowing water to standing water immediately behind the dam. Both of these are good examples of a disruption in the habitat needs for these fishes.

If we could summarize, each species needs specific habitats for each component of its life cycle. When habitats change, the organisms change. Typically, these changes are not for the good.

Using an example from one of my student's (Nick Haunert) MS thesis research and on a more local level – "Habitat Selection of Stocked Age-1 Muskellunge in Eagle Creek Reservoir"

Eagle Creek Reservoir was constructed in 1968 and used as a water supply impoundment and for flood control. It is 1350 acres in size and has been stocked with several sport fishes, including Largemouth Bass, White Crappie, and Channel Catfish. There are also a number of "rough" fishes, including Gizzard Shad and Common Carp. The Indiana Department of Natural Resources (DNR) management strategy for a lake of this character is to stock predator fish that will eat the rough fish, effectively trading unwanted species for more desirable ones. The DNR has stocked in Walleye, Hybrid Striped Bass, White Bass, and Muskellunge (muskies) in this effort over the years.

Most recently, there has been some concern about whether the muskies were doing what was intended – eating only the rough fishes and not eating the other sport fishes. To answer this question,

a study was undertaken in 2012-2014 by a graduate student Nick Haunert. Fish were sampled (>3000 were caught), but not a single musky. The objective of the study was then changed.

The new objective was to radio tag fish that were stocked and follow them around the reservoir to determine where they were locating, specifically the type of habitat. In March 2015, 40 one-year-old muskies with radio tags were stocked in the northern end of the reservoir and followed until December 2015. Each fish carried a unique signal and thus, individual fish identification was possible, along with the specific location of the fish. At the same time, a lake wide assessment of the habitat was completed.

The results indicated that muskies were highly associated with timber and wooded habitat in the reservoir. This habitat only comprised 3% of the reservoir surface area. Approximately 95% of the surface area was mud/sand and no muskies were associated with this habitat. Timber would be associated with the eating, resting, and hiding components of these young fish. Enhancing or expanding the timber in the reservoir would likely enhance the musky population in Eagle Creek Reservoir. A reduction in the timber would likely have a negative effect on the musky.

With this Eagle Creek Reservoir example, one can relate “habitat” to the type and quantity of organisms found.

A change in eating, resting, hiding, and reproduction habitat = organism change.
A change could mean increase or decrease in existing organism abundance/diversity.

IDNR fisheries biologist Nicholas Haunert and Thomas Lauer