29-Sep-07

Salmonid Fish of the Boyne River

The Boyne River elicits varied responses from observers. Some will delight in the complex patterns produced by the flowing water. Tongues of current appear, playing over the shifting patterns of stream structure illuminated by sunlight and distorted by ripples on the water surface. Here and there are backflows, tiny whirlpools, bubbles, and the disruption caused by water tugging on hanging vegetation. Others may imagine the varied insects, amphibians, reptiles, birds, and small land mammals supported by the richness of the river. Some will see the great variety of flowers, plants, and trees that wetland environments produce. A few carefree individuals will only be aware of the inconvenience of a misstep resulting in an unscheduled emersion. What I see are the cold-water fishes known as salmonids that are found here. These are the members of the true trout, the char, and the salmon groups of sport fishes. Thoughts of the equipment, specialized knowledge, skills, and concentration required for fly-fishing occupy me. These are ever appealing. The memory of the occasional prize removed for the table can only be considered a bonus. The wise will realize that Boyne City would not exist in its present location without the ever constant river which was so necessary in establishing a frontier settlement.

The Boyne River either, by nature or by man's intervention, has been home to a variety of the fish from the family Salmonidae. These are grayling, white fish, char, trout, and salmon, which we will visit individually. This grouping of fish is particularly interesting, because for some unknown reason during their evolution they developed chromosomal tetraploidy, that is, they have four copies of each chromosome, whereas all other fish are diploid and have only pairs of chromosomes. This richness of genetic material may explain the many subspecies and strains of rainbow and cutthroat trout.

When European settlers arrived at the Boyne River there were only native grayling and brook trout. Brook trout and grayling were recorded as sharing the Jordan River. Absent the two Boyne River dams, the Boyne and the slightly larger Jordan Rivers would be very comparable and their head waters are only a few miles apart. This is interesting because it is established that the grayling was the fish of the Lower Peninsula and the brook trout was the fish of the Upper Peninsula. Apparently in this small northwestern corner of Lower Michigan there was a tolerant overlapping.

The **Michigan Grayling**, (*Thymallus arcticus*), which seems to be identical to the Montana and Arctic grayling went into a precipitous decline due to the effects of logging on habitat and the grayling's carefree attitude toward greedy fisherman. By the mid nineteenth century it was extinct. The Michigan DNR has tried to reestablish grayling by numerous plants in the Au Sable, Jordan, and Cedar rivers. These have been uniformly and rapidly unsuccessful. Reports indicate that the grayling was an exceptional table fish with a suggestive taste of thyme, hence the scientific name. I had an opportunity to catch numerous grayling on dry flies in Russia. I

found them to be eager, strong fish that put up a vigorous but brief fight. In color and form they were spectacularly beautiful. Grayling are small fish, averaging only eleven to twelve inches. Fifteen inches would be a very large grayling, indeed. We released them all so I cannot comment on the taste.

Grayling

So now we can discuss the fish that still inhabit the Boyne River and offer a sport fishery. A short note about the history and characteristics of each follows. As a general rule the salmonidae that arose from the Atlantic basin and the salmonidae that arose from the Pacific basin have sufficient similarities within the group and sufficient differences between the groups to be classified in two separate genera. Rather than classify these fish on the basis of life cycle behavior or appearances, the scientists who make the decisions have classified these fish primarily on the basis of teeth and the bones in the head. The Pacific fish genus is *Oncorhynchus*, which refers to the large "kype"or hooked jaw that is characteristic of breeding male salmon, rainbow trout, and cutthroat trout. The Atlantic fish are only two members, the Atlantic salmon and the brown trout, with the genus name of *Salmo*. The third group of fish, distributed in a circumarctic manner, is the char which consist of five members: lake trout, brook trout, arctic char, Dolly Varden, and bull trout. The genus name is *Salvelinus*. The word char is derived from the old Celtic word "charre" meaning blood red, referring to the brilliant spawning colors of the male members of this species. The Boyne River hosts the brook trout, brown trout, rainbow trout, Chinnook salmon, and Coho salmon. All of the salmonids were originally limited to the Northern Hemisphere.

With the exception of the lake trout that spawns on deep water reefs, the Salmonidae demonstrate great interspecies spawning similarities with apparent variations due entirely to local factors involving the time of year, amount of daylight, and water temperature. A ripe female uses her caudal fin to produce a depression, known as a "redd" in the river bed by removing sand and sediment, leaving a gravel base to receive the fertilized eggs. When the female is ready, one or more males come beside her and release a cloud of milt as the eggs are expelled and fall down into the recesses in the gravel. The eggs are sticky to aid in adhering so they are not washed away. The eggs need to be exposed to flowing cold water to provide a continuous supply of oxygen, emphasizing the importance of keeping our rivers free of excess sand and sediment. The females watch over the "redd" for a period of time and then, in the case of char and trout, move on. They may return to spawn another year, whereas the Pacific Salmon always die

and float away to enrich the stream. Salmonidae eggs are larger than most fish eggs. When the eggs hatch the young, known as "alevin," have the yolk sac remaining attached for about one month. During this time the alevin absorbs nutrients from the yolk sac while it adjusts to feeding on river fare. Because the yolk sac is so large, when it is absorbed, the fish enter life as "fry" at a much larger competitive size than other species.

In the fry stage the fish begin to demonstrate profound interspecies behavioral differences. Some immediately begin their life's migration. Chinook may travel as much as one thousand miles to reach the ocean. Other salmon do not migrate until their second year and some fish migrate only locally or not at all. The life span of most salmonids is six to seven years, although in colder climates they grow slower, older, and larger. For the first two years of life, salmonids display a species specific pattern of vertical round or oval markings known as "parr markings" and are then known as "parr." A salmonid is said to become a "smolt" when it migrates down out of its natal river. Salmonids eat primarily aquatic insects. If they grow very large they will shift to larger prey such as invertebrates, crustaceans, and other fish. This may allow a fish to grow very large and become independent of predators.

The nature of the "homing instinct" of trout and salmon has been questioned since the first studies. It is now believed that the Oncorhynchus genus uses celestial navigation and interpretation of the earth's magnetic field to find its home river. Magnetite, ferric sulfate, granules present in the nasal cavities seem to confer this ability. Once in the home stream the salmonids exercise an acute sense of smell to select the tributary in which they were born.

The best way to identify these fish is to realize that salmon and trout have dark spots on a light background. In the case of brown trout the spots may have other colors. The Coho salmon has gray gums while the Chinook salmon has black gums. Char have light spots on a dark back ground with the brook trout having unmistakable vermiculations on its back and colored spots.

Eastern Brook Trout, *(Salvelinus fontanalis)*. The brook trout has been in the Boyne River throughout modern history. It is a char along with its relatives: the lake trout, Dolly Varden, bull trout, and the arctic char. Brook trout continue to be the major species in the tributary streams particularly of the south branch. With effort a careful bait fisherman can still be successful with fish up to twelve inches.

Brook Trout

Brown Trout, *(Salmo trutta),* up to eighteen inches can be found in the Boyne River, particularly in the north branch and in the river between the two dams. The brown trout is a true alien having been brought from Germany in 1873 and planted first in the United States from a railroad trestle into the Baldwin River, a tributary of the Pere Marquette River. It was known as the German Brown Trout and was regarded with disdain by early fishermen. Now that it has been found to grow larger and be much more sophisticated than brook trout, fishermen have eagerly embraced this fish and few would be willing to give it up.

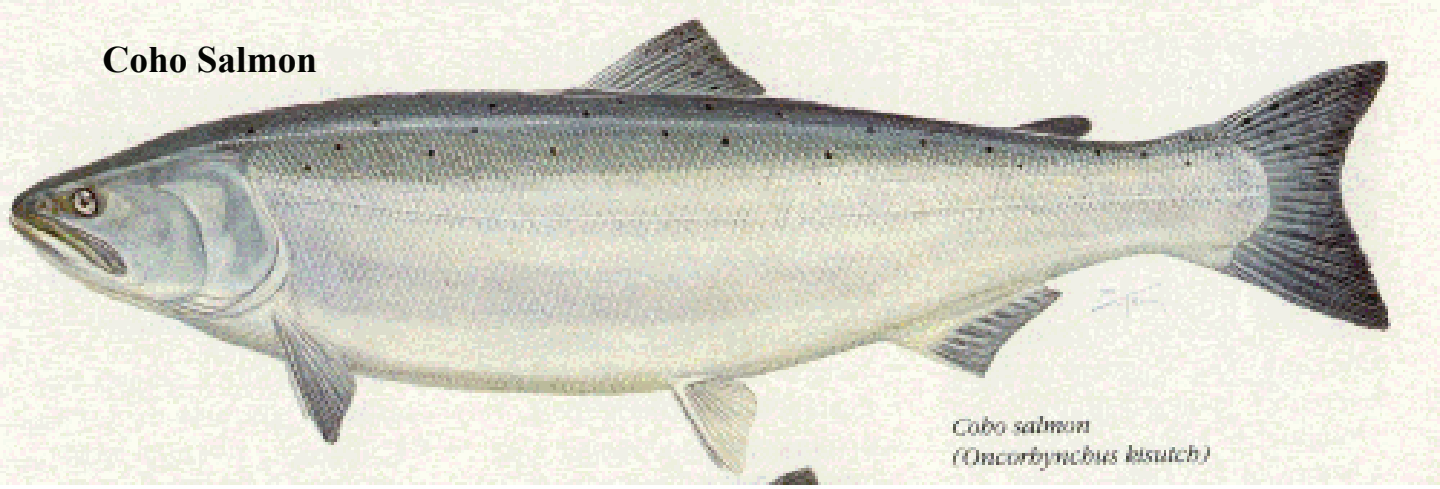
Brown Trout

Rainbow trout, (*Oncorhyncus mykiss),* are also alien trout, originating in the Pacific basin. They have become distributed worldwide and have great commercial value. In The Boyne River rainbow trout are restricted to the lower river below the Boyne USA dam. In streams rainbow trout grow to twelve to sixteen inches. Lake run rainbows may exceed twenty-five pounds. Rainbow trout seem to be segregated into two groups. Stream rainbow live their entire life in streams and rivers. A second group, often called "steelhead," after two years as parr, smolt into a large body of water where food is more plentiful and grow to great size. After years of controversy researchers have found that, although genetically identical, the two groups have certain biochemical differences and that the vast majority breeds true. That is to say that the stream trout breed with stream trout and steelhead breed with steelhead. This is accomplished primarily by separation in time and space during breeding. So the groups with different behavioral characteristics are separated by environmental influences.

Rainbow Trout

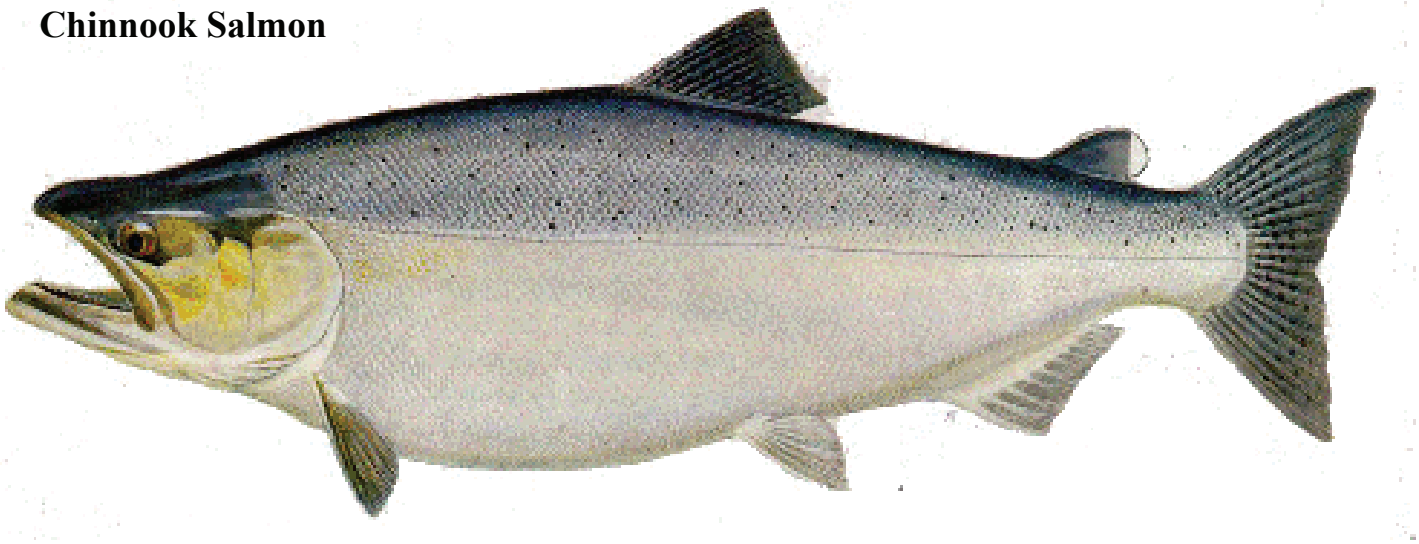
Coho Salmon, *(Oncorhyncus kisutch),* is one of the two salmon that can be found in the Boyne River isolated by the lower dam. They grow to six to ten pounds. After hatching, coho parr remain in the river for over one year and throughout their parr stage. During this time they compete with native trout for food. The other Pacific salmon are the chinnook, chum, pink, and sockeye salmon. All of the Pacific salmon are considered to be "anadromous", meaning that after birth in freshwater they migrate to salt water where they feed extensively, grow large, and prepare to return to their natal stream where they spawn and die. The coho of the Boyne River of course go to the great lakes instead of salt water and are therefore technically "adfluvial" but continue to be described by the more familiar term. After overfishing to supply protein to a nation at war in the forties and the simultaneous onslaught by the sea lamprey, the lake trout of the lower great lakes became extinct. This was a permanent irretrievable loss of a gene pool. As a result the population of another illegal immigrant, the alewife, exploded until they comprised 98% of the weight of great lake fish and the sport fishery disappeared. A yearly summer die-off of alewives piled up on the beaches, unsightly and malodorous. Dr. Howard Tanner, MDNR Fishery Chief, studied the problem and decided to begin plants of coho salmon in selected river mouths of the great lakes in 1967. This was, "just what the doctor ordered." The salmon ate alewives, and grew fast and very big, completely reviving sport fishing and rapidly controlling the alewives. The MDNR continues these yearly plants. Coho can be recognized by having black spots and gray gums.

Coho Salmon



Chinnook Salmon, *(Oncorhynchus tshawytscha)*. Chinnook or "king" salmon plants were begun soon after the coho and continue today and they are the salmon seen most often in the Boyne River where there most certainly is natural reproduction. They offer certain advantages. They leave the rivers earlier and require less hatchery time. They stay in the great lakes an additional year and become much larger, weighing ten to twenty-five pounds. This makes them popular with fisherman. The great lakes fishery depends on these salmon and with continued plants and natural reproduction they are here to stay.

Chinnook Salmon



Well, what about fishing in our Boyne River? The fish are there. The major problem, as in so many of our rivers, is access. It is important that fishers seek permission to fish in the river. Avoid trespass. It will make you feel better. Good stewardship may well allow landowners to feel comfortable granting access to well mannered fisherman on their portion of the river. We can always dream.

Reference, Behnke, Robert J. Trout and Salmon of North America, The Free Press, A Division of Simon and Schuster, Inc, 1230 Avenue of the Americas New York, NY 10020

Images: Kraft, C.E., D.M. Carlson, and M. Carlson, 2006, Inland Fishes of New York, (Online), Version 4.0 Department of Natural Resources, Cornell University, and the New York State Department of Conservation. jas