



Hey, that's still not a trout:

GETTING TO KNOW YOUR KNOTTYHEADS

by Jacob Rash and Luke Etchison

If you are a regular reader of **The Drift**, you are probably wondering if this column will ever have an article focused on trout exclusively. Of course, it will, but that is a fair question given the ground we have covered to date. The previous columns and range of topics are due to all of the amazing things associated with our coldwater fisheries outside of just trout themselves, so truthfully, it seemed (and seems) appropriate (and definitely fun) to take advantage of the freedoms allowed by the editors and to explore our aquatic resources. With that said, we wanted to expand upon our piece in the Fall 2019 edition of **The Drift** and share even more info about some of the cool fish you catch now and again fly fishing.

If you remember last time, we discussed Rosyside Dace and Warpaint Shiners and their potential diet and habitat overlaps with trout. Although those are truly fascinating species, our goal within this article was to embrace the theme of collaboration shared throughout this edition of **The Drift** by highlighting the eco-engineers of our mountain streams: chubs.

Many folks may have seen or heard tales of the chubs (“knottyheads” or “hornyheads” as they’re more commonly known) being caught while fishing streams in NC. These truly are a cool group of fishes that will require a decent amount of information to capture their descriptions and behaviors, so please don’t be intimidated by the amount of information that follows. We know that not everyone will catch one of these fishes, but our goal is for you to find this information not only informative but as interesting as

these species are themselves. To do that, we don’t have to look much farther than the name these fishes are grouped into: “knottyheads.”

First, what is a “knottyhead?” Knottyheads are a bunch of species that have been lumped together by the identifying characteristic of horns, knots, or what are technically called tubercles. These fishes can vary in size, color, and even “knottiness.” Typically, tubercles are only present in male fish close to spawning season. Tubercles are made of keratin, which is what hooves and fingernails are made of, and these breeding tubercles function like antlers in deer and are used for fighting and attracting a mate.

There are many fish species that grow breeding tubercles ranging from minnows, darters, and topminnows. Even some trout and salmon species (e.g., Lake Trout, Artic Grayling, and Huchen) are known to get these breeding tubercles, even though they may not be as obvious as some of our local knottyheads.

In western North Carolina (WNC), there are five main knottyhead species that grow large, obvious tubercles: Bigmouth Chubs, Bluehead Chubs, Creek Chubs, River Chubs, and even Central Stonerollers. However, finding and identifying them truly depends on what river basin you are in or which side of the continental divide you are on.

In most streams in WNC you have a chance to come into contact with Central Stonerollers and Creek Chubs. The other three species definitely depend on where you are fishing at.

Central Stonerollers



Image 1: Central Stoneroller males schooling with Tennessee Shiners in Cartoogechaye Creek, Little Tennessee River Basin.



Image 2: Male Central Stoneroller with breeding tubercles.



Image 3: Closeup of male Central Stoneroller breeding tubercles present on its head.



Image 4: Closeup of male Central Stoneroller dorsal fin with breeding tubercles on first ray.

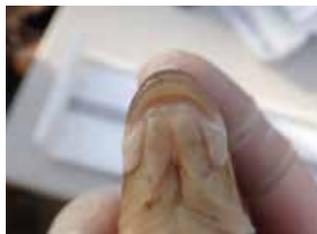


Image 6: Closeup of Central Stoneroller mouth.

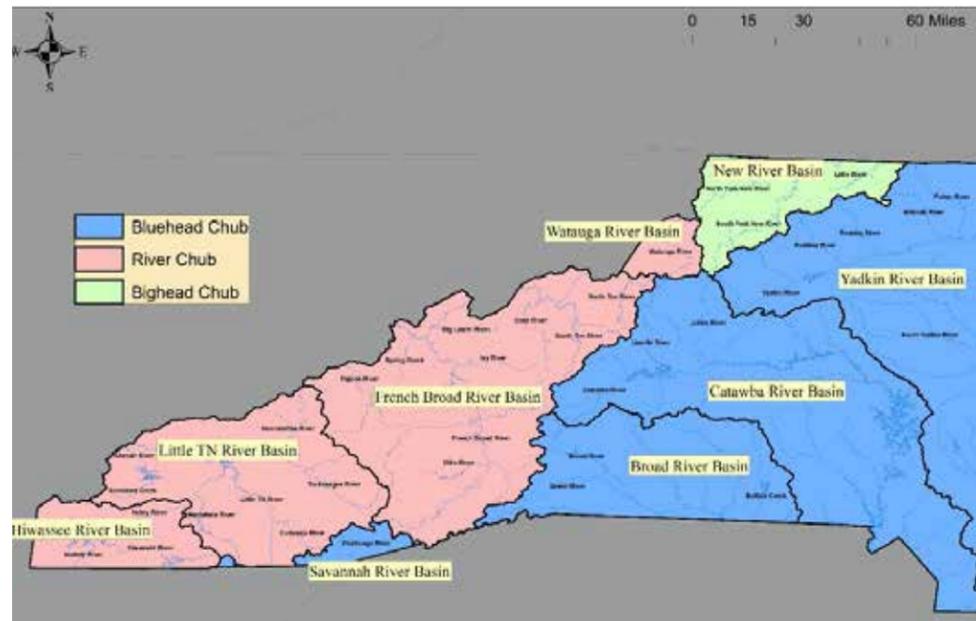


Image 7: Female Central Stoneroller.

Central Stonerollers are a minnow species that often travel in large, mixed-species schools (Image 1). Breeding males can be distinguished easily from other knottyheads by the presence of tubercles on much of the body (Image 2) including the head (Image 3) and dorsal fin (Image 4). However, a non-breeding male and female Central Stoneroller (Image 5) cannot be identified by these characteristics. The best trait for identifying a Central Stoneroller is the presence of a firm cartilage shelf on the lower lip that is hard and used for scraping algae off of rocks, which is where the term “stoneroller” is from.

The remaining four knottyheads are all chubs that can grow up to around 12 inches and are commonly caught while fishing for trout and other sport fish.

Native ranges of Bluehead Chubs, River Chubs, and Bigmouth Chubs in western North Carolina. →



Creek Chubs

Creek Chubs can be found anywhere in WNC but are easier to differentiate from the other three chubs considered knottyheads. Unlike the other knottyheads, Creek Chubs have a dark spot on the front of the dorsal fin (the large fin on their backs; Image 8). These fish are commonly caught fishing and can easily reach over 12 inches in length.

Here is where it gets a little more challenging. The last three knottyheads can be extremely difficult to identify if they are side by side. Each species has a similar diet, mouth position, and they all vary in coloration. Luckily for those of us trying to identify them, there are few places that these species co-occur, so identification really takes into account which river basin you are in. Unfortunately, all three species can be found in the New River basin from what is likely due to the movement of fishes between basins by humans (something we'll discuss further in future columns).



Image 8: Male Creek Chub in early spawning condition.

Bluehead Chubs

Bluehead Chubs are native to Atlantic slope river basins. This includes the Savannah, Catawba, Broad, and Yadkin Pee Dee river basins. Bluehead Chubs often have tan or yellow fins, except for some in the Savannah River watershed show red fins (Image 9) outside of spawning season. Spawning males grow large tubercles above the nostrils and often have a bright blue head (Images 10–11), and this position of the tubercles in a breeding male is the easiest way to differentiate these three species.



Image 9: Young Bluehead Chub from the Toxaway River, Savannah River Basin.



Image 10: Male Bluehead Chub with spawning tubercles and colors. (Photo Credit: NCFishes.com).



Image 11: Male Bluehead Chub near spawning condition in the Savannah River Basin.



Image 12: Female Bluehead Chub. (Photo Credit: NCFishes.com).

River Chubs

River Chubs are found in streams that flow into the Tennessee River from WNC; this includes any stream in the Hiwassee, Little Tennessee, French Broad, and Watauga river basins. River Chubs are easiest to identify when they are a spawning male like Bigmouth and Bluehead Chubs. They can reach up to 13 inches and are found anywhere from medium-sized streams to larger rivers. A breeding male grows large tubercles below the eyes on the snout. Their head also becomes very swollen and turns pink, purple, or red when they are ready to spawn.



Image 13: Young River Chub from the Little Tennessee River Basin.



Image 14: Male River Chub from the Big Laurel River, French Broad River Basin.

Bigmouth Chubs

Bigmouth Chubs are similar to the other chub species, but they are only native to the New River basin of WNC and grow over 10 inches. As the name implies, this species has a larger mouth than its counterparts and it has a slightly more robust body shape. Unlike Bluehead Chubs and River Chubs, this species has many smaller tubercles above and below the nostrils. Similar to a River Chub, the Bigmouth Chub has a large pink to purple swollen head (Image 15) when it is ready to spawn.



Image 15: Male Bigmouth Chub from the New River in early spawning condition.

Visual guide to the chubs of western North Carolina. Images obtained via Jenkins and Burkhead (1993).

Bluehead Chubs

Let's talk tubercles: Tubercles on this species are only found above the nostrils (noted by an arrow). Tubercle scars or often visible outside of breeding season.

River Chubs

Let's talk tubercles: Tubercles on this species are only found below the eyes on the snout. Tubercle scars or often visible

Bighead Chubs

Let's talk tubercles: Tubercles on this species are found above and below the eyes and nostrils (noted by an arrow). Tubercle scars or often visible outside of breeding season.

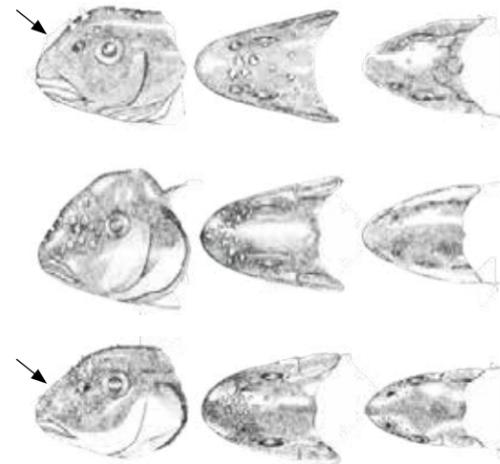


Image 16: Breeding tubercles of male Bluehead Chub (A.), River Chub (B.), and Bigmouth Chub (C.).

Roles of Knottyheads in Our Ecosystems

Okay, hopefully we have established how cool these fishes look, but they are much more than unique-looking fish. All five of these species play a significant role in maintaining our stream ecosystems. We mentioned earlier they are the eco-engineers of our mountain streams, and they received this title given how they each modify habitats by building spawning nests that are often used or required by many other fish species. The importance of nest-builders like these species has been noted by many cultures including early Native Americans in the Hudson Bay area who called them "Awadosi," which translates to "stone carriers."

Male River Chubs, Bigmouth Chubs, and Bluehead Chubs build large pebble mounds used for spawning. These mounds vary in size and are typically built by a larger male to attract females. As noted above, these chub mounds are used by many other species for spawning and play a critical role in stream ecology (take a look at Images 17–19 to see this community effect in action).

Without the mounds built by these engineers, many of our aquatic species would have lower reproductive success or not reproduce at all. Not only that, but due to their "engineering," they modify habitat which is attributed to increasing species diversity and abundance of aquatic insects and fishes in the streams they occupy. Many additional species will use the nest (or "mound") for spawning and the associated school of fish for protection. Some fish species are so closely tied to chub mounds that they will not begin spawning until chub milt (sperm) is present in the mound.

Even Stonerollers and Creek Chubs enjoy the added benefit of a mound in a stream. These species don't require a chub mound for spawning but are often found building spawning pits in the bases or sides of large chub mounds built by River Chubs, Bigmouth Chubs, and Bluehead Chubs in WNC.



Image 17: River Chub mound being used by Warpaint Shiners, Tennessee Shiners, and Central Stonerollers in the South Toe River, French Broad River Basin.



Image 18: River Chub mound being used by Saffron Shiners and Tennessee Shiners in the Little River, French Broad River Basin.



Image 19: Mountain Redbelly Dace, Saffron Shiners, Redlip Shiners, and Roseyside Dace using a Bigmouth Chub mound in Helton Creek, New River Basin.

Trout Conservation Flows Downstream

As we noted in our previous article, these are but a few of the native species that live here in NC, and although taxonomy can be challenging, we hope that we've been able to help with the identification and awareness of additional fishes in our waters. We also know that anglers may not encounter these fishes on a regular basis, but you might (and given how big they get...maybe you should).

Nevertheless, just like the two minnow species we shared previously, these knottyheads are interwoven into the health of our aquatic systems. There isn't a reader of this column that doesn't appreciate the value of our State's aquatic resources, and for us and our interest in trout, we remain in a unique position to have our coldwater conservation efforts provide an expansive impact. This text is taken from our previous article and remains true today: ...it is important to remember that trout conservation flows downstream. In the end, the good work done to help trout and their habitats has impacts beyond our favorite fishing holes.

Just like the knottyheads, our actions have far ranging impacts beyond their immediate goals. We're fortunate that our efforts directed towards trout have the opportunity to have a much larger conservation footprint to help everything lower in a watershed. In the end, trout conservation really does flow downstream.

References

- Jenkins, R. E., and N. M. Burkhead. 1993. *Freshwater fishes of Virginia*. American Fisheries Society, Bethesda, Maryland.
- Kratt, L. F., & Smith, R. J. F. (1978). Breeding tubercles occur on male and female Arctic grayling (*Thymallus arcticus*). *Copeia*: 185–88.

NCfishes.com

No doubt you're somewhat interested in fishes if you've made it this far, so keep an eye on this developing website that helps with identification of North Carolina's fishes.

