

Snake River Chinook retain more ancestral genetics

Genetic diversity is essential to long-term adaptability and survival of any species. By that measure, upper Columbia River Chinook salmon are in deep trouble. A new study, published Jan. 10 finds that within the past century, the Chinook salmon in the upper Columbia River have lost almost 70 percent of their genetic variation.

But their Snake River cousins have lost only about 30 percent of their genetic variation, making Snake River Chinook a potentially more resilient fish.

Bobbi Johnson, a graduate student at Washington State University, compared the genetics (mostly mitochondrial DNA) from modern fish with fish remains found at Native American sites. The ancient samples came either from middens (places where encampments piled food waste and scraps) or were supplied to her by the Colville, Nez Perce and other tribes from their archival or heritage materials.

Her 346 ancient samples from the Columbia, Spokane and Snake Rivers included a 7,627-year-old salmon vertebrae found at an ancient fishing encampment site the Columbia at Kettle Falls, Wash. She also used 7,200-year-old fish remains from near Spokane Falls, and an estimated 2,500- to 5,000-year-old fish backbone from Granite Point on the Snake.

Younger samples included a 1,450-year-old site at Harder on the Snake, and a second, 1,150-year-old site near Kettle Falls. All of the ancient Columbia River samples came from sites above Grand Coolee



GUEST COLUMN

Ellen Bishop

Dam, which ended salmon runs in the 600 miles of main-stem river above it.

Johnson also analyzed fin clips of 379 contemporary Chinook from the Columbia, and Snake. Her results confirmed what biologists have long suspected: The genetic diversity of Chinook salmon has declined significantly.

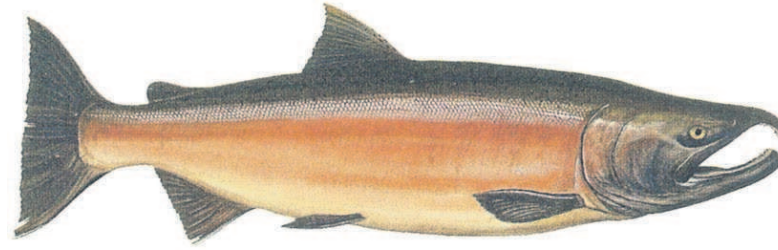
The research revealed other things as well. Prior to European settlement, spring, summer and fall runs of Columbia River Chinook swan (and spawned in) the entire river. Today, the Columbia River Fall Chinook spawns only in Hanford Reach.

The samples from Spokane Falls came from six different lineages of Chinook. Today, Chinook are extinct in the Spokane River, blocked in 1911 by the construction of the Little Falls Dam. Their ancient DNA held far more genetic diversity than modern Chinook.

Most of Johnson's study examined mitochondrial DNA. She and her partners in the study tallied details from the same segment of each fish's genetic code.

Haplotypes (groups of genes passed down through generations) figured prominently, as did determination of nucleotide diversity (an estimate of overall genetic variation.)

While not a way of defining "sub-species," this information shows



Submitted photo

A spring Chinook salmon, also known as an Alaskan king salmon.

how closely related different individuals are. Present-day Columbia River Chinook are sort of all married to their second cousins. More than 2/3 of their genetic diversity has vanished.

Genetic lineages that were present 1,000 years ago are absent today. In Snake River fish, the loss is less devastating. Only about 1/3 of the gene variations found in ancient samples are missing today.

The vanished gene sequences likely controlled a range of sometimes-subtle variations in physical appearance (size, color) to behaviors (the length of time at sea, the timing of return). Now lost, these variations cannot be recovered except through mutation or genetic drift.

Why the difference between

Columbia and Snake River Chinook diversity? Johnson has a few ideas.

First, there's the possible influence of pre-Contact Native American harvest. Both Snake River and Upper Columbia River fish would have been caught at about the same percentages at Celilo Falls.

But the Columbia River fish were subjected to another intense fishery at Kettle Falls. It's estimated that the Colville tribe alone harvested almost 300,000 pounds of Chinook at Kettle Falls (on the Columbia) each year.

The Snake River system has no equivalent passage barrier/fishing opportunity. Fish bearing the full spectrum of genetic variation were able to navigate the Snake River and its tributaries to reach their spawning grounds.

LEARN MORE

news.wsu.edu/2018/01/10/chinook-salmon/

journals.plos.org/plosone/article?id=10.1371/journal.pone.0190059

Johnson also believes it likely that the Nez Perce and other tribes along the Snake included a greater diversity of other fish (sturgeon, suckers, pikeminnows), thus lowering their total catch of salmon and helping the Chinook retain a greater amount of genetic diversity. Ancient samples from the Snake river included these species of fish along with Chinook and other salmon.

Once Europeans arrived, they tended to target the large Chinook that were bound for the upper Columbia, thus further depleting the fish's genetic pool. More contemporary factors in the loss of diversity include the introduction of millions of hatchery fish and the overall challenges of navigating today's oceans.

Whatever the reasons, Snake River Chinook have retained a greater percentage of their genetic diversity than their upper Columbia cousins. They are, potentially, more resilient fish. And that is good news for us and for the fish.

Ellen Morris Bishop holds a doctorate in geology and specializes in the exotic terranes of the Northwest. Pacific Northwest landscapes — their geologic history and ecosystems — are her specialty.

I hope I'm never 'nonessential'

I've lived through a couple of government shutdowns over the years.

There's always talk of "nonessential" government functions being impacted. Heaven knows, if Kim Jong Un sends a nuclear missile our way, we want the personnel that track those things on duty.



WAHL TO WALL

Paul Wahl

Which begs the question, "Why does the federal government have nonessential employees and who says they are nonessential?"

It's a lot more clear from a private sector standpoint. I can't think of one person at the Chieftain who could be considered nonessential. Each one is vital to the process of producing and distributing a weekly newspaper.

Let's hope the latest silly season in Washington, D.C., has passed by the time you read this.

REMEMBER WHEN Facebook was for young people? I do.

Oh those silly young folks posting about what they had for lunch and adding videos of their friends acting giddy.

Fast-forward 15 years and the young people have moved on to other platforms.

This fact hit home with me rather dramatically a while back when I checked to see how the various posts on the Chieftain Facebook page were doing.

Several times I came across this message: "Your video is popular with women ages 65+." They call it "the graying of Facebook."

I remember when newspapers first began using Facebook as a way to communicate with the community. We were told it was of utmost importance because it was a

way to reach the "younger generation" and expose them to the newspaper.

We've come full circle. Our print demographic — older women — is now the median Facebook demographic. So where do we go to reach those younger folks we were told were so important to our future existence as newspapers?

In order of use, Instagram, Snapchat and Twitter. I have never ventured into the Instagram or Snapchat world.

I have tweeted but it never seemed like the way to reach people with an important message.

Around three quarters of American teens age 13-17 use Instagram and Snapchat equally. Facebook is still in the running along with Twitter.

I couldn't find a convincing statistic to report on whether social media use as a whole is decreasing, increasing or stagnant. I do know there is a counter-culture of young people who are unplugging and reverting back to reading books printed on paper. Imagine that.

I guess it's true that the more things change, the more they stay the same.

KUDOS TO everyone who had a part in the Eagle Camp Extreme Dog Race last week, whether participant or spectator. It certainly brought life to our corner of the world during an otherwise rather gray period weather-wise.

Everywhere you went in the county you saw signs welcoming the mushers and everyone else affiliated with the competition. I'd venture to say most of them had a terrific time.

I was particularly thrilled to watch potential journalists in action during the vet check in Enterprise. Young people with pencils and notebooks asking insightful questions of the mushers. May your tribe increase.

So who really is the national champion?

Pop quiz: What unconventional opinion do Wesley Colley, Scott Frost, Rick Scott and John McColgan have in common?

Before you venture a guess, let me hazard one: You probably have no idea who most of those people are. Right? Good, score one point for me.

In fact, as I write this column, I take some delight in the notion that at this very moment, I might be the only person in the universe who knows who all four of them are, let alone what singular belief we hold in common.

Okay, time's up. What all the aforementioned gentlemen, myself included, share is that we believe the University of Central Florida deserves to be recognized as the 2017 College Football National Champion.

Using both my ESP and my ESPN, I assume that if you are even a casual fan of college football, you are now saying to yourself, "What is he talking about? Alabama won the National Championship in the game against Georgia, after beating Clemson to get there on New Year's Day." Kindly score one more point for me for my guess.

Before I begin to decipher the mysteries of this curious football column, let me turn back the clock 20 years to review how national champions have traditionally been crowned in college football.

Prior to 1998, champions were determined by national polls completed by college coaches or by news outlets such as the Associated Press and USA Today. While there was usually a champion by consensus, sometimes there were split decisions among the judges.

So beginning in 1998 and continuing through 2013, the Bowl Championship Series was employed to determine in a head-to-head contest, which of the nation's two front-runners would emerge as the national champion.

While polls were still used to winnow the field down to two teams, computer analytics were also introduced by mathematicians and scientists in an effort to reduce the element of human bias in the decision-making.

One of the contributors from the scientific community was astrophysicist Wesley N. Colley from the University of Alabama (in Huntsville, not Tuscaloosa). In 2001, he developed a rating system based primarily on wins and losses while also factoring in strength of schedule, but with no reliance on considerations such as margin of victory or conference membership or region of the country.

His computer model, known as the Colley Matrix, continues to rate all NCAA Division I football teams, with weekly updates based on the records of all teams.

Whether human polls or computer models, there was still considerable



POLITICAL PHILOSOPHY

John McColgan



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debate over whether the top two teams were being correctly chosen each year to compete in the BCS title game. In 2011, for instance, I argued in a Chieftain column that Oklahoma State should have been one of the teams in the title game instead of Alabama, but an all SEC championship game between LSU and Alabama was what many disgruntled college football fans had to settle for.

Demands for a playoff system, along with support for it from a popular President Obama, eventually swayed the college football powers to develop a four-team playoff, which we have seen employed since 2014. A seven member committee now chooses which teams emerge as the final four, and most years, most fans seemed to agree that the committee probably got their selection just about right.

But not this year. Following Alabama's loss to Auburn in the rivalry game known as the Ironbowl, previously undefeated Alabama dropped from 1 to 5 in the College Football Playoff rankings, while 2-loss Auburn vaulted past undefeated Wisconsin and UCF all the way to a No. 2 ranking, right behind 1-loss Clemson.

The committee appeared to be practically falling over itself to insure that there would be at least one SEC team in the final four, and the expectation was that Auburn, which had already beaten

Georgia, would do so again in the SEC Championship game.

But when Georgia won that game, the rankings of 1-loss conference winners Clemson, Oklahoma and Georgia were all set at 1, 2 and 3, and most observers expected the winner of the Big 10 championship (either Wisconsin or Ohio State) to emerge at the 4 spot.

But when 2-loss Ohio State beat Wisconsin, the door was left open to allow a third place SEC team, Alabama, back into the playoff picture in the No. 4 ranking. Meanwhile a still undefeated American Athletic Conference Champion, UCF, was largely ignored by the committee, posting a final ranking of No. 12.

But some surprising things happened in the bowl games this year. The vaunted SEC finished with an unimpressive bowl season record of 5-6, despite Georgia and Alabama closing out the playoff championship game. Meanwhile the underrated Big 10 kicked butt and took names, finishing their bowl season with a remarkable 7-1 record. And even the lowly AAC posted a better bowl record than the SEC, finishing their games at 4-3.

But most significantly, in the Peach Bowl, UCF beat Auburn, thereby capping their season as the nation's only undefeated Division I team, and beating the one team — Auburn — who had already beaten both the teams, Alabama and Georgia, that ended up in the title game.

So the very next day, UCF coach Scott Frost began proclaiming proudly to anyone who would listen that his undefeated team had been shafted by the playoff committee. The university president followed Frost's lead, and a banner was unfurled over their stadium proclaiming UCF as the national champion.

The university even agreed to pay all coaches and assistants national championship bonuses. A block party and a parade were held in downtown Orlando, and the UCF student body celebrated at Disney World.

On Jan. 8, the same day that Alabama beat Georgia in the national title game, the Florida state legislature recognized UCF as the college football National Champion. Gov. Rick Scott signed the proclamation into law.

On Jan. 9, the Colley Matrix system released final rankings for the 2017 season, vindicating UCF by listing them as No. 1 and Alabama as No. 2. All of us fans who love rooting for underdogs can celebrate UCF's spotless season, while also hoping that it might lead college football's governing honchos to give more credit to smaller conferences and to expand their playoff berths to eight teams. Let the Knights roll back the Tide!

John McColgan writes from his home in Joseph.

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