

Chum Salmon feat. Jesse Morin and Michelle George

Hey to all you fish enthusiasts out there. Whether you're an avid angler or just curious about fish, we'd like to welcome you to fish of the week. It's Monday, December 20 2021. We're excited to talk about all the fish. I'm Katrina Liebich with the US Fish and Wildlife Service in Alaska.

And I'm Guy Eroh coming to you this week from the iodine state.

Today, we're taking a special angle on chum salmon. We've got Jesse Morin, adjunct professor at University of British Columbia's Institute for the Oceans and Fisheries. We've also got Michelle George, both from the Tsleil-Waututh Nation and we really wanted to extend a warm welcome.

This is going to be an interesting and a little bit of a different episode because we're basing it both off of a species and a very interesting paper. The author's, two of whom we have here today, are investigating sex selective salmon harvesting, essentially an early form of fisheries management by pre contact Indigenous peoples around British Columbia. I found this article real treat to read because the investigation was so multidisciplinary, they use techniques from archeology, genetics, ethnography, and even traditional fishery science among others. Now, we're living in a time where increasingly people from outside of scientific careers and disciplines want to be able to read and understand science for themselves. But often technical jargon is a barrier. So if you're a teacher or a student, listen to this. Or if you're just someone who wants to increase your scientific literacy, I'd suggest going and reading this because it's sophisticated science, but it's easy to read. I just think this was a great piece of literature. And I'm really excited to get to talk to the two authors about it a little bit more.

So I share Guy's excitement about learning some of the different ways of knowing that are presented in this article, ways of knowing the past and ways to inform the future. And I guess first things first, could either or both of you describe what a chum salmon looks like when they return to freshwater to spawn, including any differences between males and females that might be important to kind of inform this conversation and also give us just a little bit of grounding in this region, and what the landscape and rivers are like.

So if we imagine this environment, you know, it's Burrard Inlet is where we're talking about, which is in the northern part of the city of Vancouver. And it's I think it's the most southerly fjord on the west coast of North America. So on one side of the inlet, it's very steep mountain canyons, a little steep rivers tumbling into them. And then on the south side of the inlet is sort of like a more flatter plane, rolling hills. And then you've got the Fraser River right there, you know, one of the biggest rivers in Canada. And so this little corner of British Columbia here on the Salish Sea, you know, it was occupied for at least 10 to 14,000 years, by Coast Salish people in the past. Archaeologically, we can see really clearly by about 3000 years ago that in the eastern part of Burrard inlet has been filled in with indigenous villages, and people living off the marine resources there especially so we find the remains of these big villages, lots of shells built up, and then in the salmon, bones and herringbone. And so we find evidence of large number of people living almost entirely off marine foods in this environment. So very stable way of life

harvesting salmon, shellfish, herring, hooligan, seabirds, and all sorts of stuff like that. So that just sets a little bit of the background like geographical background and cultural background.

And then so chum, you know, this area, cultural anthropologists have always called this area, this salmon area, right? Because people eat so much salmon, it was the defining feature of their culture, you know, salmon was incredibly important to like bred to Europeans or rice to East Asians, right, this is a staple food that people are eating more or less day in, day out. We know this because we find tons and tons of salmon bones in these sites. And we can analyze the chemistry of the people, the bones of the people to even see that they've got their bones are full of marine protein, right, like 95% marine protein. But archaeologically, we can't tell salmon from salmon. Really, they all look like salmon bones, some are bigger, some are smaller. So if you're very careful when you measure them, you can start to organize them into to size classes: bigger and smaller, and sort of guesstimate what species those are. Chum salmon or something that haven't really obtained a lot of archaeological interest. For whatever reason, I think perhaps it's because of the dominance of the Fraser Sockeye, you know, we're thinking about like 20 and 50 million river going or fish going up that river, but chum have a really important story to tell. And so chum when they return that they're the last salmon to return to their spawning streams at the end of the year. So you can hear in Burrard Inlet what is that probably late October, November, Michelle, when they start coming back up, and they're a big fish, big lean salmon. I think they're the second biggest salmon and clean low fat content. So they're perfect for smoking and drying. Right? They last for a long time through the winter. As they approached their needle streams, they start to change color. The males are bigger than the females as is and then they start to undergo these changes of these. I think the males get these red stripes for like a tiger on their side, and their jaw gets hooked for biting and fighting, perhaps as they're, as they're doing their stuff on the way back up there. So they look really different for one another. And we've got a great image in our paper, they're just boy versus girl. And it's a sort of thing if you're standing at a clear stream or river looking into, you know, a pool of salmon, chums. And when you see one type versus another type, like, it's quite an immediate difference.

Yeah, they get that that hook jaw, really something I always kind of key in on when I see them is something that stands out, it's they're a really cool looking fish with their markings. So that was a nice description. Thank you. We talked with Andy Bassich earlier this fall about fall, chum salmon and the importance to indigenous communities along the Yukon River, which you know, crosses Alaska and into Canada. And I think, Michelle, you know, could you just describe a little bit more how chum are important to Tsleil-Waututh people in British Columbia and the Pacific Northwest today, and maybe just talk a little bit more about how oral history helps span the present and the past connections to these fish?

So chum, like Jesse mentioned, it's good for smoking, which is a really important preservation practice for First Nations in general. So that is something that would carry you through the seasons until the next salmon fishery or hunting or being able to pack it tightly and accordingly. So some places have a smoking site set up by your fishing weir, and in order to have a productive harvest, you would smoke your fish on site, so that you weren't transporting so much resources in your canoe. And because some First Nations don't live by salmon-producing rivers, that became a trade economy, you hiked into further reaches and trade your goods. And even today, currently, we still do those practices and still have,

technically those trade routes. I have family up and down the Fraser River. And depending on what family, we have access to different things, some of my family has access to ooligan and other fisheries, and we have access to crabs and prawns. So there's still a lot of traditional trading that goes on in between First Nations communities. But what I'd like to highlight is that it's technically family. My traditional ways point me to blood ties and not boundary lines. So traditional practices are still being done. The importance of fisheries is very important, not only for harvesting, but sustainability.

Chum was really important for 1000s of years, we can say that with full confidence, absolutely important for 1000s of years. And right now, you know, Tsleil-Waututh has traditionally in the last few decades, we're getting a lot of sockeye from the Fraser River and some Chinook as well. And those stocks are completely imperiled right now they're going down and down every single year. And I don't know if Tsleil-Waututh has gotten a sockeye allocation over the last couple of years. So the sock is off the table really in the Chinook definitely off the table. So I think, you know, this is Back to the Future sort of stuff, I think Tsleil-Waututh need to start looking very seriously at focusing on this chum fishery, because that's what they've got.

Alright, so I'm curious how these people that lived around Burrard Inlet would selectively harvest the males or the females? Why did they do that? And what techniques were they using that allowed them to select from males preferentially?

So in your mind is imagine that we've got these villages sort of on the southern part of Burrard Inlet, and there's little creeks and streams near there. But we suspect that they were doing the major fisheries up at the top of Burrard Inlet called Indian River, that's where the biggest fishery is now and that's where all the Tsleil-Waututh oral history is described people going to and there's another reserve to reserves up there that were defined as a fishing station. So if you ever talked to Tsleil-Waututh people that say, well, that's where we go to get chum, that's where we've always got to go to get chum. And that's where we will always go to get chum as well. And so it's a smaller river, you know, it's not big by any stretch of the imagination, it's clear water, it is rolling it relatively steep gradient over the mountains. And in more recently Tsleil-Waututh history, they set nets, there is a catch them overnight, and you can set a net across the river and scoop up 100 fish in a night. But in the past, I'm quite certain that they built weirs like wooden fence enclosures across the river with stakes driven into the substrate there. And then a lattice sort of attachment, basically impeding the the access of the salmon upstream and guiding them into little basket traps or pens. And if you imagine the fish are funneled forward into a little pen, and then they get into a pen and they can't get out, you just walk up there with a spear or a dip net, and you can see the males and you just spear the males and toss them up. And so then the question is, why would you selectively harvest males over females? And I think there's two really good reasons for that and one builds on the other. So first, they're, they're bigger, and they're meatier. So if you're taking more males out of system, you can actually take more food out of that system without diminishing future returns, right? You maintain stable populations for the next generation. Now, I guess the other interesting thing about it is you can do that on purpose. Or you can do that by accident, right? Even if you're only selectively harvesting the males, because they're bigger. The net result is you can still take more out of that system. I don't think it was by accident. I think people knew exactly what they're doing, because they're managing that river there those series of rivers for, you know, dozens and hundreds of generations. So I'm thinking do they knew exactly what they're doing?

Michelle, you're part of the Tseil-Waututh Nation. I'd love to hear what you know about the intentional management of salmon using the techniques that Jesse just described.

The techniques that Jesse just described are like family teachings and family history that have been passed on through many generations, and I have family across the territory, our people were so smart that you pull a salmon from the river, and they could tell which tributary they went to. And this applied to almost all salmon species. And our families had protocol on what salmon and where they could fish, I have family that even recalls being able to fish sturgeon a certain way and have it actually released back into the waters and did live to be harvested another day. So the family teachings and connections to salmon are really strong. And a lot of people believe that our family were like doctors related to the knowledge of salmon by the colors of the skin to the cycle of life and understanding exactly what Jessie pretty much just said, how you're able to harvest more males. And if you let the females live, they'd give you more fish. And that's like connected to traditional teachings and just cultural understandings of the land and our salmon family. So being able to have that cultural understanding, and then have someone like Jesse, translate it, or make it scientific proof is amazing. Yeah,

it is really cool. How you have this traditional information being passed down generation to generation, and being able to actually, you know, confirm it, I think that's really neat.

Jesse, could you go into a little bit more depth on the paleogenetic techniques that you're using to understand the actual past fishing techniques in management?

It definitely sounds like a question for a geneticist. And I'm not a geneticist. I'm an archaeologist. So we had a great team of geneticists from SFU, including my brother. But really, we're looking at mitochondrial DNA, because it's small segments, and it's relatively easy to extract. In Dongya's lab there at SFU, Dongya Yang, he developed a technique to identify the species of salmon from the mitochondrial DNA. So that was new science in like 2005, or something like that. And now we've got a number of studies have used those techniques in various locations of BC to identify the species. So building on that, identifying the male chromosome in the mitochondrial DNA, so he can identify that and so when we, when we have successfully illicit extracted DNA, we can tell the male versus female relatively straightforwardly now.

So where are you actually finding these bones? And which bones? Are you finding it? I assume you're not just walking I there's a salmon bone? They're pretty small and fine. are you digging a pit? How do you find these little bones?

Yeah, well, that's a really good question. So rather than me digging them, I sort of went to the archives in the museums and institutions of where people have undertaken excavations over decades, when they bagged them all up as they excavate them excavated through hand by hand with little trails and little brushes and whatnot. In the bones. They're primarily vertebrae, theoretically, the DNA is in all the bones. But the these units has been focused on the vertebrae and whole vertebrae as well, too. You know, fish bones are delicate little things. But sometimes, especially with enough shell around them, it makes it nice alkaline sorta soil matrix, and they stay relatively intact. So that a 3000 year vertebrae

can feel pretty much like 200, you know, a two year old or two month old vertebrae. So we look for whole center and they bust them open and just take a little tiny sample from the inside. We do find ribs and head bones or whatnot, but vertebrae, I guess, more robust, they just preserve better. And so you know, we go through these layers of previous excavations, and we find certain layers of interest in you know, the this research is trying to look at across space and across time. So we tried to sample different stratigraphic layers at different depths, knowing that the older layers are at the bottom and then your layers are at the top. And we had a series of radiocarbon dates and also those layers as well too. So we knew what time frame we're dealing with which each sample so I didn't have to undertake any additional excavation for this. This is just going to stuff excavated in really the 70s and 80s, a little bit more recently as well, too, and just trying to extract as much information as we could, right like doing archaeological work is a destructive practice. I once we excavate those things, they're never coming back. So it's great just to go back and make more use of the, of the materials that are already sitting there on the shelves. And in some cases, there's 1000s and 1000s and 1000s of bags of vertebrae. So you know, we analyzed 115 or something here, but there's 10s of 1000s of potential samples out there of salmon and herring and hooligan. You know, these, these fish they preserve quite well in these shellman sites that we get here and Burrard Inlet, across most of coastal British Columbia.

Those mittens are those just refuse piles where these bones are where they've been collected?

Yeah, it's the middle. The word midden is not a good word. But it's what we use. And midden does mean refuse pile. I think it's a Danish word, right and shellman, we get these shell pile up piles in they are their villages, and they're the refuse pile behind houses in front of houses and their burial places and their meeting houses. And they're all those things, right. But what we see are shell because people eating so much shellfish and dumping it around and kicking it around, and occasionally building it up into mountains and putting your houses on it. And so these sites that I'm talking about, like these ancestral Tseil-Waututh village sites, you mentioned in the past would have been a couple of plank houses, you know, big barn like structures side by side, or, you know, maybe two 310 15, something like that. And shellfish, people eating and disposing stuff around them all for a long time. And maybe a long time, I mean, 3000 years layer after layer after layer after layer after layer. These things can build up quite quickly, you know, sometimes, you know, a meter over just a couple of centuries.

We do like to include a section on the show about eating fish when it's relevant, and we're not talking about an endangered species or anything. I especially like to ask Michelle, we've talked a little bit about the ways people used to prepare and still prepare chum salmon. If you have a specific recipe, I'd love to hear it.

I do not have a recipe. You can smoke it, you can bake it, you can it you can you can fry it, there's there's a million ways to prepare fish and my preferred way is actually canned. And I'm sure my dad's gonna kick me for it. But I prefer jarred salmon.

Do you like to eat it on anything like a cracker or just straight out of the jar,

I could technically eat it straight out of the jar. But with a cracker or on a sandwich or rice potatoes. It's one of those things I started just crave once in a while to like just basic fish and rice. It sounds so plain and I know my little cousins absolutely despise it. But it's something I go to.

That sounds good Jesse, do you have a favorite way to eat some salmon?

I like it smoke like cold smokes, you know, lightly smoke. So it's not hard. But like still are a little bit juicy. For sure. It's hard to buy, you gotta have friends that give you that stuff is my experience. That's good. I think I've had you know, maybe a red caviar as well with the eggs, I think that's pretty good. You have to have that pretty small, little quantity.

So I was wondering if each of you could just kind of speak to any kind of message you have for folks out there listening, in terms of incorporating different ways of knowing. So we've talked a little bit about archaeology, genetics, oral history, and how all of that can kind of come together to paint a really full picture that can be used in form management and conservation.

Well, there's a lot there. It's a rich, it's a rich body, you know, there's a whole wealth of information held in the collective minds of people who've been fishing this way for 1000s of years. So I think you need relationships with people and in communities, right? And you just can't poke and say, Hey, what do you how do you deal with chum? Right? This is a part of a long term process of getting to know each other and getting to know what we're thinking and talking in dealing with. But, you know, I this paper is interesting that way that we've got geneticists and archaeologists, and we've got First Nations authors, and we've got people talking about the past and the present and into the future. So it's a wealth of information from every single perspective right in any one standing on its own and be certainly a little less robust. If this was just a genetics paper. This would you know, it probably wouldn't be making such a splash.

Yeah, Michelle, what do you think?

Something that I was taught is, if you're not learning, hopefully, you're dead. You should be learning every day. You should be expanding your mind you should be growing your brain. And so the educational part and being able to bring traditional oral history to paper in a scientific respected manner. We're writing our own books, we're heading our history. We're putting our mark down on paper. So that's how come I see this as important stuff.

No, like Franz Boas and he said they're ethnographers, they didn't show up and talk to any Tsleil-Waututh people, for whatever reason they didn't. So Tsleil-Waututh as a people remained largely invisible in the ethnographic and historical record, you know, occasionally lumped in with other people occasionally totally know what exists. But here we are, right. And here we were for a long time. This this is real. So, you know, now Tsleil-Waututh has a chance to have their voice captured and shared with the broader communities.

Yeah, that's great.

Episode 51 Fish of the Week! podcast

Where can people go to learn more about this study about the Tsleil-Waututh people?

So Tsleil-Waututh's website is www.twnation.ca. They've got links, all sorts of stuff that's going on in there and bits and pieces of history and culture information. And the title of this paper is open access. So if you just Google it, you can pull it off of scientific reports was where it was published. It's called "Indigenous Sex Selective Salmon Harvesting Demonstrates Precontact Marine Resource Management in Burrard Inlet British Columbia, Canada."

Okay. Well, thank you very much. It's been great talking with you. And as Michelle said, keep learning and we hope that you enjoyed learning about the chum salmon today and some of these different ways of of knowing and keep learning about all the fish.

Thanks for listening to Fish of the Week! My name is Katrina Liebich. And my co host is Guy Eroh. Our production partner for this series is Citizen Racecar. Produced and story edited by Charlotte Moore. Production management by Gabriela Montequin. Post production by Alex Brower. This show the week is a production of the US Fish and Wildlife Service Alaska Region Office of External Affairs. As the Service reflects on 150 years of fisheries conservation, we honor thank and celebrate the whole community, individuals tribes, the state of Alaska, our sister agencies, fish enthusiast scientists and others who have elevated our understanding and love as people and professionals of all the fish