



The Early People: The Russian River Salmon Question

For use with *Trails Across Time* Chapter 2; page 21-28



Description:

The Kenai Peninsula has been inhabited for thousands of years by several indigenous groups of people. Evidence of their presence can be seen throughout much of the peninsula. The Kenai provided a rich environment to obtain food, shelter, and clothing. One of the richest pockets of archeological remains is in the vicinity of the confluence of the Russian and Kenai Rivers. The confluence has been a trove of archeological remains including house pits, middens, and tool remnants. (See field trip notes : K' Beq' Interpretative Site). The story that has emerged is that the area has been intensively and alternately utilized by Kenaitz Indians and Chugach Eskimo who seasonally traveled through the Kenai Corridors to come to the banks of the Russian River.

The reason why Native Alaskans traveled to this area is simple: It's the same reason why modern anglers travel thousands of miles: It's the salmon.

Now students familiar to the Russian River fishery will be quick to point out that the Russian is unique in that it has two distinct runs of reds. What makes the Russian River salmon unique is that there are actually three runs of salmon with two populations that are genetically distinct from one another. In fact, one of those populations is unrelated to any sockeyes in the Cook Inlet watershed.

Ahhh... but why? This short lesson (that can be used as an end of class period challenge to think about overnight) will demonstrate that there is more to archaeology than simply studying artifacts. The objective of this lesson is for students to understand that to learn about indigenous cultures of the Kenai one needs to mesh anthropology with an understanding of geology and biology, then wrap this in the unique dynamics of the Kenai Peninsula.

In the end, the students will return the next day with a well thought-out hypothesis to the "Two Populations of Russian River Reds."

Materials:

Hand Outs (also available at www.kmtacorridor.org)
Google Earth hovering above Russian Lake area.



Alaska Content Standards:

Geography:

A-6: Use spatial tools to analyze and develop explanations to problems {Questions}

C-2: Distinguish the forces and dynamics of physical processes that cause variation in natural regions.

Inquiry Based Thinking Strategies Utilized:

Interpreting: Students will interpret maps to determine former glacial processes.

Hypothesize: Students will develop possible solutions to the Russian River salmon runs based upon interpretations of maps.

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Background: It's no huge wonder that various Native groups found themselves on the shores of Russian River during the summer. Just like modern visitors, they were here enjoying the richness of the Russian River salmon fishery. Long before there were licensed fishing guides, the Russian River was a blue ribbon, and at least regionally, famous fishing stream.

But the Russian River fishery is not only incredibly rich; it is also unique. Unlike other streams that have a single run of a species of salmon making their way to their natal gravel bed, every summer three runs of sockeye salmon make their way up the Kenai River to spawn in the Russian River. What further causes head scratching is the fact is the genetics of the runs and where they end up spawning/overwintering. There is one run of larger sockeye that spawns BELOW the falls and over winters in Skilak Lake. There are two other runs (early and late) that are genetically similar to each other but are genetically distinct from any other stocks in the Kenai River drainage. These fish spawn ABOVE the falls and overwinters in their Upper or Lower Russian Lakes. It just doesn't make sense!

Procedure:

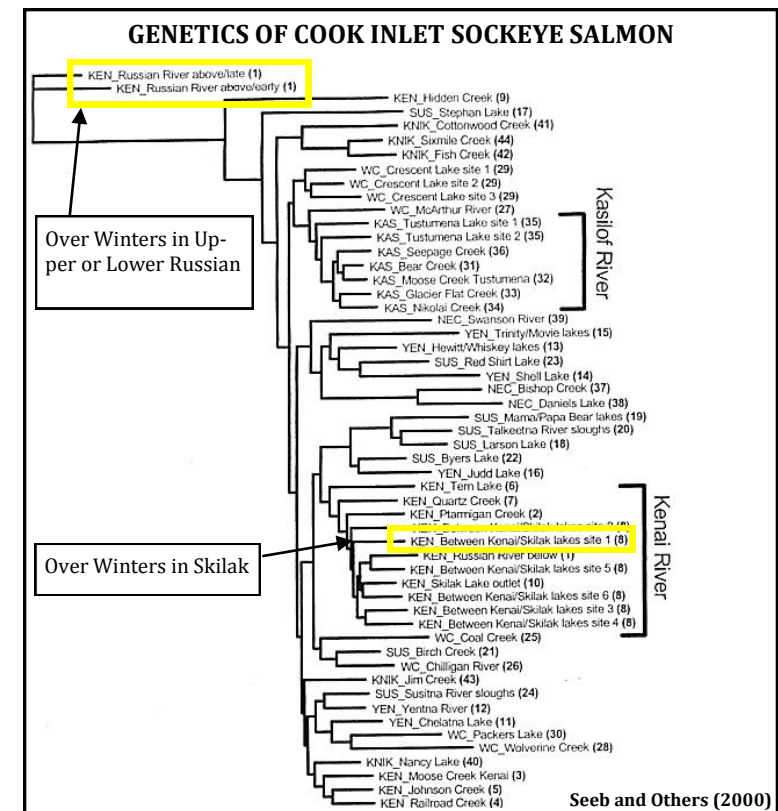
1) **Set the Stage:** The confluence of the Russian River is incredibly rich in archeological sites. Remains of house pits are packed in this region. These are remnants of occupations of both the Kenaitz Indians and Chugach Eskimos. Each of these groups, alternatively, traveled and settled in this region. Why? Of course, it's the fish. However, point out that salmon is a commodity found in streams throughout the Kenai. Why come here to the Russian River? The answer is a melding of anthropology, biology, and geology.

2) Define the Question:

If students are familiar with the Russian River fishery ask them first why the Russian River is unique? *They'll likely say there two runs of sockeye salmon: an early run in June and a later run in August.* You can correct them right off the bat by saying that indeed there are two populations of sockeye but they spawn in THREE separate runs. One population (that tends to be smaller in stature) spawns above the falls early in the summer and then again in another wave later in the summer. (Both runs end up overwintering in Upper or Lower Russian Lake). There is another population of larger sockeye that come in late summer and spawns below the falls. This population overwinters in Skilak Lake.

3) Deepen the Mystery:

(Display **genetics chart**—to the right and available on [KMTA website](#)). Hint number one: The two runs are genetically separate. In fact you can see that the later run of sockeye are genetically similar to other runs in the Cook Inlet region while the other two runs (the ones that spawn and over winter in the Upper Russian area) are completely and totally separate from the other Cook Inlet salmon. *Something's going on here!*



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Procedure (Continued)

4) Set the Hook:

Let the students run with their idea. Maybe they'll even wager some decent guesses. Assuming no one can fully put together the various pieces, set them down (or send them home) with a topographical map of the region (or use an on-line application such as Google Earth) available on-line to decipher the mystery.

5) Mystery Evolves:

No doubt all the students returned to school after spending a sleepless night pouring over topographic maps of the Russian River drainage. Perhaps they would have noticed the narrow separation of the Russian River watershed from the Resurrection River. If they did, then they are on the right track. Indeed, the Upper Russian River sockeye probably originated from the Resurrection River stock.

6) Mystery Solved:

But how? One hypothesis suggested by geologist Dick Reger is based upon glacial impoundment.

If you follow the Resurrection River drainage down a bit, you'll come to where it meets the Exit Creek drainage—home to Exit Glacier. With dendrochronology (the study/dating of tree rings) {*Wiles and Calkin*} we can get a sense of where Exit Glacier has been in modern times. And indeed, this glacier has actively advanced and receded a number of times since the last ice age.

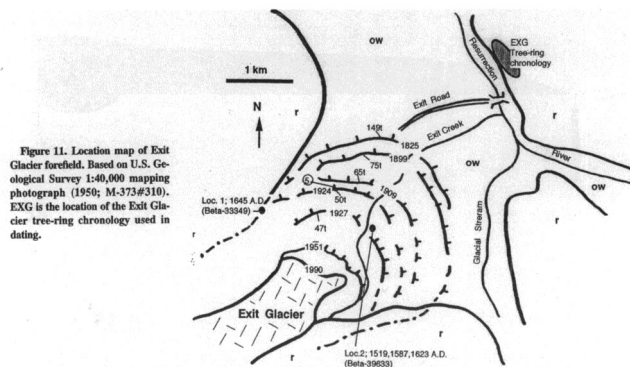
Reger's theory suggests goes that the upper **Resurrection** River was well supplied with a sockeye stock. At some point, perhaps 11-12,000 years ago, Exit Glacier advanced to the point of pinching off Resurrection River, blocking the flow of the water and trapping the salmon in a glacially impounded lake.

Now it is well known that red salmon can become landlocked and survive for generations in melt-water lakes. During that time the glacially blocked lake grew deeper to the point where it breached the low rise that separates the two drainages, thus spilling its water (and out-migrating smolt) into the Russian River/Kenai/Cook Inlet watershed.

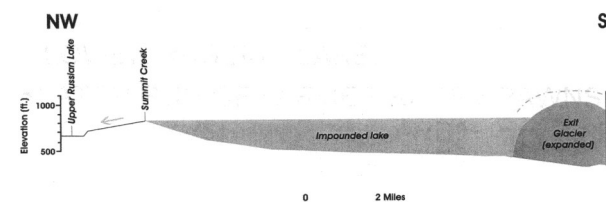
The out-migrating fish became imprinted to their new home and, from that day on, became fish of the Kenai drainage thus furnishing humans— indigenous and modern— with a bounty of sockeye throughout the summer months with plenty to smoke and dry for the cold dark winter time.

Fish On!

PAST LOCATIONS OF TERMINUS OF EXIT GLACIER (WILES AND CALKIN 1994)



GLACIAL-LAKE IMPOUNDMENT MODEL (11,000-12,000 YEARS AGO) Reger



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This model is far more complicated than the drawings suggest. It is likely other glaciers, such as the one to the north, may have had a role in creating this glacially impounded lake. It is further complicated since the Kenai Mountain are isostatically rebounding (land lifting) since the last major glaciation, resulting in a tilting of the land surface. Bottom line, more field work must be done in order to really tell the complete story.

Current



Hypothesized



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Assessment Rubric

Students will understand that the science of archaeology requires analysis of many fields and many tools.	Student works individually or in a group to <u>develop</u> and <u>defend</u> a plausible theory regarding the Russian River Salmon populations.	5	4	3	2	1
		Theory may or may not be correct, however it is plausible and is well defended.		Theory is plausible but defense is weak. Argument lacks evidence to fully defend theory.		Theory is not plausible and has no credible defending details.
	Student (or group) uses a variety of resources to support their argument.	5	4	3	2	1
		Student utilizes a variety of resources and/or understands how geology could isolate, or merge, salmon species.		Student uses at least one resource and/or demonstrates some understanding of possible geologic effects on salmon population.		Student cannot communicate an understanding connection between geology, biology, and indigenous settlement.