

# The SHOSHONE-BANNOCK TRIBES

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May 22, 2015

Paula Wilson  
IDEQ State Office  
Attorney General's Office  
1410 N. Hilton Street  
Boise, ID 83706

**RE: Docket No. 58-0102-1201 – Shoshone-Bannock Tribes' Comments Regarding the Idaho Department of Environmental Quality Recommendations on Criteria Calculation**

The Shoshone-Bannock Tribes (Tribes), a federally recognized Idaho tribe with reserved off-reservation Treaty rights and approved Treatment as State (TAS) status under the Clean Water Act (CWA), appreciates this opportunity to submit the following comments for consideration regarding the Idaho Department of Environmental Quality (IDEQ) Recommendations on Criteria Calculation. The Tribes have a vested interest to protect our reserved rights and have actively engaged, along with the other Idaho tribes and tribal consortiums, in developing surveys of actual fish consumption among our members; setting aspirational targets for continued consumption; presenting suppression issues; and, identifying heritage fish consumption rates for anadromous and resident fish from Idaho waters. The following comments are intended to convey our unique perspective on the proposed IDEQ policy choices for determining appropriate water quality standards for Idaho waters and generally comment on our position on the rulemaking process. This letter is not intended to resolve any outstanding issues that are likely to arise from the approval of Tribal water quality standards in shared Reservation boundary waters or waters received on the Reservation.

The Tribes appreciate IDEQ's statement that water quality criteria will not become less protective in the future, but some policy recommendations will not provide the protection to high end fish consumers and ultimately Idaho's water quality. Our review of IDEQ's policy choice recommendations leaves us concerned that IDEQ will not be able to adopt a proposed rule under the current timeframe. The limited information and detail being provided for comment makes it unclear as to how IDEQ will implement several policy recommendations and we expect that IDEQ will provide clarity at the July rulemaking meeting. Although, we have concerns with several of the recommended policy choices we do support the following.

- Inclusion of only consumers of fish in the fish consumption distribution. Inclusion of non-consumers would inappropriately skew the fish consumption rate (FCR) lower, which would underestimate the potential risks to fish consumers.
- The use of bioaccumulation factors (BAF) instead of bio-concentration factors (BCF). Moving to the use of BAF will reflect the uptake of contaminants from all sources by fish and shellfish, not just the water column as is the case when using BCF.
- Water quality criteria will not be allowed to become less protective going forward. The Shoshone-Bannock Tribes supports this premise with the caveat that it does not mean that the status quo will be retained. Water quality criteria in Idaho must become more protective moving forward.

The Tribes are a high consumer of resident and anadromous fish. So ensuring that Idaho's water is pollution free; and, fish are available and safe for consumption is extremely important to the Tribes. Knowing that tribes are the high end fish consumer in Idaho we expect to have our membership protected at the highest level and characterized at the general population level and not as a subpopulation. It seems apparent that the most protective standards for high end consumers would conversely be protective of the general population, so the need to stratify the groups for the purposes of developing standards seems poorly-reasoned. The Tribes recommend considering one standard that begins with the most protective rates for the highest end consumers ( $10^{-6}$  at the 95<sup>th</sup> percentile) and thus, protecting everyone in the State.

Article IV of the Fort Bridger Treaty of July 3, 1868 (15 Stat., 673) secured our subsistence lifestyle and traditional cultural practices by reserving off-reservation rights. Our intentions are to ensure that our membership has the opportunity to exercise those rights in a meaningful way. We expect IDEQ to propose rule that will prevent the downward spiral of water quality adding to the suppression of Idaho's fisheries. As a measure, IDEQ's proposed rule must provide for unsuppressed, robust fisheries based upon Idaho tribes' heritage rates. Idaho tribes' heritage rates are well documented with estimates that members of the Shoshone-Bannock Tribes ate as much as 800 pounds of fish per year; the equivalent of 1,000 grams of fish per day.<sup>1</sup> This will ensure that our future generations have the opportunity to enjoy our reserved subsistence rights without the perception that they may be consuming contaminated fish.

Over the last 12 months the Shoshone-Bannock Tribes and the Nez Perce Tribe have engaged in the development and implementation of our own Tribal Fish Consumption Survey. We provided draft results of the food frequency questionnaire to the Environmental Protection Agency (EPA) and IDEQ on May 13, 2015, which supports our reliance on Idaho's fish for subsistence. At the 95th percentile, the Shoshone-Bannock Tribes consume 768.8 grams/day of species group 1 (all finfish and shellfish). For species group 2 (near coastal, estuarine, and freshwater and anadromous), the Shoshone-Bannock Tribes consume 310.4 grams/day at the 95th percentile. Fish consumption at these levels will require

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<sup>1</sup> Scholz, A., K. O'Laughlin, D. Geist, D. Peone, J. Uehara, L. Fields, T. Kleist, I. Zozaya, T. Peone, and K. Teesatuskie. 1985. *Compilation of Information on Salmon and Steelhead Total Run Size, Catch and Hydropower Related Losses in the Upper Columbia River Basin, above Grand Coulee Dam*. Fisheries Technical Report No. 2. Upper Columbia United Tribes Fisheries Center, Eastern Washington University, Department of Biology. Cheney, Washington 99004.

DecemberTooze, J., et. al. 2006. A new statistical method for estimating the usual intake of episodically consumed foods with application to their distribution. *Journal of the American Dietetic Association* 106:10, 2006, pp. 1575-1587.

IDEQ to implement stringent water quality standards and fish consumption rates commensurate with our subsistence rights and needs.

Water resources are truly fluid resources, flowing from one jurisdiction to another without regard for political boundaries or differing standards; the same can be said of the aquatic biota living in those waters. The topic of fish consumption, particularly as it relates to the development of appropriate water quality standard, is an issue touching everyone living along the Snake and Columbia Rivers from producers, municipalities, and industry to end consumers of the fish in these systems. The State of Oregon has already set a high value on promoting healthy watersheds to sustain productive fisheries for both its citizens and members of tribes; the State of Washington will soon follow suit. In an effort to build a cohesive and consistent strategy to managing discharge and protecting high end consumers, the Tribes strongly recommend Idaho join with its neighbors in implementing a high standard for all who live in this state. A regionally consistent standard would provide protection for consumers groups utilizing 175 grams of fish per person per day. The unfortunate truth facing Idaho is that many streams and rivers are limited by water quality issues that are suppressing higher consumption rates and the productivity of those waters to produce healthy, harvestable populations of fish for consumption. Even if the Tribes were to support a rate of 175 grams per day it would be a significant compromise on our behalf to accept a suppressed consumption for our membership many years into the future.

The Tribes harvest fish resources from Idaho waters throughout the year, both anadromous and resident fish species, as a component of our subsistence lifestyle reserved by Treaty. We oppose IDEQ's proposal to segment aquatic biota, and exempt anadromous fish species, in the evaluation and development of water quality standards. Anadromous fish species have significant residence time in Idaho waters, from egg to smolt, before returning as adults from the ocean. It is the position of the Tribes that IDEQ's proposal should be regionally consistent and include anadromous fish in developing standards that will be protective of anadromous fish and prevent the accumulation of toxins.

It must also be noted, although not resolved in these comments, the Tribes are a significant land owner and sovereign entity in southern Idaho with extensive water rights throughout Southeast Idaho. As you are aware, the northern and western boundaries of the Fort Hall Reservation are shared in the middle of the Snake and Blackfoot River channels. An immediate concern is to demonstrate consistency with Tribal standards and avoid any unnecessary conflicts over waters we share, or waters that return to the Reservation in a degraded state like the Portneuf River. The Tribes have a legitimate right to set standards for all Reservation waters, and State standards will need to be consistent with those same Tribal standards. The Tribes are not asking for immediate resolution to this concern, but do raise this as an issue for the State to consider before setting potentially conflicting standards from the Tribes.

In developing water quality standards it is critical to be conscious of the distinction between a standard and actual implementation of actions to remediate Idaho waters. During the development of TMDL's for a number of Idaho waters, a myriad of actions and appropriate mitigation measures were identified and codified in existing water quality standards. A complete implementation of those actions may take up to a century to complete, without any assurances that waters will improve in the interim with the advent of a changing climate and diminishing ecosystem services. Merely setting a standard will not be adequate for the Tribes; our members would like to see actions and measureable success in protecting pristine river systems, promoting recovery in impaired waters, and immediate actions to remediate waters not currently in compliance.

As a member of the Upper Snake River Tribes (USRT) Foundation, a tribal consortium composed of four Indian tribes of the Upper Snake River region in Idaho, Nevada, and Oregon: the Burns Paiute Tribe, Fort McDermitt Paiute-Shoshone Tribe, Shoshone-Bannock Tribes of the Fort Hall Reservation, and Shoshone-Paiute Tribes of the Duck Valley Reservation, the Tribes were supported in our efforts to complete a review by USRT, who is also preparing comments on IDEQ's Policy Choices to formulate ambient water quality standards for the protection of human health. To the extent USRT's comments do not conflict with anything herein they are incorporated by reference and should be accepted by IDEQ as an expanded and detailed version of the Tribes comments. For technical questions on this submission, please contact Chad Colter, Fish and Wildlife Director at [ccolter@sbtribes.com](mailto:ccolter@sbtribes.com) or (208) 239-4551. For policy level questions, or to establish a consultation meeting here in Fort Hall with Tribal leadership please contact Claude Broncho, Fish and Wildlife Policy Representative at [cbroncho@sbtribes.com](mailto:cbroncho@sbtribes.com) or (208) 239-4563. Thank you for your consideration of this submittal and we look forward to continuing a dialogue on this important issue.

Sincerely,



Nathan Small, Chairman  
Fort Hall Business Council, Shoshone-Bannock Tribes

Attachments:

1. Fort Bridger Treaty of July 3, 1868 (15 Stat., 673)
2. Review of Heritage Fish Consumption Rates from Idaho Tribal Heritage Reports

TREATY WITH THE EASTERN BAND SHOSHONI AND  
BANNOCK, 1868.

July 3, 1868.  
15 Stat., 673.  
Ratified Feb. 26,  
1869.  
Proclaimed Feb. 24,  
1869.

*Articles of a treaty made and concluded at Fort Bridger, Utah Territory, on the third day of July, in the year of our Lord one thousand eight hundred and sixty-eight, by and between the undersigned commissioners on the part of the United States, and the undersigned chiefs and head-men of and representing the Shoshonee (eastern band) and Bannack tribes of Indians, they being duly authorized to act in the premises:*

Peace and friendship.

ARTICLE 1. From this day forward peace between the parties to this treaty shall forever continue. The Government of the United States desires peace, and its honor is hereby pledged to keep it. The Indians desire peace, and they hereby pledge their honor to maintain it.

Offenders among the whites to be arrested and punished.

If bad men among the whites, or among other people subject to the authority of the United States, shall commit any wrong upon the person or property of the Indians, the United States will, upon proof made to the agent and forwarded to the Commissioner of Indian Affairs, at Washington City, proceed at once to cause the offender to be arrested and punished according to the laws of the United States, and also re-imburse the injured person for the loss sustained.

Among the Indians to be given up to the United States, etc.

If bad men among the Indians shall commit a wrong or depredation upon the person or property of any one, white, black, or Indian, subject to the authority of the United States, and at peace therewith, the Indians herein named solemnly agree that they will, on proof made to their agent and notice by him, deliver up the wrong-doer to the United States, to be tried and punished according to the laws; and in case they wilfully refuse so to do, the person injured shall be re-imbursed for his loss from the annuities or other moneys due or to become due to them under this or other treaties made with the United States. And the President, on advising with the Commissioner of Indian Affairs, shall prescribe such rules and regulations for ascertaining damages under the provisions of this article as in his judgment may be proper. But no such damages shall be adjusted and paid until thoroughly examined and passed upon by the Commissioner of Indian Affairs, and no one sustaining loss while violating or because of his violating the provisions of this treaty or the laws of the United States, shall be reimbursed therefor.

Rules for ascertaining damages.

Reservation.

ARTICLE 2. It is agreed that whenever the Bannacks desire a reservation to be set apart for their use, or whenever the President of the United States shall deem it advisable for them to be put upon a reservation, he shall cause a suitable one to be selected for them in their present country, which shall embrace reasonable portions of the "Port Neuf" and "Kansas Prairie" countries, and that, when this reservation is declared, the United States will secure to the Bannacks the same rights and privileges therein, and make the same and like expenditures therein for their benefit, except the agency-house and residence of agent, in proportion to their numbers, as herein provided for the Shoshonee reservation. The United States further agrees that the follow-

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Effect of such selection.	and twenty acres in extent, which tract so selected, certified, and recorded in the "land-book," as herein directed, shall cease to be held in common, but the same may be occupied and held in the exclusive possession of the person selecting it, and of his family, so long as he or they may continue to cultivate it.
Persons not heads of families.	Any person over eighteen years of age, not being the head of a family, may in like manner select and cause to be certified to him or her, for purposes of cultivation, a quantity of land not exceeding eighty acres in extent, and thereupon be entitled to the exclusive possession of the same as above described. For each tract of land so selected a certificate, containing a description thereof, and the name of the person selecting it, with a certificate indorsed thereon that the same has been recorded, shall be delivered to the party entitled to it by the agent, after the same shall have been recorded by him in a book to be kept in his office subject to inspection, which said book shall be known as the "Shoshone (eastern band) and Bannack land-book."
Certificates of selection to be delivered, etc., to be recorded.	
Survey.	The President may at any time order a survey of these reservations, and when so surveyed Congress shall provide for protecting the rights of the Indian settlers in these improvements, and may fix the character of the title held by each. The United States may pass such laws on the subject of alienation and descent of property as between Indians, and on all subjects connected with the government of the Indians on said reservations, and the internal police thereof, as may be thought proper.
Alienation and descent of property.	
Children between 6 and 16 to attend school.	ARTICLE 7. In order to insure the civilization of the tribes entering into this treaty, the necessity of education is admitted, especially of such of them as are or may be settled on said agricultural reservations, and they therefore pledge themselves to compel their children, male and female, between the ages of six and sixteen years, to attend school; and it is hereby made the duty of the agent for said Indians to see that this stipulation is strictly complied with; and the United States agrees that for every thirty children between said ages who can be induced or compelled to attend school, a house shall be provided and a teacher competent to teach the elementary branches of an English education shall be furnished, who will reside among said Indians and faithfully discharge his or her duties as a teacher. The provisions of this article to continue for twenty years.
Duty of agent.	
Schoolhouses and teachers.	
Seeds and agricultural implements.	ARTICLE 8. When the head of a family or lodge shall have selected lands and received his certificate as above directed, and the agent shall be satisfied that he intends in good faith to commence cultivating the soil for a living, he shall be entitled to receive seeds and agricultural implements for the first year, in value one hundred dollars, and for each succeeding year he shall continue to farm, for a period of three years more, he shall be entitled to receive seeds and implements as aforesaid in value twenty-five dollars per annum.
Instructions in farming.	And it is further stipulated that such persons as commence farming shall receive instructions from the farmers herein provided for, and whenever more than one hundred persons on either reservation shall enter upon the cultivation of the soil, a second blacksmith shall be provided, with such iron, steel, and other material as may be required.
Second blacksmith.	ARTICLE 9. In lieu of all sums of money or other annuities provided to be paid to the Indians herein named, under any and all treaties heretofore made with them, the United States agrees to deliver at the agency-house on the reservation herein provided for, on the first day of September of each year, for thirty years, the following articles, to wit:
Delivery of articles in lieu of money and annuities.	
Clothing, etc.	For each male person over fourteen years of age, a suit of good substantial woollen clothing, consisting of coat, hat, pantaloons, flannel shirt, and a pair of woollen socks; for each female over twelve years of age, a flannel skirt, or the goods necessary to make it, a pair

TREATY WITH THE EASTERN BAND SHOSHONI AND BANNOCK, 1868.

of woollen hose, twelve yards of calico; and twelve yards of cotton domestics.

For the boys and girls under the ages named, such flannel and cotton goods as may be needed to make each a suit as aforesaid, together with a pair of woollen hose for each.

And in order that the Commissioner of Indian Affairs may be able to estimate properly for the articles herein named, it shall be the duty of the agent each year to forward to him a full and exact census of the Indians, on which the estimate from year to year can be based; and in addition to the clothing herein named, the sum of ten dollars shall be annually appropriated for each Indian roaming and twenty dollars for each Indian engaged in agriculture, for a period of ten years, to be used by the Secretary of the Interior in the purchase of such articles as from time to time the condition and necessities of the Indians may indicate to be proper. And if at any time within the ten years it shall appear that the amount of money needed for clothing under this article can be appropriated to better uses for the tribes herein named, Congress may by law change the appropriation to other purposes; but in no event shall the amount of this appropriation be withdrawn or discontinued for the period named. And the President shall annually detail an officer of the Army to be present and attest the delivery of all the goods herein named to the Indians, and he shall inspect and report on the quantity and quality of the goods and the manner of their delivery.

Census.

May be changed.

Army officer to attest delivery of goods, etc.

Physician, teachers, carpenter, etc.

ARTICLE 10. The United States hereby agrees to furnish annually to the Indians the physician, teachers, carpenter, miller, engineer, farmer, and blacksmith, as herein contemplated, and that such appropriations shall be made from time to time, on the estimates of the Secretary of the Interior, as will be sufficient to employ such persons.

Cession of reservation not to be valid unless, etc.

ARTICLE 11. No treaty for the cession of any portion of the reservations herein described which may be held in common shall be of any force or validity as against the said Indians, unless executed and signed by at least a majority of all the adult male Indians occupying or interested in the same; and no cession by the tribe shall be understood or construed in such manner as to deprive without his consent, any individual member of the tribe of his right to any tract of land selected by him, as provided in Article 6 of this treaty.

ARTICLE 12. It is agreed that the sum of five hundred dollars annually, for three years from the date when they commence to cultivate a farm, shall be expended in presents to the ten persons of said tribe who, in the judgment of the agent, may grow the most valuable crops for the respective year.

Presents for most valuable crops.

ARTICLE 13. It is further agreed that until such time as the agency-buildings are established on the Shoshonee reservation, their agent shall reside at Fort Bridger, U. T., and their annuities shall be delivered to them at the same place in June of each year.

N. G. Taylor, [SEAL.]  
W. T. Sherman, [SEAL.]  
Lieutenant-General.

Wm. S. Harney, [SEAL.]  
John B. Sanborn, [SEAL.]  
S. F. Tappan, [SEAL.]  
C. C. Augur, [SEAL.]

Brevet Major-General, U. S. Army, Commissioners.

Alfred H. Terry, [SEAL.]  
Brigadier-General and Brevet Major-General, U. S. Army.

Attest:

A. S. H. White, Secretary.

Shoshones:

Wash-a-kie,	his x mark.
Wau-ny-pitz,	his x mark.
Toop-se-po-wot,	his x mark.
Nar-kok,	his x mark.
Taboonshe-ya,	his x mark.
Bazeel,	his x mark.
Pan-to-she-ga,	his x mark.
Ninny-Bitse,	his x mark.

Bannacks:

Taggee,	his x mark.
Tay-to-ba,	his x mark.
We-rat-ze-won-a-gen,	his x mark.
Coo-sha-gan,	his x mark.
Pan-sook-a-motse,	his x mark.
A-wite-etse,	his x mark.

Witnesses:

Henry A. Morrow,  
Lieutenant-Colonel Thirty-sixth Infantry and  
Brevet Colonel U. S. Army, Commanding Fort Bridger.  
Luther Manpa, United States Indian agent.  
W. A. Carter.  
J. Van Allen Carter, interpreter.

Review of Heritage Fish Consumption Rates from Idaho Tribal Heritage Reports								
Reference	Methodology	Tribes Evaluated	Species Evaluated	Rate in g/day	Rate Derivation	Includes (Note: +/-/U indicates whether the way in which a particular factor was addressed causes an increase, decrease, or unknown impact on the FCR)		
						Uses Besides Consumption	Migratory Caloric Loss Factor <sup>1</sup>	Accounting for inedible portion <sup>2</sup>
Craig & Hacker 1940	Ethnographic Observation	Columbia Basin Tribes	Salmon, sturgeon, trout	454	Not presented	No (+)	No (-)	Yes (U)
Swindell 1942	Ethnographic Observation	Columbia Basin Tribes, Celio Region	Salmon	401	1611 lb salmon/year ÷ 5 people/family x 454 g salmon/lb salmon ÷ 365 days/year	No (+)	No (-)	Yes (U)
Hewes 1947	Caloric Analysis	Columbia Basin Tribes	Salmon	454	2000 calories/day x 50% of diet as salmon x 1000 calories/lb salmon x lb salmon/454 g salmon	Yes (-)	No (-)	Yes (U)
Griswold 1954	Ethnographic Observation	Columbia Basin Tribes, Celio Region	Salmon	746	30 sacks salmon/year/family x 10 lb salmon/sack x family/5 people x 454 g salmon/lb salmon x year/365 days  Griswold cited 40 sacks of salmon per family were obtained with 30 retained for family use and 10 used for other purposes.	No (+)	No (-)	No (U)
Walker 1967	Evaluation of Craig & Hacker 1940 and Griswold 1954	Columbia Basin Tribes	Salmon	725	Average of 454 g/day (from Craig and Hacker, 1940) and 995 g/day (from Griswold 1954). The Griswold value was based on families obtaining 40 bags of salmon, 30 for consumption and 10 for trade.  995 g/day = 40 sacks salmon/year/family x 100 lb salmon/sack x family/5 people x 454 g salmon/lb salmon x year/365 days	Yes (+)	No (-)	No (U)
Boldt 1974	Undocumented	Columbia Basin Tribes	Salmon	622	500 lb salmon/person/year x 454 g salmon/lb salmon x year/365 days	Unknown (U)	No (-)	Unknown (U)
Walker 1967	Ethnographic observation citing Spalding 1936	Nez Perce Tribe	Salmon	373 <sup>a</sup> 466 <sup>b</sup>	300 fish/peak day/fishing site x 10 peak days/year x 10 lb tissue/fish x 50 fishing sites ÷ 5000 total population (from Spalding 1936) a: assumes population of 5000 b: assumes population of 4000 (Hewes 1947)	Unknown (U)	No (-)	Unknown (U)
Hewes 1973	Caloric Analysis/Ethnographic Observation	Nez Perce Tribe	Salmon	373		No (+)	No (-)	No (U)
Marshall 1977	Ethnographic Observation citing Walker	Nez Perce Tribe	Salmon	701	300 fish/peak day/fishing site x 10 peak days/year x 10 lb salmon/fish x 94 fishing sites x 454 g salmon/lb salmon ÷ 5000 total population  Note: fishing sites increased from 50 to 94 based on Schwede 1966	Unknown (U)	No (-)	No (U)
Walker 1985	Ethnographic Observation, unpublished by cited by Scholz 1985	Nez Perce Tribe	Salmon & Resident	1,244	Methodology not presented	Unknown (U)	Unknown (U)	Unknown (U)
Schalk 1986	Ethnographic Observation citing Hewes 1947 and 1973	Nez Perce Tribe	Salmon	804	300 lb salmon/year/person x 454 g salmon/lb salmon x year/365 days ÷ 0.58 caloric loss factor ÷ 0.8 edible fraction.  Modified consumption rates of Hewes 1947 and 1973. Hewes (1973) assumed a consumption rate of 300 lb/year. Assumed that caloric content of fish was reduced during migration. For the Nez Perce, there was a 58% reduction in caloric value. Further, not all parts of the salmon are edible. Schalk assumed 80% of the fish was consumed.	Unknown (U)	Yes (+)	Yes (+)
Hunn and Bruneau 1989	Ethnographic Observation, derived	Nez Perce Tribe	Salmon, Steelhead,	398	400 lb salmon/year/person x 454 g salmon/pound of salmon x year/365 days x 0.8 edible fraction	Unknown (U)	No (-)	Yes (-)

	from: Craig and Hacker 1950; Hewes 1947 & 1973; Walker 1967		Lamprey		Based on review of references cited in the methodology column, Hunn and Bruneau estimated the annual salmon harvest per person at 400 lb/year			
Hewes 1973	Caloric Analysis/Ethnographic Observation	Coeur d'Alene Tribe	Salmon	124		Unknown (U)	Unknown (U)	Unknown (U)
Scholz et al. 1985	Reanalysis of Hewes 1947 and 1973	Coeur d'Alene Tribe	Salmon	818 996	124 g/day estimate of Hewes adjusted upward to 373 to 454 g/day 818 g/day = 373 g/day ÷ 0.57 caloric loss factor ÷ 0.8 waste loss factor 996 g/day = 454 g/day ÷ 0.57 caloric loss factor ÷ 0.8 waste loss factor	Unknown (U)	Yes (+)	Yes (+)
Walker 1985	Unpublished, cited by Scholz et al 1985.	Coeur d'Alene Tribe	Salmon and Resident	1,244	Methodology not presented	Unknown (U)	Unknown (U)	Unknown (U)
Schalk 1986	Reanalysis of Hewes 1947 and 1973	Coeur d'Alene Tribe	Salmon	273	273 g/day = 124 g/day from Hewes ÷ 0.57 caloric loss factor ÷ 0.8 waste loss factor	Unknown (U)	Yes (+)	Yes (+)
Hewes 1973	Caloric Analysis/Ethnographic Observation	Shoshone Bannock	Salmon	62	Methodology not presented	Unknown (U)	Unknown (U)	Unknown (U)
Walker 1985	Unpublished, cited by Scholz et al 1985.	Shoshone Bannock	Salmon and Resident	995	Methodology not presented	Unknown (U)	Unknown (U)	Unknown (U)
Schalk 1986	Reanalysis of Hewes 1947 and 1973	Shoshone Bannock	Salmon	222	222 g/day = 62 g/day from Hewes 1973 ÷ 0.35 caloric loss factor ÷ 0.8 waste loss factor	Unknown (U)	Yes (+)	Yes (+)
Walker 1993	Review of Schalk 1986 for the Northwest Planning Council	Shoshone Bannock	Salmon	790	Reviewed work of Schalk 1986, determining this work was applicable to the Shoshone Bannock Tribe	Unknown (U)	Yes (+)	Yes (+)
Hewes 1973	Caloric Analysis/Ethnographic Observation	Kootenai	Salmon	373		Unknown (U)	Unknown (U)	Unknown (U)
Northcote 1973`	Caloric Analysis/Ethnographic Observation	Kootenai	Salmon and Resident	1,646	NOTE rate is for tribal members fishing from Kootenay Lake in British Columbia 1,646 g/day = 2,500 calories/day x 0.75 salmon diet fraction x 100 g wet wt. fish / 113.9 kcal	Unknown (U)	Unknown (U)	Unknown (U)
Walker 1985	Unpublished, cited by Scholz et al. 1985	Kootenai	Salmon and Resident	1,244	Methodology not presented	Unknown (U)	Unknown (U)	Unknown (U)
Schalk 1986	Reanalysis of Hewes 1973	Kootenai	Salmon	599	599 g/day = 187 g/day (Schalk modification of Hewes 1973 of 373 g/day) ÷ 0.39 caloric loss factor ÷ 0.8 waste loss factor. However, this calculation yields 1,195 g/day NOT 598.	Unknown (U)	Yes (+)	Yes (+)

Notes:

**1** Includes a migration calorie loss factor (based on Hunn, 1981, citing Idler and Clemens, 1959) to adjust estimates based on caloric intake.

**2** Waste loss may be accounted for either in direct observation (i.e. the author is citing consumption of fish that had been prepared for consumption, as was done by Craig and Hacker and Swindell) or by adjusting the amount of fish harvested by a waste loss factor loss factor (0.8, based on Hunn, 1981) to translate from amount consumed to amount harvested. For consumption rates derived using caloric analysis, waste loss is inherently accounted for, as calories consumed are converted into edible fish mass consumed.

## Other Notes

Estimates based on ethnographic observation sometimes appear to be based on amounts actually consumed (e.g. Craig and Hacker; Swindell) and sometimes based on amounts harvested (e.g. Walker; Marshall). Those based on the amount harvested would include the inedible (waste loss) portion, and would likely overestimate consumption. They may also include harvest for other uses, although that is not specifically stated in most studies.

Different studies address “waste loss” differently. Most that use the “waste loss factor”, like Schalk and Scholz, use the factor to translate from a consumption rate to a harvest rate, so they tend to inflate the consumption rate (by dividing by 0.8). Other studies (e.g. Hunn and Bruneau, 1989) use the same factor to translate from a harvest rate to a consumption rate (by multiplying by 0.8). So both studies “account” for waste loss, but they do so to opposite effect.

Here is an excerpt from Hunn and Bruneau:

“Based on these educated guesses, I use 500 pounds per person per year as a reasonable traditional gross harvest rate for "River Yakima" and 400 pounds for the Nez Perce (cf. Walker 1973:56) and the Colville. Actual consumption is estimated at 80% for the edible fraction (thus 400 and 320 pounds respectively).”