

Overview of Seafood^{*} Consumption Survey Methodology, Studies & Results

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Points to be discussed

- Factors affecting seafood consumption and its assessment
- Seafood consumption survey methodologies
- Considerations in using specific methodologies
- Key studies strengths and limitations
- Relationship between consumption rates from key studies and other studies

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Factors affecting magnitude and variability of seafood consumption

- Population: ethnicity, race, age, sex, economic status, culture, spirituality
- Presence/abundance and seasonality of species as well as availability of other food resources
- Altered consumption based on knowledge of contamination

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Variability in consumption rates introduced by study methodology

- Sources of seafood covered in survey
- How species are assigned to classes
- Types of seafood preparations recorded
- Use of cooked or uncooked weights
- When survey is conducted
- Statistics/data handling (e.g. outliers, non-response, weighting, etc.)

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Possible purposes of seafood consumption surveys

- To determine trends in seafood consumption
- To determine fishing pressures on water bodies
- To assess water body or site specific risks posed by contaminants in seafood
 - Environmental regulation
 - Fish consumption advisories
 - Identification of water bodies where fish consumption advisories are needed
 - Determine effectiveness of fish consumption advisories
- To support development of water quality criteria

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Survey methodologies

- Telephone survey
- Mail survey
- Diary
- Personal interview
- Creel

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Considerations in selecting a survey methodology

- Characterization of target population
 - Representative
 - Literacy/language
 - Culturally relevant
- Accuracy
 - Validity
 - Question misinterpretation
 - Perception of interviewer by respondent
 - Bias (e.g. recall, prestige)

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Survey methodology considerations (continued)

- Time frame: When are results needed?
- Resource considerations
 - Interviewer burden
 - Respondent burden
 - Resources
- Distribution of seafood and fishing locations

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SEE: Table 3. Comparison of
Five Fish and Wildlife
Consumption Survey Approaches
Using Various Selection Criteria

*(U.S. EPA. 1998. Guidance for
Conducting Fish and Wildlife
Consumption Surveys)*

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Methodologies for key NW surveys

- Personal interviews of members of specific groups recording 24 hour and seasonal consumption. Interviews done by members of those groups.
- Creel surveys involving field inspection of angler catch by individuals that may or may not be members of the angler's community.

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Comparison of creel vs. personal interview surveys: **Representativeness**

Personal Interview	Creel
Representative population can be determined and randomly sampled.	Higher frequency anglers over sampled. Anglers may be missed depending on survey seasons, dates, times and locations.
Pilot testing enhances relevance.	Pilot testing may be more difficult.
Language and literacy effectively addressed with cooperation of target population.	Language and literacy may prevent acquisition of representative information

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Comparison of creel vs. personal interview surveys: **Accuracy**

Personal Interview	Creel
Enhanced by comfortable environment. Cash incentives enhance cooperation. Individuals prepared to be interviewed.	Interview in field setting may be difficult. Individuals not prepared to be interviewed.
Interviewers from surveyed population enhances trust	Interviewer from outside population may not be trusted
Consumption from all sources recorded	Generally only harvested seafood consumption from time of harvest to interview recorded.
Models enhance portion size & rate estimates. Some uncertainty in seasonal consumption estimates. Consumption rate estimates for highly consumed resources more accurate.	Rates may be approximate when models not used. Catch inspection enhances accuracy. Interviews must be repeated to assess seasonal consumption.

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Weaknesses & strengths of creel vs. personal interview surveys: **Harvest Characteristics**

Personal Interview	Creel
Can be used to determine consumption over a broad geographic area with many harvest points.	Difficult to administer over a broad geographic area with many harvest points.

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Relevant personal interview seafood consumption surveys

- National USDA Continuing Survey of Food Intakes by Individuals (CSFII)
- A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin, 1994
- Other regional surveys:
 - A Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region, 1996
 - Asian & Pacific Islander Seafood Consumption Study in King County Washington, 1999
 - Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservation, Puget Sound Region, 2000

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6.5 grams per day

- '73-'74 National Purchase Diary Survey
Tuna Research Institute/National Marine
Fisheries Service
- Sampling strategy
 - 25,162 completed, 7,662 families, 80%
response
 - Sample considers census region, household
size, income, presence of children, race, age
 - 1/12th of sample surveyed each month

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6.5 grams per day (continued)

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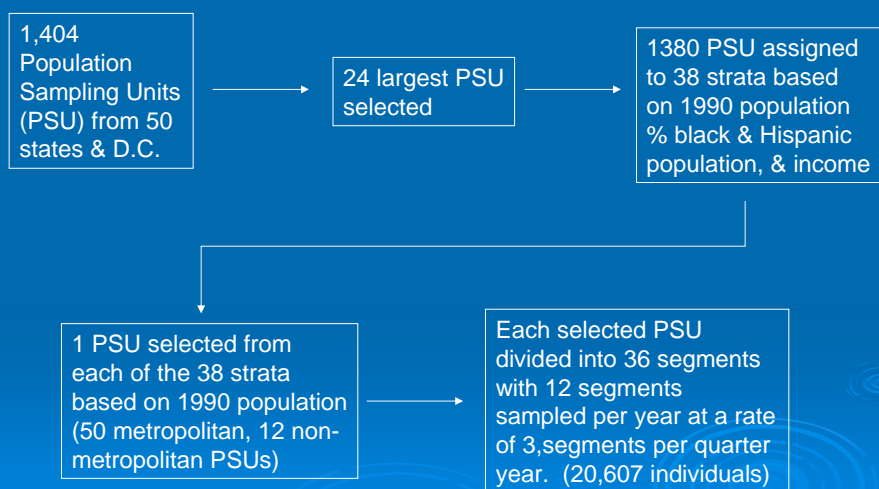
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6.5 grams per day (continued)

- Statistics, average consumption rates using weighting
 - 6.5 g/day Stephan (1980)
 - 14.3 g/day Javitz (1980) reanalysis of data
- Issues
 - Based on consumption of freshwater and estuarine species (14% of fish consuming population)
 - Does not consider recreational or non-commercial anglers
 - Data are no longer available for re-analysis

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CSFII 1994-'96 & 1998: Sampling Strategy



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CSFII 1994-'96 & '98: Purpose & Methodology

- Purpose to assess mean *per capita daily* consumption of foods, including fish & shellfish
- Interviewer performed 24 hour dietary recall survey given on two non-consecutive days
- Results from individual surveys weighted to characterize consumption of U.S. population

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CSFII 1994-'96 & '98: Strengths

- Statistically representative of the U.S. overall
- Good design for per-capita consumption estimates
- Interviewer administration enhances accuracy
- Administration on non-consecutive days avoids correlated consumption data

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CSFII 1994-'96 & '98: Limitations

- Short term of data collection makes estimation of *individual* consumption imprecise as well as an individual's variation in consumption over time
- Percentage of seafood consumers biased low
- Consumer-only rates biased high
- Smaller high consuming groups (e.g. Native Americans) under represented
- Per-capita consumption rate estimates underestimate consumer-only consumption rates

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Impact of survey length on % consumers and consumer-only consumption rate

#	Day of week, oz consumed						
	M	Tu	W	Th	F	Sa	Su
1	8						
2	8		8		8		
3							8
4				8	8		
5		8					
6		8	8	8			
7							
8						8	8
9							
10				8			

Survey days:

30% consumers

"consumer only" rate = 8 oz
or 227 g/day

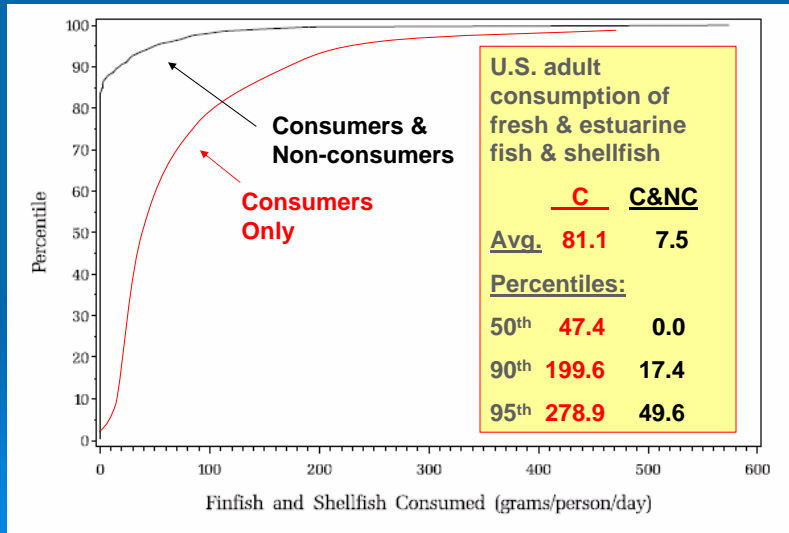
All days:

80% consumers

"consumer only" rate = 2.9 oz
or 81 g/day

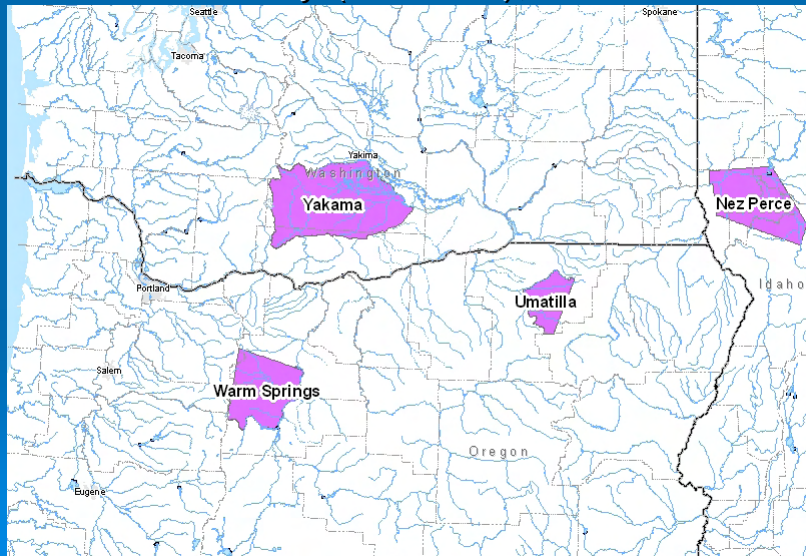
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Impact of including non-consumers on percentiles of seafood consumption



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Columbia River Intertribal Fish Commission Survey (CRITFC), 1994



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CRITFC: Sampling Strategy

Indian Health Service rosters used as basis for random selection of roughly equal numbers of participants from the Nez Perce, Yakama, Warm Springs, and Umatilla Tribes

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CRITFC: Methodology

- 24 hour recall and yearly fish consumption rates obtained by personal interviews conducted by Tribal members
- Children's consumption documented through interviews with adults
- Survey instrument pilot tested and modified based on pilot test results
- Survey administered at central locations over three weeks in November
- \$40 per person cash incentive to participate

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CRITFC: Strengths

- Representative sample of population obtained
- Survey instrument pilot tested and modified based on results
- Interviewers trained
- Interviewers trusted members of Tribes
- Quality controlled data entry

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CRITFC: Potential Biases

- Are IHS roster and overall Tribal populations identical with regards to seafood consumption?
- Distance from interview sites associated with decreased participation. Potential bias against selection of individuals finding travel difficult.
- Percentage of consumers may be overestimated if non-consumers chose not to participate.
- Survey administered in November, when fewer fish are harvested, could bias rates low.
- Four adult outliers not used in computation of statistics, could bias some statistics low.
- Some children's consumption may have been entered as though it was the consumption of the reporting adult.

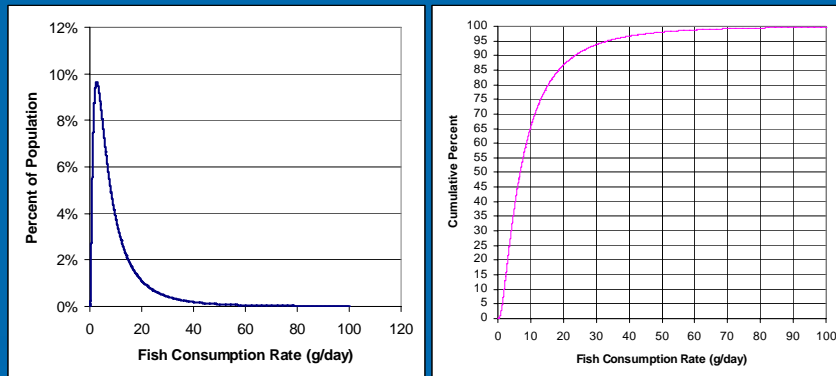
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CRITFC: Adult (consumer only) consumption of all fish from all sources

Statistic	g/day
Average	63
Percentiles:	
(median) 50 th	40
75 th	60
90 th	113
95 th	176
99 th	389

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Fish consumption rate distributions



- Distributions are not symmetric, sometimes regarded as being log normal
- Mean, influenced by upper values, is greater than the 50th percentile (median)
- Upper percentiles spread out

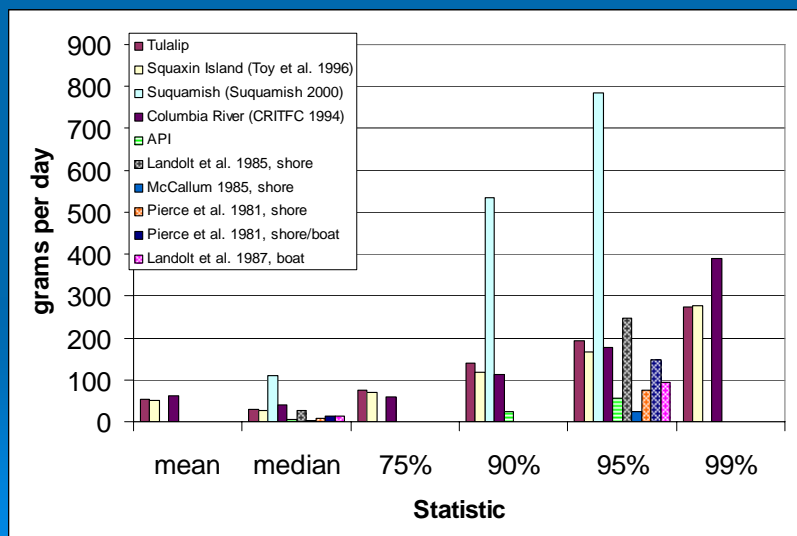
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How do CRITFC seafood consumption rates compare with other groups?

Tribe/Study	Grams per Day Associated w/Variou Statistics					
	mean	median	75%	90%	95%	99%
Tulalip	54	30	74	139	194	273
Squaxin Island (Toy et al. 1996)	51	26	71	119	167	276
Suquamish (Suquamish 2000)		110.7		533.9	784.6	
Columbia River (CRITFC 1994)	63	40	60	113	176	389
API		5.8		25.5	57.1	
Landolt et al. 1985, shore		26.1			246.2	
McCallum 1985, shore		1.9			24.3	
Pierce et al. 1981, shore		7.1			74.2	
Pierce et al. 1981, shore/boat		13.6			147.1	
Landolt et al. 1987, boat		12.3			95.1	

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How do CRITFC seafood consumption rates compare with other groups?



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Comparison of 95th percentiles of seafood consumption (pink-recreational, green-ethnic, blue-Tribal)

Table 2: Rank order of consumer only regionally harvested anadromous and resident species 95th % consumption rates

Study/Tribe	g/day
McCallum 1985, shore	24.3
API (Note total API rate is 306)	66
Pierce et al. 1981, shore	74.2
Landolt et al. 1987, boat	95.1
Pierce et al. 1981, shore/boat	147.1
Columbia River (CRITFC 1994)*	176
Tulalip (Toy et al. 1996)	194
Squaxin Island (Toy et al. 1996)	221
Landolt et al. 1985, shore	246.2
Suquamish (Suquamish 2000)	784.6

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Regional Alaskan fisheries harvest rates

Region	Resource	50%	90%	95%	Max
Arctic-Subarctic	Salmon	193.8	437.8	525.7	834.6
	Non-salmon fish	63.6	262.8	361.3	830.1
	Marine invertebrates	1.3	8.1	12.3	28.9
Aleutian-Pacific	Salmon	118.1	210.5	235.1	397.3
	Non-salmon fish	58.8	106.9	120.4	276.6
	Marine invertebrates	17.2	32.4	38	56.3
Subarctic Interior	Salmon	76.8	542.9	987.9	1988.4
	Non-salmon fish	27.8	112.7	149.6	445.4
	Marine invertebrates	0.8	1.9	2.2	5.6
SE AK Coast	Salmon	61.3	127.8	151.9	216.6
	Non-salmon fish	57.1	115.8	136.1	217.5
	Marine invertebrates	33	68.6	84.8	144.8
Urban	Salmon	32.4	54.4	60.4	82.6
	Non-salmon fish	17	25.7	28.5	37.4
	Marine invertebrates	3	12.1	16	20.8

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Questions?

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