PNL-10093
UC-600

FACTORS AFFECTING THE QUALITY OF FISH CAUGHT BY NATIVE AMERICANS IN THE ZONE 6 FISHERY 1991 THROUGH 1993

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Pacific Northwest Laboratory
Richland, Washington 99352

DISCLAIMER

SUMMARY

Native American fishers are concerned about the deteriorating quality of salmon and other fish caught from the Columbia River. In 1991, the Pacific Northwest Laboratory (PNL), with the assistance of the Yakama Indian Nation (YIN), initiated a study to monitor the salmon and steelhead (*Oncorhynchus* spp.) fishery in the lower Columbia River (Zone 6 fishery). A tribal student from the YIN worked with PNL staff during August and September of 1991 and 1992, and 2 fishery technicians from the YIN were hired to monitor the fishery in 1993. Fish collected during the project were examined by fisheries pathologists at the Lower Columbia River Fish Health Center, operated by the U.S. Department of Interior Fish and Wildlife Service (USFWS), in Underwood, Washington.

Over the three years, about 225,000 fish, mostly salmonids, were caught during the Zone 6 fishing season for commercial and subsistence use by Native American fishers. "During" the Zone 6 fishing season means the Zone 6 fall salmon season. Only about 0.01% (1 of every 10,000 fish caught) were reported to PNL as diseased, potentially contaminated, or unfit for sale or consumption. Pathologists attributed most of the external symptoms on fish they examined to gill net abrasion and pre-spawning trauma. Furthermore, they found nothing to link the health and condition of fish to degradation of the aquatic environment by pollution or contamination. The pathologists concluded that consumption of these fish posed no risk to human health.

During August and September of 1991, about 81,000 salmon and steelhead were caught during the Zone 6 fishery. Only two calls were received on the hot-line and one chinook salmon (*O. tshawytscha*) and two steelhead (*O. mykiss*) were recovered for analysis. Small white spots in the flesh of one steelhead were caused be a myxosporidian parasite (*Henneguya salminicola*). Failure to migrate caused the poor condition of the other steelhead, and it was not examined by pathologists. The salmon had contusions (bruises) in the caudal peduncle.

More than 81,000 salmon and steelhead were harvested during the Zone 6 fishery in 1992. One steelhead, three fall chinook salmon, and one white sturgeon (*Acipenser transmontanus*) were reported to PNL and examined by a fisheries pathologist. The steelhead and two salmon had large open lesions with exposed flesh. The other salmon had small dermal hemorrhages. External lesions found on steelhead and salmon were attributed to bacterial invasion of abrasions caused by gill nets. Fungus may have caused the lesion on the sturgeon, and malignant tumors were present

in the spleen and other internal organs. According to the pathologist, the cause of the tumors was unknown.

In 1993, about 64,000 salmon and steelhead were harvested during the Zone 6 fishery. About 20 fish (8 steelhead, 10 salmon, 1 walleye (*Stizostedion vitreum vitreum*), and 1 white sturgeon) were reported by fishers and fish buyers and subsequently examined by pathologists. The sturgeon and 1 salmon had genetic deformities, and 2 steelhead had fatty tumors. All other external lesions and sores were attributed to injuries or infections related to gill net abrasion. The pathologists could not determine what caused the fatty tumors.

Fisheries pathologists concluded that most of the external symptoms on fish were related to bacterial infection of gill net abrasions and pre-spawning trauma, and were not caused by pollution or contamination of the Columbia River. The pathologists also stated that consumption of the fish posed no threat to human consumers.

ACKNOWLEDGMENTS

The involvement and cooperation of many people are greatly appreciated. Tracy Lewis, Harvey Jim, and Cecil James, Jr., of the Yakama Indian Nation spent long hours contacting fishers and buyers along the Columbia River. Steve Parker and Bill Bosch, Yakama Indian Nation, provided information on fishing seasons and harvest data. Phyllis Barney and Eric Pelton, Lower Columbia River Fish Health Center, U.S. Department of Interior, Fish and Wildlife Service, conducted the pathological analyses. Robert H. Gray and Dennis D. Dauble were peer reviewers, and Melanie DeSmet edited the report.

Special thanks go to the following fish brokers who reported fish and allowed us to make observations at their businesses: Allen Snow and Jim Saunders, King Fish Trading Company; J & A Enterprises; and Roy Gilmore.

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1.0 INTRODUCTION

A program to monitor the salmon and steelhead (*Oncorhynchus* spp.) fishery in the lower Columbia River (Zone 6 fishery [Figure 1.1]) was initiated in 1991 to respond to questions and comments frequently made by Native Americans at public meetings. Native Americans were concerned that the quality of the Columbia River had deteriorated and that the poor environmental conditions had affected the health and quality of fish they relied on for subsistence, ceremonial, religious, and commercial purposes. They also feared that eating contaminated fish might endanger the health of their children and future generations. Operations at the Hanford Site were listed as one of many causes of the deteriorating environment.

1.1 MONITORING EFFORTS IN 1991

In response to Native American concerns, the U.S. Department of Energy (DOE), Richland Operations Office (RL) asked Pacific Northwest Laboratory (PNL) to initiate a study to address Native American concerns. In 1991, scientists from PNL met with tribal fishers to develop a

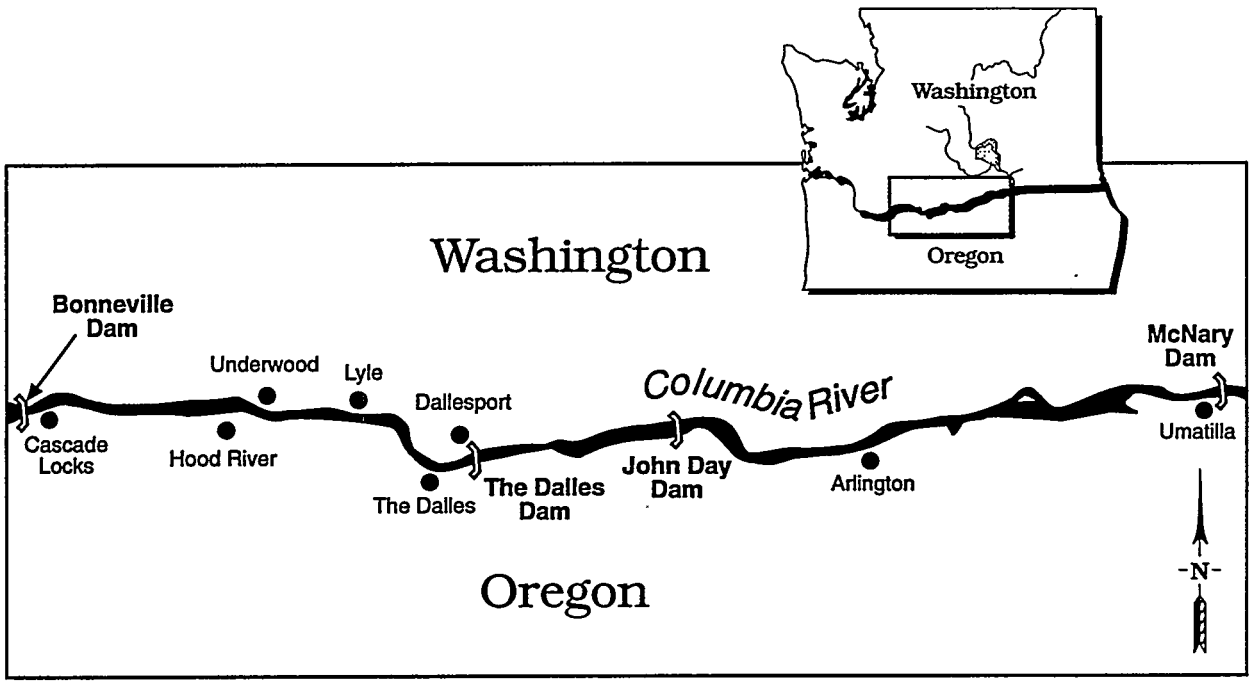

FIGURE 1.1. Location of Zone 6 Fishery

program to collect and analyze diseased or contaminated fish caught in the Zone 6 fishery. A tribal student from the Yakama Indian Nation (YIN) was hired to assist in the study. PNL posted flyers describing the study, established a hot-line for fishers to call when fish were suspected to be diseased or contaminated, and made arrangements with an independent pathologist to examine the fish. PNL also reviewed water-quality data pertaining to the Zone 6 fishery and compiled a bibliography based on abstracts of research articles and annual reports involving environmental studies on the Hanford Site (Abernethy et al. 1992).

1.2 MONITORING EFFORTS IN 1992 AND 1993

A tribal student and two tribal fishery technicians from the YIN were hired to assist in the study during the 1992 and 1993 Zone 6 fishing seasons, respectively. Instead of relying on the hot-line for reports of suspect fish, arrangements were made with fish buyers in The Dalles and Cascade Locks, Oregon; and Dallesport, Washington, to hold fish and to call PNL when suspect fish were brought to their warehouses. The tribal student and tribal technicians visited the buyers and talked to fishers on a daily basis, searching for suspect fish. PNL, with the aid of technicians from the YIN, achieved the following:

- maintained daily contact with tribal fishers to publicize the program and encourage participation
- arranged to have suspect fish examined and photographed by fisheries pathologists
- summarized harvest data for the Zone 6 fishery to evaluate the incidence of diseased fish.

2.0 TRIBAL OUTREACH

Two other goals of this program were to maintain a cooperative working relationship with the YIN and to provide educational and employment opportunities for tribal members. In 1991, Greg Strom was the tribal student hired to assist in the program. Tracy Lewis, a student from the YIN attending Mount Hood Community College in Gresham, Oregon, was hired by PNL to assist in the program in 1992. Mr. Lewis's responsibilities included meeting with fish buyers in The Dalles and Cascade Locks, Oregon, and Dallesport, Washington; distributing informational materials; visiting fish broker warehouses and satellite receiving stations daily during the fishing season; delivering suspect fish to a pathologist for examination; and interviewing tribal fishers. In 1993, Harvey Jim and Cecil James, Jr., fisheries technicians from the YIN, were hired to perform the same tasks.

3.0 METHODS

Following the study outline developed in 1991 (Abernethy et al. 1992), PNL monitored the quality of fish caught during the fall Zone 6 fishery by contacting buyers and tribal fishers. Instead of the hot-line as in 1991, tribal technicians contacted fish buyers and fishers directly in 1992 and 1993.

3.1 COMMUNICATION WITH FISH BUYERS AND ZONE 6 FISHERS

Before the beginning of the Zone 6 fishery in 1992 and 1993, PNL contacted each buyer, described the study, and solicited help. Each buyer was asked to look for fish that were unfit for human consumption because of disease or appearance (i.e., open sores, tumors, deformities, or putrid odor not related to handling). Buyers were given a list of phone numbers and instructed to call PNL or notify the fisheries technicians when they received suspect fish. The technicians and student picked up the fish, reimbursed the buyers at market value, and delivered the fish to a disease pathologist for examination.

3.2 DISEASE ANALYSIS

Fish collected during the study were examined at the Lower Columbia River Fish Health Center at Spring Creek Fish Hatchery in Underwood, Washington, operated by the U.S. Department of Interior, Fish and Wildlife Service. Pathologists conducted a routine examination that included gross external and internal inspection for signs of trauma and abnormal tissue appearance, and screening for parasites and bacterial and viral infection. The pathologists also took pictures of each fish to document their findings.

3.3 HARVEST DATA

Information on tribal fishing seasons and the number of fish harvested from the Zone 6 fishery were obtained from the YIN harvest managers. Summary harvest information was used to evaluate the incidence of diseased fish collected during the study.

4.0 RESULTS

4.1 COMMUNICATION WITH FISH BUYERS AND ZONE 6 FISHERS

Flyers describing our program and listing the hot-line number were posted at boat launches and campsites along the Columbia River in 1991. The YIN tribal student hired in 1991 accompanied tribal fishers on one occasion, but other direct contact with fish buyers and tribal fishers was limited. In 1992 and 1993, the tribal student and tribal technicians, respectively, contacted fishers frequently and made daily visits to the three buyers that purchased virtually all fish caught in the Zone 6 fishery. These buyers were:

1) King Fish Trading Company, Inc., The Dalles, Oregon
2) Bonneville Fisheries (J & A Enterprises 1993), Cascade Locks, Oregon
3) Roy Gilmore, Dallesport, Washington.

Based on the hot-line response in 1991, the proportion of fish unfit for human consumption was small. Thus, the hot-line appeared to be ineffective as a means for reporting diseased and contaminated fish. One steelhead was collected after receiving a call from the King Fish Trading Company, Inc. The only other call on the hot-line occurred in late September. A tribal fisher called to report a steelhead he had caught by dipnet in the lower Klickitat River. When the tribal student arrived to pick up the steelhead, the fisher also gave him a salmon for analysis. There were no other calls made to the hot-line.

No calls were received nor any fish collected from Bonneville Fisheries in 1992. However, most of the technicians' activities were in the vicinity of The Dalles, and visits to the Bonneville Fisheries' warehouse in Cascade Locks were infrequent. One steelhead was received from Roy Gilmore in August. No other fish were reported or collected until September 25, when the King Fish Trading Company called to report three salmon. On October 28, they also called and reported a sturgeon (*Acipenser transmontanus*). According to the owners, other suspect fish were brought into the King Fish Trading Company on two occasions; however, they forgot to call and the fish were thrown away. Roy Gilmore also reported finding a salmon with a large tumor in its viscera, but he was unable to reach PNL or the tribal student. Pathology reports for fish collected in 1992 are included in Appendix A.

In 1993, two fisheries technicians worked the shores of the Columbia River daily from McNary Dam (River Mile 292) to Bonneville Dam (River Mile 146) throughout the August and September fishing seasons. A total of 20 fish (10 salmon, 8 steelhead, 1 walleye (*Stizostedion vitreum vitreum*), and 1 white sturgeon) were collected and delivered to the pathologists for examination. The pathology reports are in Appendix B. The fish were collected from August 11 through September 16 and included fish caught in gill nets set near John Day, Rufus, The Dalles, and Cascade Locks, Oregon, and from scaffolds at Rock Creek and the Klickitat River, Washington. Although some of the fish were obtained directly form tribal fishers, most were purchased from fish buyers.

4.2 DISEASE ANALYSES

All fish collected during the study were taken to the Lower Columbia River Fish Health Center in Underwood, Washington, for analysis. During the 1991 fall salmon fishery, only 3 fish out of more than 80,000 fish caught in Zone 6 were reported to the hot-line. One fish was infected with a parasite that affected appearance. None of the fish had bacterial or viral infections.

In 1992, the steelhead and 2 of the 3 salmon had large lesions with exposed flesh (Appendix A). The pathologists reported that lesions originated as gill net abrasions and were not caused by bacteria or exposure to polluted water. Small hemorrhages on the third salmon were also attributable to capture by gill net. The white sturgeon had fungal infections externally, and tumors were found on the heart and spleen. The cause of the tumors was not determined.

Most fish collected and analyzed in 1993 had lesions and hemorrhages similar to fish examined in 1992 (Appendix B). Large, open lesions with exposed flesh, and other inflamed areas were caused by secondary infection of gill net cuts and abrasions. Two steelhead had fatty tumors in the dorsal region. The pathologists had no explanation for the cause of the tumors. One salmon and the sturgeon had spinal deformities attributed to either injury or genetic defect. The poor condition of the walleye was likely the result of post-spawning trauma.

4.3 HARVEST DATA

Although the 1991 season ran into October, the hot-line was only active during August and September, or 20 of the 26 days of the season. During this time, 80,770 salmonids were caught (Table 4.1).

Low pre-season escapement forecasts for upriver bright (URB) and Bonneville pool hatchery (tule) fall chinook salmon runs limited harvest opportunities during the fall Zone 6 fishery in both 1992 and 1993. All or part of Zone 6 fishery was open for a total of 36 days in 1992 and 26 days in 1993. A summary of salmon catches during the Zone 6 fishery is shown in Table 4.1.

Incidental harvest of sturgeon and walleye occurred each year. Sturgeon could be retained for personal consumption but could not be sold. Less than 1,000 sturgeon were caught annually. The number of walleye caught during the fishery was also small.

TABLE 4.1. Summary of Salmonids Caught In Zone 6 Fall Salmon Fishery, 1991 Through 1993 (data from Steven Parker and Bill Bosch, Harvest Management, Yakama Indian Nation, Toppenish, Washington)

Season	Chinook Salmon URB[a]	Chinook Salmon MCB[a]	Chinook Salmon BPH[a]	Coho Salmon (*Oncorhynchus kisutch*)	Steelhead
1991					
Aug 12-16	844[b]			0	5,279
Aug 20-24	1,480[b]			1	3,837
Sept 9-14	34,784[b]			2,838	13,342
Sept 16-18	10,239[b]			1,856	6,270
Sept 30- Oct 2	3,463[b]			1,153	4,455
Oct 25-28	860[b]			1,340	3,538
Total by species:	51,670[b]			7,188	36,721
Total salmonid harvest:	95,579				
1992					
Aug 10-15	260	40	50	0	7,400
Aug 17-22	430	190	180	0	7,900
Sept 2-5	3,240	1,060	5,150	17	9,000
Sept 7-11	510	90	4,570	22	1,800
Sept 17-19	3,210	320	430	162	7,200
Sept 23-26	5,900	1,960	600	479	9,900
Oct 5-10	1,560	630	0	210	3,700
Oct 12-17	760	380	0	104	1,800
Total by race/species:	15,870	4,670	10,980	994	48,700
Total salmonid harvest:	81,214				
1993					
Aug 9-14	390	150	70	0	2,440
Aug 18-21	590	220	80	0	2,180
Aug 25-28	2,080	700	540	0	2,300
Aug 30 - Sept 2	2,550	970	1,230	6	2,570
Sept 13-18	10,000	790	1,060	136	4,920
Sept 23-25	2,240	3,560	1,350	623	5,000
Sept 27 - Oct 2	2,230	1310	110	535	6,120
Total by race/species:	20,080	7,700	4,440	1,300	25,530
Total salmonid harvest:	59,050[c]				

(a) URB = Upriver Bright.
MCB = Mid-Columbia Bright.
BPH = Bonneville Pool Hatchery (Spring Creek) Tule.

(b) Total chinook salmon catch statistics are presented for 1991.

(c) An estimated additional 2,200 chinook salmon and 2,950 steelhead were sold directly to the public or taken home through October 2.

5.0 DISCUSSION

The number of fish reported to PNL was a very small proportion of fish caught during the Zone 6 fishery. In the 3 years of the program, more than 225,000 fish, mostly salmonids, were caught while the fishery was actively monitored. Use of the hot-line in 1991 resulted in only 3 reports of diseased or suspect fish for analysis. Direct contacts with fishers and fish buyers in 1992 resulted in the collection of only four salmonids and one sturgeon. By hiring two technicians and intensifying contacts and monitoring efforts on the Columbia River in 1993, 20 fish were collected for analysis. Regardless, the magnitude of the fish quality problem appears to be much smaller than was suggested by tribal fishers when the program was initiated in 1991.

Most salmon and steelhead examined by fish pathologists had external lesions or inflammation directly attributable to net abrasion. Bacteria isolated from the lesions were not pathogenic and were not the primary cause of the lesions. Pathologists speculated that as fish struggled to free themselves from the net, slime and scales were scraped from the fish. Water-borne bacteria then attacked the abraded areas, causing skin and tissue to slough off, exposing the underlying flesh.

Bacterial degradation of fish tissue is accelerated when water temperature increases. Although water temperatures were generally warmer during August (up to 22°C), many fish with inflamed net abrasions were reported in September when water temperature in the Columbia River had begun to decrease. Since bacterial growth is temperature-dependent, the proportion of fish with surface lesions from gill net abrasions should have been higher in August than in September. However, since the proportion of fish with lesions was about the same in August and September, factors other than water temperature, such as pre-spawning stress, probably contributed to the formation of lesions. The pathologists reported that the condition of most fish brought into the laboratory for analysis was beginning to deteriorate from pre-spawning stress.

Most external lesions were confined to the skin and immediate underlying tissues (i.e., less than 1/4-inch deep). Exposure of flesh to water through open wounds could cause the flesh to get "mushy" and taste muddy. Therefore, fish with large open lesions have little commercial value. However, the pathologists stressed that none of the fish they examined posed a health threat to the consumer.

One sturgeon caught by set line had external lesions similar to those observed on salmon caught in gill nets. Microscopic examination of the lesions revealed a fungus that may have been the primary causative agent. Fish generally are not susceptible to fungal infection unless there is a previous injury or other stress that has weakened the fish. Malignant tumors were found in the heart, spleen, and other internal organs of the sturgeon caught in 1992. The pathologist suggested that the malignant disease may have made the sturgeon more vulnerable to fungal and bacterial infection.

The severe deformities of a sturgeon and one salmon collected in 1993 were attributed to genetic defects. Although fish with "birth defects" are common in the hatchery environment, they are rarely seen in the wild because debilitated fish have limited ability to compete and survive. Although chronic exposure to toxins (pollution or contamination) can cause genetic damage, the pathologists did not find any other signs, such as abnormal development or growths in internal organs, to suggest that the deformities were caused by a toxic agent.

Two fish were diagnosed as having "fatty tumors"; however, the fish health center is not equipped to analyze tissue samples or screen them for contaminants or pollutants. The fish health center's examinations reached reasonable conclusions about the cause of lesions, etc., without the need of doing expensive tissue analysis. The pathologists suggested that in the future, fish with tumors or other gross abnormalities could be offered as samples for other projects researching water quality in the Columbia River.

In 1990, the Oregon and Washington State legislatures directed the formation of the Lower Columbia River Bi-State Water Quality Program (Bi-State Program). The 4-year program was initiated in 1991 to assess water quality in the lower Columbia River (Tetra Tech, Inc. 1993). Fish tissues were sampled for 11 metals and 108 organic chemicals. Fish species sampled were largescale sucker (*Catostomus macrocheilus*), peamouth (*Mylocheilus caurinus*), white sturgeon, carp (*Cyprinus carpio*), and crayfish (*Pacifasticus leniusculus*) (Tetra Tech, Inc. 1993). Samples from resident fish from the Columbia River downstream from Bonneville Dam frequently had detectable levels of organic and trace metal contaminants. The researchers are considering adding salmon and largemouth bass (*Micropterus salmoides*) or another game fish species to their sampling protocol. It is possible that fish caught in the Zone 6 fishery could be used for samples in future monitoring projects.

It is doubtful that pollution or contamination from past or present Hanford activities affected the health or quality of salmon caught while passing through the Zone 6 fishery. Because waterborne radiological and chemical contaminants enter and accumulate in fish tissue through the same pathways (ingestion and absorption through the gills and skin), research on radiological uptake and retention provides information applicable to chemical contamination. Most URB fall chinook salmon caught in the Zone 6 fishery originate from the Hanford Reach of the Columbia River. Shortly after hatching, fall chinook salmon fry leave the Hanford Reach and begin their journey to the ocean. The life cycle of the fall chinook salmon limits their exposure to potential waterborne contaminants in the Columbia River to the brief period of incubation, emergence, and rearing that occurs before migration to the ocean. Because adult salmonids returning from the ocean to spawn generally do not feed after they enter fresh water, the main source of contaminants assimilated through the food chain would have come while feeding on organisms in the ocean (Thiede et al. 1994). The small contribution of the food chain pathway in fresh water compared to the contribution of the food chain pathway in the ocean greatly reduces the risk of contamination from bioconcentration from freshwater sources for anadromous fishes.

Resident fish species that spend their entire lives in the river have a greater chance of being exposed to toxic materials in the Columbia River. White sturgeon, because they are long-lived and bottom feeders, are more likely to take up contamination directly from the water, from ingestion of contaminated sediments, and through the aquatic food chain (Dauble et al. 1988). White sturgeon from Lake Wallula had elevated levels of polychlorinated dioxin and -furans (PCDFs); however the researchers concluded that eating Columbia River fish did not pose a significant human health risk (Serdar et al. 1991). Fish with high fat content (i.e., white sturgeon, carp, peamouth, and largescale suckers) are most likely to have elevated contaminant levels (Tetra Tech, Inc. 1993).

In 1989-1990, white sturgeon were collected from several areas of the Columbia River, including areas near The Dalles and Bonneville Dams, from Lake Roosevelt upstream of Grand Coulee Dam, and from the Hanford Reach. Tissues (muscle, cartilage, and viscera) were tested for radionuclide contamination. Results showed that radionuclide concentrations in white sturgeon collected in the Hanford Reach had decreased dramatically since the time of major reactor operations in the mid-1950s (Dauble et al. 1992). Additionally, there was no significant difference in radionuclide concentration for fish caught in the Hanford Reach when compared to fish caught upstream or downstream of Hanford.

Fish tissues are routinely analyzed as part of the ongoing environmental monitoring program on the Hanford Site. In 1988, muscle samples from spawnout fall chinook salmon collected along the Hanford Reach and from the Priest Rapids Hatchery just upstream of the Hanford Reach were analyzed. Radionuclide analyses indicated no measurable influence on fish from radionuclides released to the Columbia River during current or past operations at Hanford (Jaquish and Bryce 1989). Analyses of fish collected throughout the Columbia River Basin have repeatedly shown that levels of radionuclides in fish tissues are at background levels or below detection limits.

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APPENDIX A

FISH DISEASE REPORTS
1992

R1-57

UNITED STATES GOVERNMENT FISH AND WILDLIFE SERVICE

Memorandum

TO : Scott Abernathy
Battelle Northwest

DATE: October 26, 1992

FROM : Eric Pelton
Lower Columbia River Fish Health Center

SUBJECT: Pathology of gill netted Salmonids

The Lower Columbia River Fish Health Center detected no particular pathology on all fish brought in for examination on August 13 and September 25.

The adult steelhead brought in on August 13 had two small lesions, associated bacterial pathology, and no obvious parasitology. The fish had been dead over 24 hours and was definitely decomposing.

The three upriver bright fall chinook females brought in on September 25 were fresher. The Health Center took virology samples which tested negative on two cell lines (CHSE 214 and EPC cells) for IHN, IPN, and VHS viruses. The numerous external petechiae could have been caused by compression from gill nets. The shallow lesions on fish #2 and #3 were of unknown origin. Some decomposition complicated the exam but overall, indications were of external origin and typical of fish near spawning.

Having more fish to examine will give us a better idea of what is normal and what is not, and how wide spread these symptoms could be. We appreciate the opportunity to help, and if you have questions, or more fish, please call.

Sincerely,

Eric Pelton

REPORT OF HEALTH EXAMINATION OF FISH

Location: COL. RIV	Date: 08/13/92	Brood Year:	
Lot No.: ADULT	Species: STT	Case: 501385	Container ID:
Exam type:	D		
Pond. No. or Descr.:	GILL NET FISHERY		
Water Source:	COLUMBIA RIVER		
Examiner:	PELTON		

REMARKS

#92-01. One adult male SST in gill net fishery was brought in for examination. Fish had two small shallow lesions on anterior dorsal and supra abdominal. Fins were good except tail (cut?). Probably wild fish, dead well over 24 hours. Lesions appear to be surface origin (abrasion or cut?). Light bacterial growth on TSA, motile aeromonads. Fish not fresh enough for parasite exam (external). Possible hook tear in jaw.

NO RECOMMENDATIONS FOUND FOR CASE # 501385
Tissue records for case=501385

Type of Analysis	Tissue Tested	Comments
B	KD	Motile aeromonads - 2 isolations
B	SK	Relatively clean
E	WF	Skin abrasion, lesion

Disease records for case=501385

Disease	Incidence percent	Incidence (L,M,H)	Comments
XX	0.0		Unknown

REPORT OF HEALTH EXAMINATION OF FISH

Location: COL. RIV Date: 09/25/92 Brood Year:

Lot No.: ADULT Species: URB Case: 501384 Container ID:

Exam type: D

Pond. No. or Descr.: GILL NET FISHERY

Water Source: COLUMBIA RIVER

Examiner: PELTON

REMARKS

#92-02. Three fish brought in by Scott Abernethy from Battelle Northwest in Richland, WA, Indian gill net fishery. Fish #1 had numerous 1/4" diameter epidermal petechiae, primarily visible posterior to gill net abrasion, which cut deep. Fish was fresh, no bacterial growth on TSA. Fish #2 and #3 had gill net abrasion behind gills, not fresh, shallow to 1/4" deep lesions to 15-30% of Body surface. TSA was CO+ gram- motile rods predominantly, probably from decomposing. Virology negative.

NO RECOMMENDATIONS FOUND FOR CASE # 501384
Tissue records for case=501385

Type of Analysis	Tissue Tested	Comments
P	GL	Clean fish #1
P	SK	Clean, epidermal petechiae
B	LS	No suspect myxobacteria
B	KP	Gram- motile CO+ rods on TSA
V	KD	Negative on CHSE and EPC cells

Disease records for case=501384

Disease	Incidence percent	Incidence (L,M,H)	Comments
BU	0.0	L	Decomposing fish

REPORT OF HEALTH EXAMINATION OF FISH

Location: COL. RIV	Date: 10/28/92	Brood Year:	
Lot No.: ADULT	Species: STU	Case: 501402	Container ID:
Exam type:	D		
Pond. No. or Descr.:	GILL NET FISHERY		
Water Source:	COLUMBIA RIVER		
Examiner:	BARNEY, PELTON		

REMARKS

One 30# sturgeon brought in alive, external lesions and scrape. Gills may have been scraped. A. Hydrophila isolated as relatively few colonies from kidney on TSA. Fungused lesion had clean leading edge. Muscle and testes had hemorrhaging, swim bladder was fibrous. Heart appeared necrotic, spleen looked "odd". No myxobacteria growth from lesion on Ordal's, no growth from kidney. Unidentified nematode worms in musculature and testes. Heart condition due to malignant lymphoma as reported by J. Morrison at Olympia Fish Health Center.

NO RECOMMENDATIONS FOUND FOR CASE # 501402
Tissue records for case=501402

Type of Analysis	Tissue Tested	Comments
B	LS	Abundant bacteria, some myxos.
B	KD	A. hydrophila
N	VS	Nematodes
E	HT	Necrotic heart
E	MS	Hemorrhage

Disease records for case=501402

Disease	Incidence percent	Incidence (L,M,H)	Comments
BA	0.0	L	Not disease situation
BM	0.0	L	In lesion

REPORT OF HEALTH EXAMINATION OF FISH

ADDITIONAL REMARKS FOR CASE #501402

STURGEON: One 30 pound sturgeon, still alive.

EXTERNAL: Gills looked like they had been scraped clean of 2° lamellae by a fishing line or something on one side.

More chronic-looking lesion along left side, fungused but with a clean leading edge.

1 Slide taken from the leading edge of the lesion (dried, not heat fixed)

3 TSA (1 lesion, 2 kidney)

3 Ordals (1 lesion, 2 kidney)

INTERNAL: Nematode worms in musculature and testes.

TAKEN FOR HISTOLOGY: Heart, looked very necrotic

Spleen, looked odd

Swim bladder, was fibrous inside.

Lesion: Myxobacteria from smear, no growth (myxos) on Ordals.

Kidney: A. hydrophila, few colonies only.

Heart condition due to malignant lymphoma as reported by J. Morrison at Olympia Fish Health Center.

APPENDIX B

FISH DISEASE REPORTS
1993

R1-57

UNITED STATES GOVERNMENT . FISH AND WILDLIFE SERVICE

Memorandum

TO : Scott Abernathy
Pacific Northwest Laboratories
Battelle Blvd.
Richland, WA 99352

DATE: Sept. 23, 1993

FROM : Eric Pelton
Lower Columbia River Fish Health Center
MP 61.75R SR 14
Underwood, WA 98651

Dear Scott,

I have summarized the diagnostic services on 8 steelhead, 8 fall chinook (includes 4 brights), 1 pink (?) salmon, 1 spring chinook, 1 walleye, and 1 small sturgeon. Fish were received between 8/11/93 and 9/16/93 from catch points at John Day, Rufus, The Dalles, Cascade Locks, and other places. Most were in fair condition. Several should have been iced better and at least four were too decomposed to gather much information. All tumors and lesions appeared to be benign or injury (net?) related. Bacteriology was typical of prespawning or dead salmon with a few (normal) isolates such as a motile aeromonad and two fish with gross BKD lesions. The sturgeon and spring chinook had genetic deformities. A walleye female was a spawnout and had poor conformation.

Some fish, perhaps most of these could have been culled out before considering bringing them into our lab. Fish which are obviously deteriorating from spawning stresses and those which have cuts and net abrasions are examples. It does appear that the word is getting out about checking suspect fish. More fish next year with good preselection could be more useful. Last year had what? Two or three fish?

In summary, the majority of fish had net or other injuries, a few real tumors or lesions, two deformed fish, and two gross BKD fish, which could not be identified externally. We appreciate the opportunity to help you again. If you have further questions, please call.

Sincerely,

Eric Pelton
Fish Health Biologist

P.S. Photos of most fish will be available, referenced to case number.

Date Received	Case #	Location	SPP	Observations	Results
08/11/93	93-224	Cascade Locks (Borstein Co.)	SST (F)	Large fatty oily tumor, tagged, snout removed, heavy net abrasion	Few motile aeromonads
08/17/93	93-227	Rock Creek Platforms	SCS	Not good condition, odorous, twisted spine	Scoliosis
08/18/93	93-228	Kingfish	Walleye	Approx. 5 yr old, possible spawnout, poor body conformation (deformed?)	Negative
08/20/93	93-230	Klickitat River Falls	STT (F)	Hatchery steelhead, numerous superficial cuts, odorous (not fresh?)	Negative
08/20/93	93-233	Cascade Locks	STT (F)	Bleeding from net marks, swollen kidney	BKD+, TSA-
08/27/93	93-241 93-242	Cascade Locks	FCS (2)	(2) Poor condition, not fresh enough to examine	
	93-242		Pink (1)	Poor condition, not fresh enough to examine, Pink had a hematoma possibly from impact	
08/31/93	93-245	The Dalles	STT	Large fatty dorsal tumor, cut open so was contaminated, headless	Bacteria negative
09/01/93	93-249	The Dalles	STT	Headless, eviscerated, petechiae on skin, possible net damage	None
09/15/93	93-260	Rufus	STT (2)	Few net marks, some hemorrhage	Negative
09/15/93	93-261	John Day	FCS (M) FCS (F)	Caudal lesion Abdominal lesion	Negative
09/16/93	93-266	John Day	URB (3)	Minor net cuts and abrasions, fish look like normal prespawners, patchy skin. One fish tagged, snout removed.	BKD+. one fish
09/16/93	93-267	John Day	URB (F)	Fresh dorsal lesions, net abrasions	Negative
09/16/93	93-268	John Day	STU	Juvenile, deformed tail and caudal	Genetic Deformity (?)

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