Annual catch-per-unit-effort data collected by the Yukon River Sub-district Y-5A Test Fish Wheel Project, 2008

R&M# 06-08

Project Proponent: Patrick Moore, Garden Creek Fish Research Services, P.O. Box 61 Tanana, Alaska 99777, patrick_moore23@hotmail.com

Project Partner: David Daum**,** U.S. Fish and Wildlife Service, 101 12th Avenue, Room 110, Fairbanks, Alaska 99701

1. Introduction:

Summary:

Catch-per-unit-effort (CPUE) data were collected from Sub-district Y-5A test fish wheel in 2008. The operator accessed the fish wheel from Tanana by riverboat. Alaska Department of Fish and Game (ADF&G) and U.S. Fish and Wildlife Service (USFWS) personnel from Fairbanks monitored the site during the operating season. The project is located six miles downstream of Tanana, Alaska at approximately river mile 695, on the south bank of the Yukon River. The fish wheel is positioned about 1/2 mile downstream of the mouth of Corbusier Slough. The slough is the farthest downstream entrance to the Tanana River (Fig. 1). The salmon migrating past the site are considered to be primarily of Tanana River origin (Buklis 1981). The information was collected in 2008 using the same "trigger switch" video capture equipment installed on the fishwheel and tested in 2001 (Fliris 2001). Salmon species counted by the project were: Chinook salmon *Oncorhynchus tshawytscha,* chum salmon *O. keta,* and coho salmon *O. kisutch.* Other fish species, by common name, included: burbot, pike, grayling, sheefish and three species of whitefish. Comparatively, the numbers of these non-salmon species were low.

Objectives:

The Sub-district Y-5A Test Fishwheel Project (the Project) has provided CPUE data to managers of the ADF&G since 1993, with the exception of 2007. The Project gives the first indication of the run timing and relative abundance of salmon stocks entering the Tanana River. The information gathered is used in-season to help apportion the salmon harvest on the Tanana and upper Yukon Rivers.

2. Study Area:

Yukon River (Sub-district Y-5A), river-mile 695

3. Methods:

The Project began counting on June 15 and ceased operations on September 27 2008. The same fish wheel that was modified and used during the 2006 season was positioned in approximately the same spot as had been used in the previous seasons. The same length of underwater lead was used as in the past to guide salmon to the fish wheel. Dave Daum, USFWS, arrived nine days after the project startup and assisted with the computer and equipment setup on the wheel and in the office. Prior to D. Daum's arrival, counting was taken place on the fish wheel with a live box and dip net. Counting was done 24 hours a day, seven days a week, unless interrupted by maintenance or river conditions; i.e., high debris load or freezing temperatures. Mudflows that had intermittently interrupted the project's operation in previous years, although present in 2008, posed no problems with the operation of the project in 2008. A water temperature data logger was installed on the fish wheel as in previous years, but a malfunction rendered the 2008 data unusable.

The video capture equipment used by the project was the same as in 2003 (Table 1) and was operated in a similar manner as described in Fliris and Daum (2003). The "trigger switch"

capture method (Fliris 2001) was the primary method of data collection throughout the season. Video capture is the process of separating and storing only the frames that contain fish images from the total number of video frames processed in a day. The video system utilized a 12-volt surveillance camera mounted above an enclosed chute on the fish wheel. A door with a magnetic trigger switch attached to it, located at the bottom of the camera chute, opened whenever a fish passed through. The trigger switch in turn signaled a Panasonic Toughbook model portable computer to capture a set number of video frames from the camera and store them on the computers' hard-drive. The capture software used was Salmonsoft FishCap 1.4.0. The digital video files (avi format) were copied to a removable IBM micro-drive for transportation from the fish wheel. The files were then transferred to a computer in the operator's home where the video frames were reviewed and the daily count of each salmon species was done using Salmonsoft FishRev 1.4.0. To ensure that the video system was working properly, comparisons between video counts and counts recorded on a video cassette recorder (VCR), live box dip netting, or visual fish wheel capture were done throughout the season. When fish numbers were high, the operator would manually count the fish wheel catch while watching the actual video capture on the computer's monitor.

Video counts were recorded in a logbook and then transferred to a Microsoft Excel worksheet. The daily tallies of each species were adjusted for a 24-hour period. All the worksheets and video files were backed-up to Compact Disks (CD-R). The daily worksheet summary was forwarded by e-mail attachment to the Fairbanks office of the ADF&G. A live box was kept on the wheel for the duration of the project for backup in case the electronics failed and counts had to be done by dip netting.

4. Results:

This was the sixth year of gathering information on the timing and relative abundance of Chinook and summer chum salmon entering the Tanana River, with a one year interruption in 2007. Information for fall chum and coho salmon has been collected since 1993 with the exceptions of 2006 and 2007.

Of the 2,520 sampling hours possible (105 days), 2,126 hours were counted from June 15 to September 27 (Table 2). During the beginning of August, the Tanana River flooded and caused the Project to be shutdown for eight days (August 1-8). The Project ceased operation on September 27 due to icing conditions. The total numbers of salmon counted in 2008 were:

1. Chinook: 800; 450 ≥70 cm, 350 <70 cm
2. Chum: Total: 9,053
3. Coho: Total: 5,699
4. Sockeye: Total: 2

White fishes counted were:

1. cisco-379
2. humpback-255
3. broad-342

Other species and their numbers were:

1. burbot-9
2. sheefish-28

3. northern pike-7
4. 112 longnose suckers

The Chinook salmon run peaked on July 8 with a 24-hour adjusted count of 84 fish and experienced a smaller, earlier peak on June 27 of 54 fish (Figure 2). The summer chum salmon run peaked on July 15 with 135 fish and the fall run experienced three increasing peaks with the largest on September 21 with 619 fish (Figure 3). The coho salmon run peaked on September 23 with 674 fish (Figure 4).

Results from the in-season comparisons between the video counts and counts recorded on a video cassette recorder (VCR), live box dip netting, and visual fish wheel capture showed that the video system missed very few fish. Only one small cisco was missed by the video system (Table 3). No fish were missed by the video system when compared to either live box counts or actual fish wheel capture.

Table 1. Video system equipment list.

POWER SUPPLY AND LIGHTS:

- 1 Honda EU2000I and 2 Honda EU1000I, portable generators (for recharging batteries and running night lights – 2 spares).
- 5 Trojan, SCS200, 115 amp hour, deep cycle batteries (1 spare)
- 1 Schumacher, Model SE-1-125, 1.5 amp automatic maintenance charger (use off-season)
- 1 Solar Converters Inc., Model BD-2 battery de-sulphator (use off-season)
- 1 Todd Engineering PC30b power supply/battery charger (fish wheel)
- 1 Portawattz 300 voltage inverter
- 2 90 Watt, General Electric Halogen Floodlights. (+ spares)
- 1 Electripik Surge Suppressor
- 2 Max serial interfaces (1 spare)
- 2 Radio Shack auto DC adaptor 273-1815 (1 spare)
- 2 Belkin F5U208 power supply (1 spare)

VIDEO EQUIPMENT:

- 2 Panasonic 1070dc Video Recorders (1 spare)
- 2 Panasonic AG-6124 Time Lapse Video Recorders (1 spare)
- 2 Panansonic WV-CP450/WV-CP454 Video Cameras (1 spare)
- 1 Computar Vari-Focus Lens TG272814FCS-2 (1 spare)
- 1 Pelco Waterproof Surveillance Camera Housing

COMPUTERS AND SOFTWARE:

- 1 Gateway GP7-600 computer (Video processing, storage, data analysis and archiving)
- 1 Intel Smart Video Recorder 3 capture card and software
- Salmon Soft Video Capture(Fish.Cap) version 1.4.0 and Fish Rev. version 1.4.0 (from Columbia River Intertribal Fish Commission)
- Microsoft Windows ’98 second edition
- Microsoft Office 2000 Small Business Edition (for reports, spreadsheets, etc.)
- Adobe Photoshop 6 (photo processing)
- 2 Panasonic CF-48 Toughbooks (for direct video capture via trigger switch - 1 spare)
- 3 IBM Microdrives, 1 Gbyte capacity, with PC Card adaptors (for data transfer)

MISCELLANEOUS:

- 2 Pelican 1600 watertight storage cases (used on the fishwheel to house the recording VCR and for sending both VCR’s to Fairbanks for cleaning and maintenance)
- Stowaway Tidbit, model TBI32-05+37, water temperature data logger

Table 2. Video summary, Tanana, Y-5A, 2008.

Counting	Start	End	Run Time	King Salmon			Chum salmon	Coho salmon	Cisco	Humpback	Broad				King	Chum	Coho		Depth Off
Date	Date/Time	Date/Time	(hr)	Large	Jack	Total	Total	Total	Whitefish	Whitefish	Whitefish	Sheefish	Sucker	Other	per 24 hr	per 24 hr	per 24 hr	Comments	Bottom
		TOTALS	2125.88	450	350	800	9053	5699	379	255	342	28	112						
6/15/2008	0:00	23:59	24.00	0	0	0	0	0	3	0	4	1	2	0	0.00	0.00	0.00	Dip counts, 2 rpm, windy	8"
6/16/2008	0:00	23:59	24.00	0	0	0	0	0	5	0	4	3	0	0	0.00	0.00	0.00	Dip counts, 2 rpm, windy	8"
6/17/2008	0:00	23:59	24.00	0	0	0	0	0	1	0	0	1	0	0	0.00	0.00	0.00	Dip counts, 3 rpm, Overcast	1 foot
6/18/2008	0:00	23:59	24.00	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	Dip counts, 4 rpm, Nice day	1 foot
6/19/2008	0:00	23:59	24.00	1	0	1	0	0	0	1	1	1	0	0	1.00	0.00	0.00	Dip counts, 3 rpm, Overcast	1 foot
6/20/2008	0:00	23:59	24.00	2	0	2	0	0	0	1	0	0	1	1 burbot	2.00	0.00	0.00	Dip counts, 2 rpm, Nice day, Dave D. arrives	1 foot
6/21/2008	0:00	23:59	24.00	1	0	1	0	0	4	0	4	2	1	0	1.00	0.00	0.00	Dip counts, 2 rpm, just missed thunderstorm	1 foot
6/22/2008	0:00	23:59	24.00	1	2	3	0	0	0	3	2	0	2	0	3.00	0.00	0.00	dip counts, 2 rpm 78 degrees and thundershower set up video gear	1 foot
6/23/2008	0:00	23:59	23.33	2	0	2	0	0	6	7	6	1	0	1 pike	2.06	0.00	0.00	1st. Day video count	1 foot
6/24/2008	0:00	23:59	23.67	10	0	10	0	0	9	8	6	0	0	0	10.14	0.00	0.00	nasty rainy day cleared up in the evening last nite for little man on my shoulder	1 foot
6/25/2008	0:00	23:59	23.86	6	1	7	0	0	8	7	2	1	1	0	7.04	0.00	0.00	rev every 40 secs drift wind out of the north	1 foot
6/26/2008	0:00	23:59	12.89	14	0	14	0	0	6	1	0	1	0	0	26.07	0.00	0.00	down due to debris for 11.11 hours nice weather	1foot
6/27/2008	0:00	23:59	21.08	44	3	47	1	0	6	5	0	1	2	0	53.51	1.14	0.00	down due to debris for a short period of time	1 foot
6/28/2008	0:00	23:59	23.89	36	7	43	1	0	16	1	0	0	2	0	43.20	1.00	0.00	water coming up overcast and coolish	1.5 foot
6/29/2008	0:00	23:59	22.65	30	5	35	0	0	1	3	0	0	0	0	37.09	0.00	0.00	much electrical and mechanical problems but everything back running again	1.5 foot
6/30/2008	23:05	23:59	0.91	0	0	0	0	0	0	0	0	0	1	0	0.00	0.00	0.00	drift raised hell with the wheel and assoc. electronic and electrical apparatus	1.5 foot
7/1/2008	0:00	23:59	22.31	10	4	14	2	0	4	2	1	0	0	0	15.06	2.15	0.00	back running smoothly	1.75 foot
7/2/2008	0:00	23:59	21.64	17	16	33	2	0	6	7	1	0	1	0	36.60	2.22	0.00	nice day, 2 rpm	1.5 foot
7/3/2008	0:00	23:59	23.87	15	17	32	8	0	6	2	2	1	1	0	32.17	8.04	0.00	hot windy day	1.5 foot
7/4/2008	0:00	23:59	23.85	19	27	46	12	0	3	6	0	1	4	0	46.29	12.08	0.00	nice day drift clearing out 2 rpm	1.5 foot
7/5/2008	0:00	23:59	23.90	21	19	40	18	0	4	4	0	0	4	0	40.17	18.08	0.00	nice hot day 2 rpm	1.5 foot
7/6/2008	0:00	23:59	23.87	10	14	24	17	0	3	9	1	0	7	0	24.13	17.09	0.00	nice hot day 2 rpm	1.5 foot
7/7/2008	0:00	23:59	14.75	11	16	27	19	0	2	6	0	0	5	1 pike	43.93	30.92	0.00	door was messed up from yukon drift therefore short count day	1.5 foot
7/8/2008	0:00	23:59	23.64	33	49	82	51	0	2	5	1	0	3	1 burbot	83.25	51.78	0.00	cloudy and cooler	1.5 foot
7/9/2008	0:00	23:59	23.96	28	35	63	55	0	3	6	0	1	2	0	63.11	55.09	0.00	nice with a few thundershowers 2 rpm water steady	1.5 foot
7/10/2008	0:00	23:59	23.94	17	16	33	45	0	4	2	1	0	3	0	33.08	45.11	0.00	2 rpm drift coming down the tanana	1.5 foot
7/11/2008	0:00	23:59	22.23	21	26	47	59	0	5	4	0	0	1	0	50.74	63.70	0.00	drift and water rising rapidly 2 rpm readjusted time threw out last file	2 foot
7/12/2008	0:00	0:00	0.00															problem with video and camera sync and drift in the chute this day was a bust	
7/13/2008	0:00	23:59	23.96	3	12	15	27	0	4	4	0	1	0	0	15.03	27.05	0.00	rain 2 rpm water way up and probably effecting counts trouble with counting	2 foot
7/14/2008	0:00	23:59	22.72	21	20	41	82	0	6	0	0	1	0	0	43.31	86.62	0.00	repaired wheel and office computer nice day	2.5 foot
7/15/2008	0:00	23:59	23.69	17	10	27	133	0	6	11	2	1	0	0	27.35	134.74	0.00	warm cloudy day , lots of water and drift , 2 rpm	2.5 foot
7/16/2008	0:00	23:59	23.81	3	9	12	136	0	6	2	1	0	0	0	12.10	137.09	0.00	nice cloudy warm day 2 rpm	2.5 foot
7/17/2008	0:00	23:59	23.91	4	5	9	75	0	13	0	0	0	0	0	9.03	75.28	0.00	rainy and cool 2 rpm	2 Foot
7/18/2008	0:00	23:59	22.10	1	11	12	88	0	4	8	1	0	0	0	13.03	95.57	0.00	performed lots of maintenance to the wheel	1.5 foot
7/19/2008	0:00	23:59	23.75	3	3	6	46	0	1	1	2	0	2	0	6.06	46.48	0.00	axle fix not gonna hold rainy misty foggy 2 rpm	1.5 foot
7/20/2008	0:00	23:59	16.99	3	4	7	32	0	2	2	0	0	0	0	9.89	45.20	0.00	lost file 00001.avi as computer shut down when lid was opened water raising	1.5 foot
7/21/2008	0:00	23:59	23.90	2	3	5	35	0	3	2	1	0	1	0	5.02	35.15	0.00	nasty day 2 rpm	2 foot
7/22/2008	0:00	23:59	23.93	6	4	10	36	0	1	2	0	0	0	0	10.03	36.11	0.00	partly cloudy	2 foot
7/23/2008	0:00	23:59	23.85	3	0	3	25	0	2	2	0	1	1	0	3.02	25.16	0.00	partly cloudy ,warmer but still cool, drift both sides water rising	2.5 foot
7/24/2008	0:00	23:59	23.85	5	1	6	20	0	5	2	0	0	1	0	6.04	20.13	0.00	drift on both sides of the river wheel taking a beating	3 foot
7/25/2008	0:00	23:59	15.87	2	1	3	5	0	2	2	1	0	0	0	4.54	7.56	0.00	lost a file, other wise not sure of the accuracy of the counts due to high water	3 foot
7/26/2008	0:00	23:59	23.71	7	4	11	46	0	12	6	0	2	0	0	11.13	46.56	0.00	must be another bump as wheel and conditions same as day before 2 rpm	3 foot
7/27/2008	0:00	23:59	23.76	3	2	5	54	0	12	0	0	0	0	0	5.05	54.55	0.00	cool breezy partly / mostly cloudy water slightly down 2 rpm	3 foot
7/28/2008	0:00	23:59	14.36	1	2	3	36	0	5	0	0	0	0	0	5.01	60.17	0.00	debris stopped wheel, lost a file, computer turned off 3 xs windy big waves	3 foot
7/29/2008	1:09	23:59	22.67	1	2	3	60	0	3	0	0	0	0	1 sockeye	3.18	63.52	0.00	rainy windy,log jammed in video chute	3 foot
7/30/2008	0:00	23:59	23.43	3	0	3	50	0	7	1	0	1	0	0	3.07	51.22	0.00	water down just a bit, waves are making bank erode in a big time way	3 foot
7/31/2008	0:00	20:10	20.18	1	0	1	32	0	7	1	0	1	0	0	1.19	38.06	0.00	nasty, windy day, terrible drift, lost of bank being lost, wheel is shut down	3 foot
8/1/2008			0.00																
8/2/2008			0.00																
8/3/2008			0.00																
8/4/2008			0.00																
8/5/2008			0.00																
8/6/2008			0.00																
8/7/2008			0.00																
8/8/2008			0.00																

Table 2. Video summary, Tanana, Y-5A, 2008. Continued.

8/9/2008	16:51	23:59	7.14	0	0	0	12	0	0	0	0	0	0	0.00	40.34	0.00	restarted operations but still a lot of water under the baskets	3.5 foot
8/10/2008	0:00	23:59	23.82	0	0	0	45	0	0	0	0	0	1 pike	0.00	45.34	0.00	water down a little	3.25 foot
8/11/2008	0:00	23:59	21.68	3	0	3	27	0	0	0	4	1	1	3.32	29.89	0.00	worked on axle,nicer day, 2 rpm, water about steady	3.25 foot
8/12/2008	0:00	23:59	22.96	1	0	1	55	0	0	1	2	0	2	1.05	57.49	0.00	worked on live box, chutes, paddle flaps, and spars	3.25 foot
8/13/2008	0:00	23:59	23.81	1	0	1	36	0	0	0	0	0	1	1.01	36.29	0.00	not as warm and more than a little breezy, 2rpm	3.25 foot
8/14/2008	0:00	23:59	23.94	0	0	0	39	2	1	1	2	0	0	0.00	39.10	2.01	nice but windy 2 nice looking coho	3.25 foot
8/15/2008	0:00	17:27	17.47	1	0	1	36	0	0	1	3	0	1	1.37	49.46	0.00	thunderbumpers and warm at least 1/2 appear to be fall chums	3 foot
8/16/2008	0:00	23:59	23.97	1	0	1	43	0	1	1	5	0	1	1.00	43.05	0.00	hard showers 2 rpm	3 foot
8/17/2008	0:00	23:59	23.78	1	0	1	38	1	3	2	2	0	0	1.01	38.35	1.01	cloudy,gloomy,calm winds and no rain	2.75 foot
8/18/2008	0:00	18:16	18.09	0	0	0	35	3	5	0	4	0	1	0.00	46.43	3.98	nice breezy clear day, 2 rpm, generator malfunction	2.75 foot
8/19/2008	18:53	23:59	5.11	1	0	1	11	1	0	2	1	0	0	4.70	51.66	4.70	nice breezy clear day, 2 rpm, computer malfunction	2.75 foot
8/20/2008	0:00	23:59	23.86	0	0	0	51	5	2	1	3	0	0	0.00	51.30	5.03	nice breezy clear day, 2 rpm	2.75 foot
8/21/2008	0:00	23:59	23.84	0	0	0	61	6	2	1	2	0	1 burbot	0.00	61.41	6.04	nice breezy clear day, 2 rpm	2 foot
8/22/2008	0:00	23:59	23.65	0	0	0	49	5	2	2	15	1	3	0.00	49.73	5.07	nice, a little warmer, 2 rpm	1.75 foot
8/23/2008	0:00	23:59	23.89	2	0	2	63	5	1	2	13	0	3	2.01	63.29	5.02	nice, breezy, 2 rpm	1.5 foot
8/24/2008	0:00	23:59	23.90	0	0	0	77	5	0	4	15	0	6	0.00	77.32	5.02	nice, no wind, 2 rpm	1.25 foot
8/25/2008	19:31	23:59	4.47	0	0	0	16	1	0	0	2	0	0	0.00	85.91	5.37	nice, sunny, warm, 2 rpm, rope drifting downriver caught in wheel	1.25 foot
8/26/2008	0:00	23:59	23.69	1	0	1	104	23	5	5	16	0	1	1.01	105.36	23.30	nice, a few clouds, 2 rpm	1 foot
8/27/2008	0:00	23:59	23.92	0	0	0	111	28	5	5	12	0	3	1 burbot, 1 pike	0.00	111.37	28.09	nice, a little breezy, 2 rpm	0.75 foot
8/28/2008	0:00	23:59	23.88	0	0	0	66	20	6	4	9	0	1	0	0.00	66.33	20.10	nice, lite showers, 2 rpm	0.5 foot
8/29/2008	0:00	23:59	23.95	0	0	0	51	32	7	8	8	0	1 pike	0.00	51.11	32.07	sprinkles, 2 rpm	0.25 foot
8/30/2008	0:00	23:59	23.93	0	0	0	68	35	11	4	10	0	3	1 burbot	0.00	68.20	35.10	nice, sunny, 2 rpm	0 foot
8/31/2008	0:00	23:59	23.88	0	0	0	61	32	2	3	5	0	2	0	0.00	61.31	32.16	nice day	0.25 foot
9/1/2008	0:00	23:59	23.82	0	0	0	73	47	2	3	8	0	5	1 burbot, 1 sockeye	0.00	73.55	47.36	another nice day, daves here straightening me out 2 rpm	1 foot
9/2/2008	0:00	23:59	23.85	0	0	0	124	53	3	2	10	0	4	0	0.00	124.78	53.33	nice and warm,daves here fixin me up,2 rpm	1.5 foot
9/3/2008	0:00	23:59	23.80	0	0	0	160	56	5	2	11	0	2	0	0.00	161.34	56.47	dave left, my son helped get a log out of the wheel, overcast no rain, 2 rpm	1.75 foot
9/4/2008	0:00	23:59	23.93	0	0	0	185	41	3	1	9	0	1	0	0.00	185.54	41.12	log caught in chute damaging part of it, placing 8 chum on the raft,	1.75 foot
9/5/2008	0:00	23:59	23.96	0	0	0	181	62	5	0	13	1	1	0	0.00	181.30	62.10	nice sept. day, 2 rpm	1.50 foot
9/6/2008	0:00	23:59	23.90	0	0	0	123	35	5	0	12	0	2	0	0.00	123.51	35.15	another beautiful day, 2 rpm	1.25 foot
9/7/2008	0:00	23:59	23.96	0	0	0	104	37	5	0	10	0	1	0	0.00	104.17	37.06	rainy and cooler 2 rpm	1 foot
9/8/2008	0:00	23:59	23.81	0	0	0	104	23	9	3	3	0	0	0	0.00	104.83	23.18	rainy day 2 rpm	.75 foot
9/9/2008	0:00	23:59	23.97	0	0	0	55	11	10	4	14	0	1	1 burbot	0.00	55.07	11.01	cooler but a nice day with a breeze 2 rpm	,25 foot
9/10/2008	0:00	23:59	23.97	0	0	0	89	24	9	7	12	0	2	0	0.00	89.11	24.03	sprinkles in the am, turned into a nice day 2 rpm	0 foot
9/11/2008	0:00	23:59	23.94	0	0	0	87	40	13	2	9	1	1	0	0.00	87.22	40.10	27 degrees in am nice day 2rpm	0 foot
9/12/2008	0:00	23:59	23.81	0	0	0	119	59	2	3	13	0	1	1 pike	0.00	119.95	59.47	another beautifull fall day, 1rev every 40 secs	0 foot
9/13/2008	0:00	23:59	23.60	0	0	0	89	51	6	3	5	0	1	1 burbot	0.00	90.51	51.86	cold with drizzle 1 rev every 40 secs	0 foot
9/14/2008	0:00	23:59	22.47	0	0	0	312	106	6	0	5	0	4	0	0.00	333.24	113.22	cold and rainy 1 rev every 40 secs last file 2 rpm	0 foot
9/15/2008	0:00	23:59	23.92	0	0	0	362	128	3	8	2	0	0	0	0.00	363.21	128.43	one cold day till about 3:00 pm 2 rpm	0.5 foot
9/16/2008	0:00	23:59	23.94	0	0	0	340	135	4	4	5	0	0	0	0.00	340.85	135.34	rain in pm other wise not to bad of a day 2 rpm	0.5 foot
9/17/2008	0:00	23:59	23.92	0	0	0	350	159	0	2	1	0	0	0	0.00	351.17	159.53	cold rainy and dark, electric eye lamp stayed on till 11:50 am 2rpm	0.5 foot
9/18/2008	0:00	23:59	23.86	0	0	0	404	174	2	1	5	0	0	0	0.00	406.37	175.02	cool but turned nice in the pm 2 rpm	0.5 foot
9/19/2008	0:00	23:59	23.93	0	0	0	329	164	3	0	3	0	1	0	0.00	329.96	164.48	nice cool day till the rain came in the pm 2 rpm	0.5 foot
9/20/2008	0:00	23:59	23.87	0	0	0	523	260	8	1	1	0	1	0	0.00	525.85	261.42	rainy am and nice and cold in pm water up just a tad 2 rpm	0.5 foot
9/21/2008	0:00	23:59	23.92	0	0	0	617	549	4	2	1	0	1	0	0.00	619.06	550.84	foggy and drizzle and cool in the pm, chute came undone, might have missed fish	0.5 foot
9/22/2008	0:00	23:59	23.76	0	0	0	519	616	4	13	2	0	0	0	0.00	524.24	622.22	foggy and drizzle and cool in the pm, 2 rpm	0.5 foot
9/23/2008	0:00	23:59	23.82	0	0	0	507	669	2	1	5	0	2	0	0.00	510.83	674.06	20 degrees in the am nice clear day	0.5 foot
9/24/2008	0:00	23:59	23.87	0	0	0	275	618	2	6	0	0	4	0	0.00	276.50	621.37	overcast but a nice day	0.5 foot
9/25/2008	0:00	23:59	23.87	0	0	0	271	605	2	2	1	1	0	0	0.00	272.48	608.29	nice and no rain 2 rpm	0.5 foot
9/26/2008	0:00	23:59	23.86	0	0	0	192	508	1	2	2	0	0	1 burbot 1 pike	0.00	193.13	510.98	cold 18 degrees in some locations ice on the wheel and did not thaw	0.25 foot
9/27/2008	0:00	15:14	15.24	0	0	0	96	265	0	0	3	0	0	0	0.00	151.18	417.32	cold windy and snow very diffucult to stand anywhere on the raft, shut down	0 foot

Table 3. Comparisons between video system and VCR tape/dip net counts, 2008.

Tape #	Date	Review Time (hr)	Video count	Tape/Dip count	Comments
	Jun 24	22.00	2 king 1 sheefish 6 broad wf 6 humpback wf 4 cisco 3 sucker 1 pike	2 king 1 sheefish 2 broad wf 2 humpback wf 0 cisco 3 sucker 0 pike	Dip count from live box Most small fish escaped live box
	Aug 12	21.85	36 chum 1 sucker	31 chum 2 sucker	Dip count from live box Five chum escaped live box
1	Sep 1	6.00	32 chum 18 coho 3 broad wf 1 sucker	32 chum 18 coho 3 broad wf 1 sucker	Tape count .No misses
2	Sep 15	1.28	35 chum 15 coho 1 cisco	35 chum 15 coho 2 cisco	Tape count 1 cisco missed on video, slipped under door without activating switch
Total		51.13	2 kings 103 chum 33 coho 9 broad wf 6 humpback wf 5 cisco 4 sucker 1 pike	2 kings 98 chum 33 coho 5 broad wf 2 humpback wf 2 cisco 4 sucker 0 pike	Total missed by video system was 1 cisco

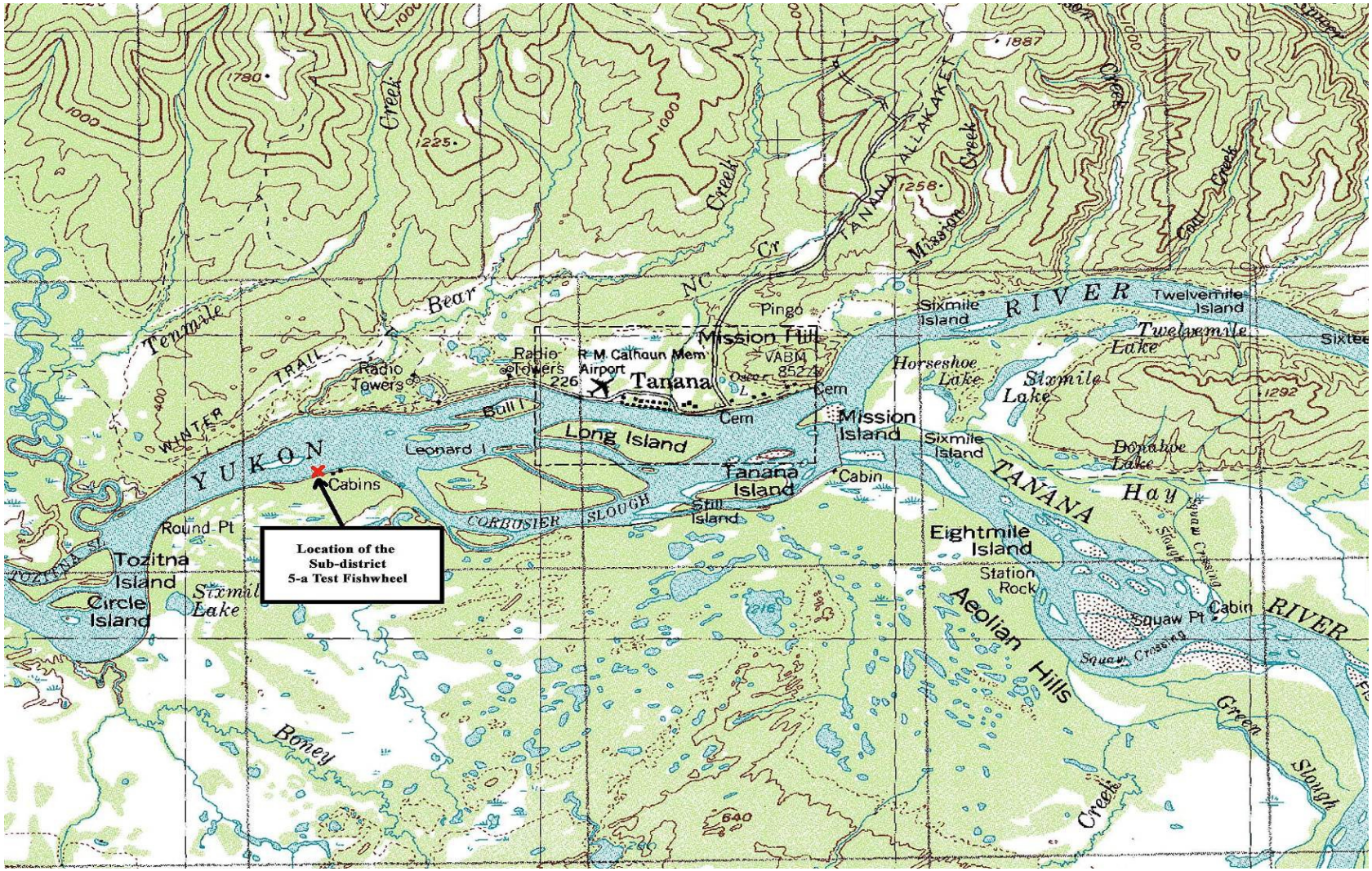

Figure 1. Map and location of the Sub-district Y-5A Test Fish Wheel Project, 2008.

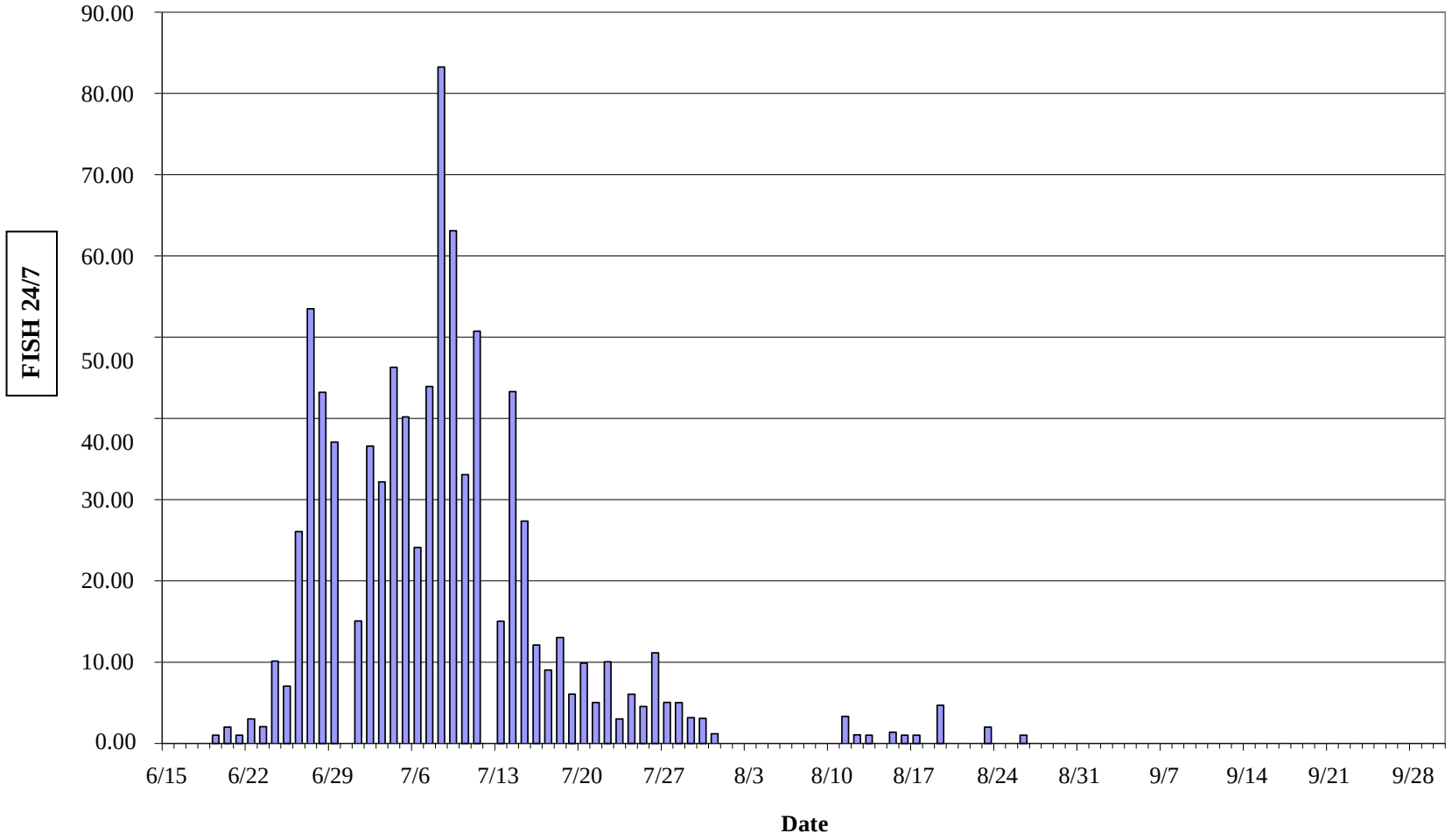

Figure 2. Chinook salmon per 24 hours (video), Tanana, Y-5A, 2008.

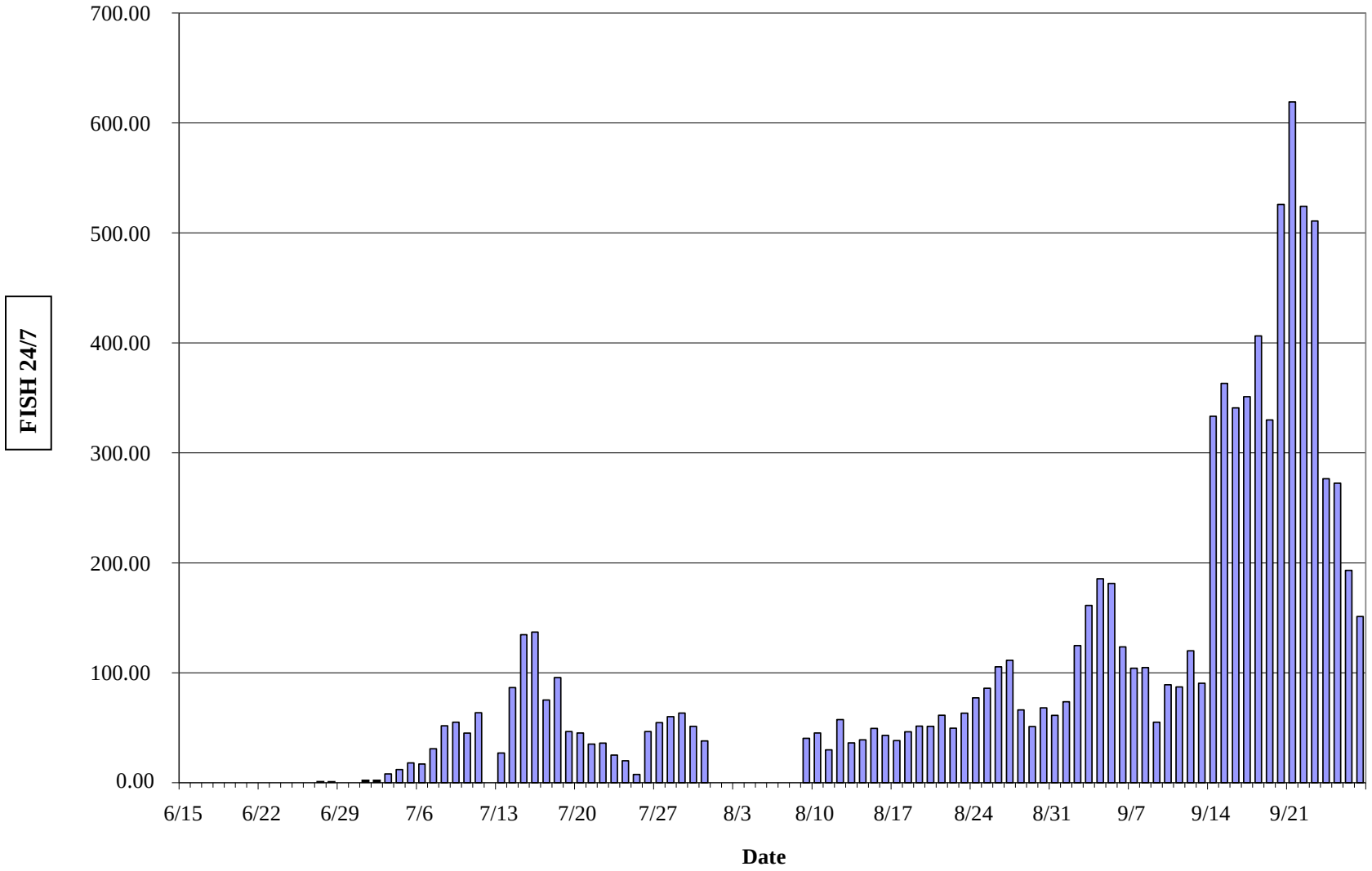

Figure 3. Chum salmon per 24 hours (video), Tanana, Y-5A, 2008.

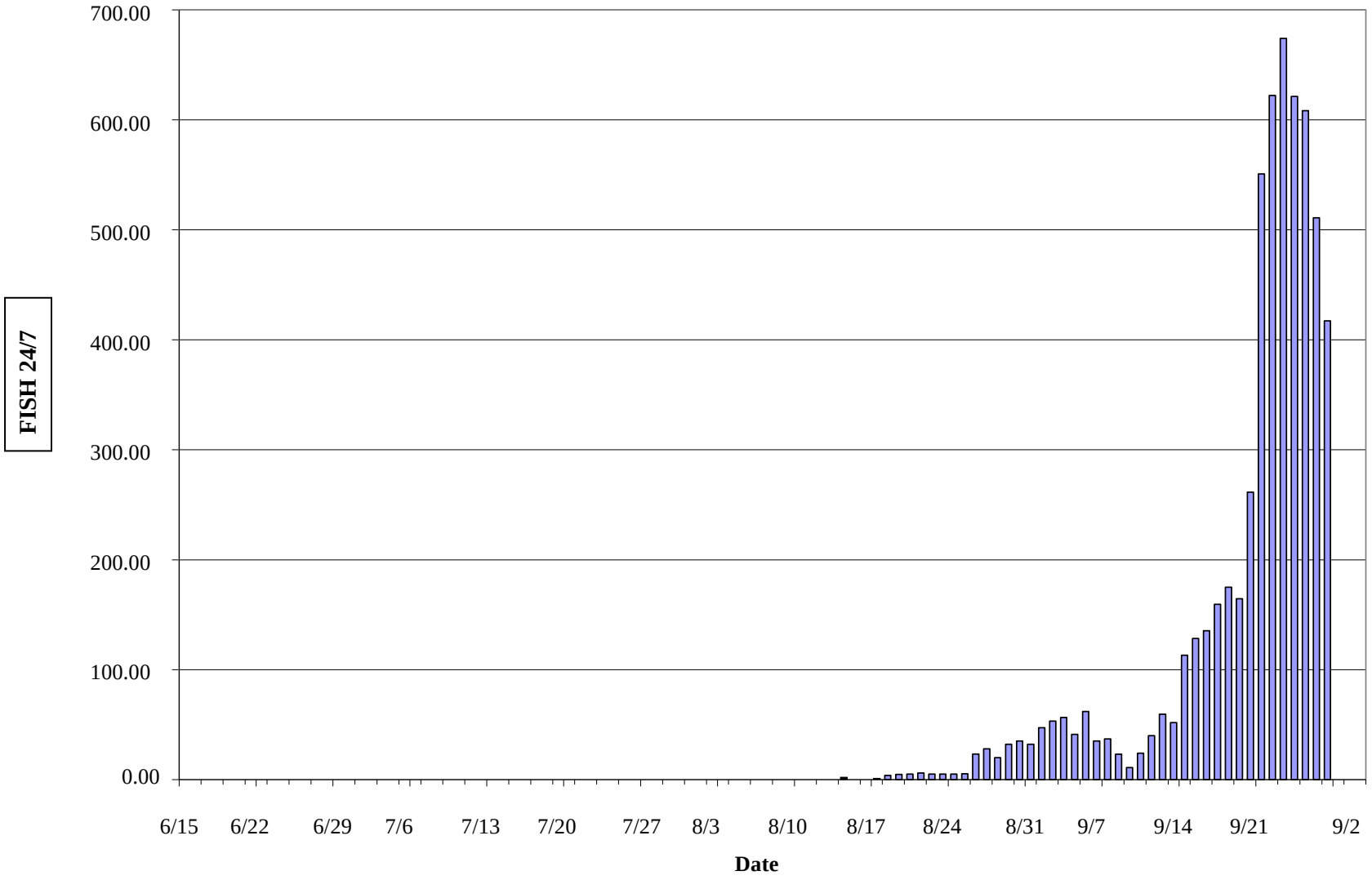

Figure 4. Coho salmon per 24 hours (video), Tanana, Y-5A, 2008.

5. Discussion:

The fish wheel began operation approximately in the same site used in previous years. Mudflows that had hampered the wheel's operation during June and July of previous years were also present in 2008, but did not interfere with the counting operation. Mudflows were also present in August, 2008, and were attributed by the operator to the flood on the Tanana River during that month. There were still many days in June and July when the water depth in mid channel was considerably shallower than it was near the bank because of the mudflow. A depth finder was installed on the operator's boat to ascertain the trends of buildup and tear down of the mud at the wheel site in 2006, but was not used in 2008 due to the transducer being lost earlier in the year when the riverboat struck submerged debris. A 12-foot long pike pole was used in its place. Depth recordings were taken from the inside of the fish wheel raft, and frequent checks on the outside of the raft during mudflow periods. At no time did the mudflows get close enough to the wheel to be detected. Water levels at the site averaged above normal from July 22 through August 21 and the project shut down between August 1 and August 8 due to an exceptionally large run of debris. This debris was the result of a flood on the Tanana River, which also affected parts of Fairbanks and Nenana.

The video equipment was fairly reliable throughout the season, given that it had set idle for a year. Data were lost on a few occasions when the batteries powering the laptop computer installed on the fish wheel were low, causing the data to be dumped when the mouse was initially touched. This was remedied with a new battery installed in the Panasonic Toughbook laptop computer. Another problem encountered in-season was the loss of the tallying computer in the operator's office. For a short period of time fish were counted on the spare video Toughbook laptop until a new desktop computer could be located, programmed, and air freighted to Tanana. My heartfelt thanks go out to D. Daum for his assistance with quickly solving these technical problems.

6. Conclusions and Recommendations:

It is always challenging to operate a fish wheel near the mouth of the Tanana River. The unusually large amounts of silt and sand discharged out of the Tanana River can cause changes to the contour of the channel bottom and actively erode river banks. Despite these obstacles, the Project was successful in accurately estimating the passage of all three salmon species passing into the Tanana River. The fish wheel caught and recorded more fish than in the previous two years that this operator has run the project.

The project has operated for 15 years in the same approximate location and has been a reliable indicator of fall chum and coho salmon run timing and abundance. The data for Chinook and summer chum salmon during three of the past five years indicates a good potential for useful CPUE information during June and July. Every year there appears to be a potential for weather events to produce water conditions that will be nonconductive to fishing with a wheel, especially in the summer; but this holds true for any fish wheel site. Though circumstances may be trying at times, providing an accurate estimate of salmon passage into the Tanana River is an important component of reliable salmon management on the Yukon River. It is

recommended to setup and operate the wheel in the same manner and location as in previous years.

Acknowledgements:

The United States Fish and Wildlife Service provided $35,368 in funding support for this project from U.S./Canada Treaty Implementation Funds, under agreement number RM-0608. Dave Daum with The United States Fish and Wildlife Service also received R&M funds to assist with this project.

References:

Buklis, L. 1981. Yukon and Tanana River fall chum salmon tagging study, 1976-1980. Alaska Department of Fish and Game, Informational Leaflet No. 194, Juneau, AK.

Fliris, B. 2001. Modification of video storage equipment for purposes of providing accurate catch-per-unit-effort data from the Sub-district 5A test fishwheel. A final report to the Yukon River Panel.

Fliris, B., and D. Daum. 2003. Annual catch-per-unit-effort data collected by the Yukon River Sub-district 5A Test Fish Wheel Project, 2003. USFWS Office of Subsistence Management, Fisheries Resource Monitoring Program, Final Report, No. 03-038, Anchorage, Alaska.