Annual catch-per-unit-effort data collected by the Yukon River Sub-district Y5A Test Fish Wheel Project, 2005

Final Report to the Yukon River Panel
Study USRM-13-05

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Investigators Affiliations: Patrick Moore, Tanana resident since 1966, project operator for 2005. David Daum, U. S. Fish and Wildlife Service, Fairbanks.

Geographic Area: Yukon River (Sub-district Y5A), river-mile 695

Information Type: Stock Status and Trends

Issue Addressed: Run timing and relative abundance of Tanana River salmon stocks, 2005.

Study Cost: $33,000

Study Duration: June 20 to September 30, 2005.

Abstract: The Y5A Test Fish Wheel Project operated from June 20 to September 30 in 2005. Data were collected for Chinook, summer chum, fall chum, and coho salmon entering the Tanana River. Video capture equipment was used throughout the season as the primary method of data collection.

Key Words: Alaska, catch patterns, Chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *Oncorhynchus keta*, coho salmon, *Oncorhynchus kisutch*, migration timing, Tanana River, video capture, fish wheel, Yukon River.

Project Data: *Description* - Data from this project produces daily counts of all Tanana River salmon species caught by the fish wheel. *Format* – Catch-Per-Unit-Effort. *Custodians* - The Alaska Department of Fish and Game, Fairbanks; The U.S. Fish and Wildlife Service, Fairbanks; Patrick Moore, Tanana. *Availability* – Access to data available upon request to the custodians.

Report Availability: Please contact Patrick Moore to receive a copy of this report

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Introduction:

Catch-per-unit-effort (CPUE) data were collected from the Sub-district Y5A Test Fish Wheel in 2005. 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 2005 using the same "trigger switch" video capture equipment installed on the fish wheel 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 very low.

Objectives:

The Sub-district Y5A Test Fish Wheel Project (the Project) has, since 1993, provided catch-per-unit-effort (CPUE) data to managers of the ADF&G. 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.

Methods:

The video capture equipment used by the project's was the same as in 2004 (Table 1) and was operated in a similar manner (Fliris 2004). The "trigger switch" capture method (Daum 2005) was the primary method of data collection throughout the season.

The Project began counting captured fish on June 20, 2005. The fish wheel was first set up in a spot 600 feet upstream of the location used in previous years because of site-specific problems experienced at the site in 2004 (Fliris 2004). This new spot is locally considered a very productive location for catching salmon. However, after a mudflow shut down the wheel for six days (June 28 – July 3), the wheel was moved back to the original spot used in previous years. The same amount of under water lead was used as in the past to guide salmon into the fish wheel. Counting was done 24 hours a day, seven days a week, unless interrupted by maintenance or river conditions; i.e., high debris load, mud flow, or freezing temperatures. Mean daily water temperatures were recorded with an archival temperature logger at 3 feet below the surface (Figure 2).

Video capture is the process of separating and storing only the frames that contain fish 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. 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 frames from the video camera and store them on the computer's 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.

The 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.

Comparisons between video counts and counts recorded on a video cassette recorder (VCR) were done every two weeks to ensure that the video system was working properly. Review time was determined by either the first 50 fish captured on video or approximately 12 hours of recording, whichever came first.

Modifications and repair of the test wheel

During a site investigation to the Y5A test wheel in the fall of 2004, Dave Daum, USFWS, Mike McDougal, YRDFA, Bill Fliris, past Project operator, and Patrick Moore, operator in training, decided that the efficiency of the wheel could be increased by shortening the baskets. Tracy Lingnau and Fred Bue (commercial fisheries managers with ADF&G) concurred. In the spring of 2005, after further discussion with Bill Fliris, it was decided to shorten the baskets by 18".

Evolving technology through the Project development had resulted in various pieces of equipment being spliced into the existing system wherever they would fit. Tearing apart the wheel and rebuilding it would allow for consolidation and easier access to all the equipment. Also, the log raft of the wheel needed to be replaced. On May 27, work commenced on disassembly of the Y5A test wheel. The baskets were labeled to allow for replacing them in their proper place during reassembly. The search then began for new raft logs. Under a YRDFA grant, Bill Fliris assisted from June 1 through June 20. As he was the original designer of these unique baskets, his help was invaluable in their reconstruction. The baskets required 160 man-hours of labor to modify (in comparison to 32 man-hours for two traditional rounded baskets 16' deep and 10' wide). New webbing and wire were attached. A piece of UHMW plastic was used to replace the rubber in the bottom corner of the baskets. This resulted in a very "fish friendly" fish wheel, with only one fish during the entire season, a whitefish, observed with gill bleeding. A wider video chute was constructed as well as boxes and platforms to hold all of the equipment (including the generator), making the entire system self contained on the fish wheel. Synchronization problems between the computer and the trip switch experienced in 2003 (Fliris 2003) were not experienced in 2005. The video chute door was manually tripped before video capture software initiation by using eye screws, parachute cord, fishing line, and a dog leash. This allowed the operator to trip the door switch from a far distance while keeping an eye on the video monitor to check for any sync problems. Dave Daum (USFWS) arrived on June 16 and stayed through July 1. With assistance from the new operator, they installed the wiring and equipment. Also, the new operator was trained in computer and video system operation. D. Daum subsequently made two more trips to Tanana during the course of the summer to monitor performance of the new operator. Without the on-site assistance of D. Daum and B.

Fliris, the new operator would not have been able to learn all the technically challenging aspects of the Project. A live box was kept on the wheel for the duration of the Project and could have been used for any in-season sampling or tagging studies, as well as, a backup in case the electronics failed and counts had to be done by dip netting fish.

Results:

This was the fourth year of gathering information on the timing and relative abundance of Chinook and summer chum salmon entering the Tanana River. Information for fall chum and coho salmon has been collected since 1993.

Of the 2,472 sampling hours possible, 2,181 hours were counted during the 103 days of operation from June 20 to September 30, 2005. Counts of less than 12 hours occurred on only ten days (Table 2). The video equipment was reliable throughout the season. However, due to the inexperience of the operator, there was a problem with the generator for two days. This resulted in no counts on one day and most of the next, until the problem was identified and fixed. Six days were missed at the beginning of the season because of mudflows in the river rendering the fish wheel inoperable.

The total numbers of fish by species counted during the 2005 season were:

1. Chinook: large male = 76; small male (< 70 cm) = 15; female = 37; Total:128
2. Chum: male = 5,006; female = 5,148; Total: 10,154
3. Coho: male = 610; female = 706; Total: 1,316
4. Cisco whitefish = 386
5. Humpback whitefish = 120
6. Broad whitefish = 238 (whitefish species were more abundant than in previous years)

The Chinook salmon run peaked on July 8, with a 24-hour adjusted count of 32 fish (Figure 3). Counts of Chinook salmon were very low this season compared to previous years, due primarily to changes in the river bottom from mudflows during the early part of the season. The chum salmon run had three major peaks, with the first occurring on July 21 with 158 fish, the second on August 30 with 390 fish, and the third on September 10 with 423 fish (Figure 4). The coho salmon run had one major peak, with 88 fish passing on September 20 (Figure 5).

Comparisons were made between the Project's daily CPUE by species and the daily catch data from the Lower Yukon Test Net and Mountain Village Projects (Figures 6 – 9) and the Nenana Test Fish Wheel Project on the Tanana River (Figures 10 – 13). The information is useful to predict the arrival of pulses that had passed the lower river projects and to assess the contribution of the various components of the salmon run into the Tanana River. For Chinook salmon, the large peak entering the Yukon River mouth on June 19 passed the Project 19 days later on July 8 (Figure 6) and Nenana on July 11, three days later (Figure 10). The first large pulse of the season, around June 12 at the Yukon River mouth, was missed by the Project due to downtime from mudflows. For summer chum salmon, the early season pulses entering the Yukon River mouth were not well represented at either the Project or Nenana (Figures 7 and 11). The later pulses were represented at both sites. Travel time from the Yukon River mouth to the Project was approximately 22 days, with fish speeding up near the end of the season. Chum salmon travel time from the Project to Nenana was about seven days. For fall chum salmon, the pulses entering the Yukon River mouth were represented at the Project, with a travel time

of around 24 days (Figure 8). The Project detected the fall chum salmon pulses better than the Nenana site (Figure 12). Travel time was about six days between the Project and Nenana. For coho salmon, the Project did a good job detecting coho salmon pulses, especially during the middle and later part of the season (Figure 9). Travel time between the Mountain Village site and the Project were about 22 days. The Nenana site showed the early pulses of coho salmon more distinctly that at the Project (Figure 13). Run timing between the Project and Nenana was about 6 days.

Comparisons between the video and VCR tape counts showed that the video system missed very few fish (Table 3). Out of 153 salmon examined, none were missed by the video system. Only three small cisco whitefish were missed because they were small enough to slide under the door without tripping the switch.

Discussion:

The f ish wheel began operation approximately 600 feet above the site used in previous years. A mudflow at the new location engulfed the wheel but it kept running by dredging a hole in the mud. When it became apparent that the wheel would become high and dry, permission was received from ADF&G to move the wheel back to the approximate location used in previous years. Mudflows did not affect operation of the wheel after this early incident.

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 to ascertain the trends of buildup and erosion of deposited mud at the wheel site. Recordings were taken from the inshore side of the raft every day (Table 2). There were periods of time when depth readings on the inshore side of the raft showed that the bottom of the fish wheel basket was 3 feet off the bottom while the offshore side was 6 inches off the bottom due to mudflows. The wheel was not moved closer to the bank due to lack of current in that area.

These observed trends were compared to both the location of driftwood flow past the site and discharge measurements taken above the site by USGS, Tanana River at Nenana and Yukon River at the Haul Road Bridge (Figure 14). Since the Project is located below the confluences of these two rivers, determining how the discharge measurements from the two river systems affected the site was difficult. There is a 36 hour lag-time between the Yukon River Bridge and the Project and about a 72 hour lag-time between Nenana and the Project site (Alaska-Pacific River Forecast Center, personal communications). From these observations, some relationships were apparent: 1) a proportional decrease in Tanana River discharge with an increase in Yukon River discharge caused the mud to be eroded in the area of the wheel; 2) when driftwood came out of Corbusier Slough (upstream of the site) and flowed offshore and away from the wheel site, the mudflow occurred at the site, and when the drift headed inshore near the wheel, the mud was eroded away. It was also noted that mudflows occurred during times of high glacial discharge from the Tanana River (caused by warm temperatures) and not from rainfall. Water levels at the site averaged above normal for the duration of the project except for a period between August 22 and September 10. High water from June 20 to July 15 was attributed to extremely high snow run-off and glacial melt. Glacier melt from the Tanana River continued to be a contributing factor until August 22. Rainfall, beginning September 5, lasted until the Project termination on September 30.

The build up of a large sandbar encountered at Round Point, below the Project site, during the 2004 season (Fliris 2004) did not occur this season. This bar and the southern channel were checked about every two weeks. The southern channel always had a depth greater than 12 feet throughout the season.

Conclusions:

It was challenging to operate the fish wheel near the mouth of the Tanana River due to higher than average water conditions in 2005. The fish wheel was unable to turn for six days in late June and early July due to a mudflow and, consequently, had to be moved to a deeper location. The unusually large amount of silt and sand discharged out of the Tanana River was constantly changing the contour of the channel bottom during the summer season. But as has been the norm in past years, the river bottom stabilized by the time the fall chum salmon arrived. The potential fish passage problems experienced by the previous operator in 2004 at Round Point were not present at any time during the 2005 operating season.

Recommendations

The project has operated for 13 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 four 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 make fishing with a fish wheel difficult, but this holds true for any fish wheel site. There is no reason to expect a repeat of the conditions that affected the project in 2005, but one should expect another set of trying circumstances. It is recommended to set up and operate the wheel in the same manner and location as in previous years.

Acknowledgements:

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Table 1. Video system equipment list.

POWER SUPPLY AND LIGHTS:

- 2 Honda EU2000i and 1 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 Y5A, 2005.

Counting	Run Time	King Salmon				Chum Salmon			Coho Salmon			Cisco	Humpback	King	Chum	Coho			Depth Off
Date	(hr)	Male	Female	Small (<70cm)	Total	Male	Female	Total	Male	Female	Total	Whitefish	Whitefish	per 24 hr	per 24 hr	per 24 hr		Comments	Bottom (ft)
	2181.21	76	37	15	128	5006	5148	10154	610	706	1316	386	120	131	10403	1349			
6/20	12.00	0	0	0	0	0	0	0	0	0	0	1	0	0.00	0.00	0.00		dipped	2
6/21	24.00	0	0	0	0	0	0	0	0	0	0	1	0	0.00	0.00	0.00		dipped till 19:23:46, started video at 19:23:46	2
6/22	14.31	0	0	0	0	0	0	0	0	0	0	1	1	0.00	0.00	0.00		shut wheel down, too much drift	2
6/23	7.32	0	0	1	1	0	0	0	0	0	0	3	1	3.28	0.00	0.00		wheel restarted after cleaning drift out of it	2
6/24	23.42	2	0	0	2	0	0	0	0	0	0	1	0	2.05	0.00	0.00		15 fps. Changed to 7 before and 9 after	1.75
6/25	23.41	2	0	2	4	0	0	0	0	0	0	3	0	4.10	0.00	0.00		mud flow 6.5 deep 12 from outside of raft	1.5
6/26	23.85	1	0	1	2	0	0	0	0	0	0	8	1	2.01	0.00	0.00		mud flow 6.5 deep 12 from outside of raft	1.5
6/27	22.86	2	1	0	3	0	0	0	0	0	0	1	1	3.15	0.00	0.00		mud flow is starting to interfere with wheel	?
6/28	0.00																	wheel down as of midnight, mud flow	
6/29	0.00																	wheel down, mud flows	
6/30	0.00																	wheel still down no change	
7/1	0.00																	wheel still down no change	
7/2	0.00																	wheel still down, looks like wheel needs to be moved due to mud	
7/3	3.31	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00		moved wheel 600 ft. downstream, started spinning at 20:00	1.5
7/4	23.90	0	0	0	0	2	0	2	0	0	0	2	0	0.00	2.01	0.00		mud is at 9ft, on outside of raft	2.5
7/5	23.91	5	5	0	10	4	1	5	0	0	0	0	0	10.04	5.02	0.00		2 rpm, nice windy day	2.5
7/6	23.81	3	1	0	4	5	3	8	0	0	0	0	0	4.03	8.06	0.00		cool thunder showers	2.5
7/7	23.94	7	2	2	11	12	8	20	0	0	0	1	1	11.03	20.05	0.00		nice windy with shower in the p.m.	2.5
7/8	23.86	20	8	4	32	19	13	32	0	0	0	1	1	32.19	32.19	0.00		moved wheel at the rear in toward bank	2.5
7/9	23.87	1	1	0	2	9	4	13	0	0	0	0	1	2.01	13.07	0.00		very windy water coming up tanana and yukon lots of drift	3
7/10	23.84	1	1	0	2	10	5	15	0	0	0	2	0	2.01	15.10	0.00		windy cranked rear of wheel in	4
7/11	23.74	6	3	1	10	18	10	28	0	0	0	4	0	10.11	28.31	0.00		windy cranked wheel in again	4
7/12	23.86	3	0	2	5	7	5	12	0	0	0	3	0	5.03	12.07	0.00			4
7/13	23.94	0	2	0	2	19	12	31	0	0	0	6	0	2.01	31.08	0.00		nice day water slowly dropping	4
7/14	23.69	1	1	0	2	12	13	25	0	0	0	3	0	2.03	25.33	0.00		nice day water slowly dropping	4
7/15	23.87	3	0	0	3	11	10	21	0	0	0	0	0	3.02	21.11	0.00		windy water slowly dropping	4
7/16	23.85	2	0	0	2	17	8	25	0	0	0	1	1	2.01	25.16	0.00		windy water slowly dropping	4
7/17	23.83	1	0	0	1	18	9	27	0	0	0	0	0	1.01	27.19	0.00		nice day water slowly dropping but the depth of the wheel stays at 4 ft.	4
7/18	23.80	0	0	0	0	17	8	25	0	0	0	1	2	0.00	25.21	0.00		cloudy and windy	4
7/19	23.84	0	0	1	1	33	25	58	0	0	0	2	0	1.01	58.39	0.00		nice day, calm	3.5
7/20	23.81	1	1	0	2	72	45	117	0	0	0	1	0	2.02	117.93	0.00		wheel speed consistant at 1.5 rpm, nice day	3.5
7/21	23.82	3	0	0	3	87	70	157	0	0	0	0	0	3.02	158.19	0.00		nice day water steady , but suddenly my depth is 4.5	4.5
7/22	23.84	1	0	0	1	71	70	141	0	0	0	0	0	1.01	141.95	0.00		nice day drift starts running again	4.5
7/23	23.94	2	1	0	3	67	61	128	0	0	0	1	0	3.01	128.32	0.00		nice calm but smokey	4.5
7/24	15.70	0	0	0	0	31	33	64	0	0	0	0	0	0.00	97.83	0.00		weather same as day before but log jammed in chute for 8.25 hrs	4.5
7/25	23.83	0	0	0	0	36	65	101	0	0	0	1	0	0.00	101.72	0.00		nice day but smoey	4.5
7/26	23.74	0	0	0	0	23	35	58	0	0	0	1	2	0.00	58.64	0.00		nice + smokey	4.5
7/27	23.89	0	0	0	0	37	76	113	0	0	0	0	0	0.00	113.52	0.00		nice hot and smokey	4
7/28	23.68	1	0	0	1	17	44	61	0	0	0	5	0	1.01	61.82	0.00		nice and smokey, rpm fluxuating as water drops	4
7/29	23.13	0	0	0	0	13	15	28	0	0	0	2	0	0.00	29.05	0.00		nice day	4
7/30	23.85	1	0	0	1	11	20	31	0	0	0	1	1	1.01	31.19	0.00		nice day a little cooler, wheel spinning at 1 rpm	3.5
7/31	23.59	0	0	0	0	13	23	36	0	0	0	0	0	0.00	36.63	0.00		same as above but with a little rain	3.5
8/1	23.85	0	0	1	1	10	23	33	0	0	0	2	0	1.01	33.21	0.00		same as above but with a little rain	3
8/2	0.00																	generator malfunction, no files saved	3
8/3	3.38	0	0	0	0	0	2	2	0	0	0	0	0	0.00	14.20	0.00		changed out generators everything back to normal	3
8/4	22.54	0	0	0	0	6	11	17	0	0	0	2	1	0.00	18.10	0.00		1 revolution every 45 secs, wheel turning nicely, few fish, look pretty beat up	3
8/5	23.89	0	1	0	1	11	18	29	0	1	1	1	0	1.00	29.13	1.00		everything is perfect, just no fish, water moving toward wheel and cutting bar	3
8/6	23.89	0	0	0	0	4	19	23	0	0	0	2	0	0.00	23.11	0.00		nice cool day with much smoke and some ash	3
8/7	23.93	0	0	0	0	2	15	17	0	0	0	1	2	0.00	17.05	0.00		cloudy windy and cool	3
8/8	23.91	0	0	0	0	4	11	15	1	0	1	1	1	0.00	15.06	1.00		water coming up, losing current, drift moving in toward wheel	3.5
8/9	23.93	0	0	0	0	5	6	11	0	0	0	4	1	0.00	11.03	0.00		mud bar forming on outside of wheel	3.5
8/10	23.92	0	1	0	1	9	11	20	0	0	0	6	0	1.00	20.07	0.00		mud being deposited under the wheel, water level is steady	2.5
8/11	23.93	1	0	0	1	16	40	56	0	0	0	4	1	1.00	56.16	0.00		rpm=1.5, water is steady, look at depth off of bottom	0.5
8/12	23.84	1	5	0	6	20	37	57	1	0	1	3	2	6.04	57.38	1.01		2 rpm water dropped slghtly, water boils coming in close to the wheel	0.5
8/13	23.96	0	1	0	1	24	43	67	0	0	0	3	1	1.00	67.11	0.00		2 rpm same as yesterday	0.5
8/14	12.12	0	0	0	0	11	18	29	1	1	2	0	0	0.00	57.43	3.96		2 rpm, log stuck in wheel, only 12.12 run time	0.5
8/15	23.94	1	0	0	1	31	43	74	0	5	5	2	0	1.00	74.19	5.01		2 rpm, hot and smokey breeze kept the gnats away	0.5
8/16	23.78	0	0	0	0	26	42	68	3	1	4	4	0	0.00	68.63	4.04		2.5 rpm, not as hot and smokey	1
8/17	23.90	0	0	0	0	43	45	88	3	2	5	2	0	0.00	88.37	5.02		2 rpm, smokey	0.5
8/18	23.90	0	0	0	0	36	35	71	2	0	2	2	0	0.00	71.30	2.01		2 rpm, clear cool and breezy, stubborn log caught in live box	0.5

Table 2. Video summary, Tanana Y5A, 2005 (continued).

Counting	Run Time	King Salmon				Chum Salmon			Coho Salmon			Cisco	Humpback	King	Chum	Coho			Depth Off
Date	(hr)	Male	Female	Small (<70cm)	Total	Male	Female	Total	Male	Female	Total	Whitefish	Whitefish	per 24 hr	per 24 hr	per 24 hr		Comments	Bottom (ft)
8/19	23.94	0	0	0	0	21	23	44	2	1	3	0	1	0.00	44.11	3.01		cool not as breezy and smokey, current moving right into wheel, water down slightly	1.5
8/20	10.11	0	0	0	0	11	7	18	0	1	1	1	0	0.00	42.73	2.37		smokey, cool, west wind, logs in wheel, water dropping but depth under wheel greate	4
8/21	23.90	0	0	0	0	24	37	61	1	0	1	5	0	0.00	61.26	1.00		2 1/3 rpm, cooler, smokey, showers, water dropping	4
8/22	23.93	0	0	0	0	44	28	72	1	0	1	2	0	0.00	72.21	1.00		2 rpm, partly cloudy, smoke went away, water level down	2
8/23	23.94	0	0	0	0	69	27	96	0	2	2	7	1	0.00	96.24	2.01		2 1/3 rpm, brought wheel in 5 ft. beginning file # 00002.avi	3
8/24	23.93	0	0	0	0	84	50	134	3	1	4	10	2	0.00	134.39	4.01		2 rpm, showers	1.5
8/25	23.91	0	0	0	0	128	73	201	4	1	5	10	1	0.00	201.76	5.02		2 rpm, cool with many showers, 1 burbot and 1 sheefish	1.5
8/26	23.93	0	0	0	0	127	64	191	1	1	2	3	3	0.00	191.56	2.01		2 rpm, showers with a little sun, water dropping and finally a gravel bottom	2
8/27	23.91	0	0	0	0	108	66	174	3	2	5	9	3	0.00	174.65	5.02		2 rpm, no rain, breezy, partly cloudy cool	2
8/28	23.92	0	0	0	0	128	75	203	7	7	14	14	1	0.00	203.68	14.05		cold and rainy	2
8/29	19.12	0	0	0	0	133	94	227	9	4	13	11	1	0.00	284.94	16.32		2 rpm, stick caught in the chute between 03:55:27 and 08:44:12	2
8/30	23.92	1	0	0	1	204	185	389	4	11	15	2	0	1.00	390.30	15.05		2 rpm, partly cloudy, some showers	1.5
8/31	23.86	0	0	0	0	124	99	223	7	6	13	1	2	0.00	224.31	13.08		caught a 22" sucker	1.5
9/1	23.72	0	0	0	0	83	86	169	5	2	7	3	1	0.00	170.99	7.08		2 rpm, very cool, mostly sunny	1.5
9/2	23.80	0	0	0	0	64	87	151	9	9	18	4	0	0.00	152.27	18.15		2 rpm, cool, mostly sunny with clouds moving in PM	1.5
9/3	23.93	0	0	0	0	86	73	159	7	13	20	4	2	0.00	159.47	20.06		daves here, also one burbot	1.5
9/4	23.93	0	0	0	0	55	61	116	5	5	10	6	2	0.00	116.34	10.03		rain, 1 broad whitefish	1.5
9/5	23.95	0	0	0	0	55	61	116	7	12	19	3	0	0.00	116.24	19.04		2 rpm, rain in morn, let up In the PM, 1 broad whitefish	1.5
9/6	23.88	0	0	0	0	74	59	133	8	9	17	4	1	0.00	133.67	17.09		generator coughed and quit early but no problems	1.5
9/7	23.88	0	0	0	0	109	80	189	12	5	17	6	4	0.00	189.95	17.09		2 rpm	1.5
9/8	23.95	3	1	0	4	197	150	347	12	8	20	12	2	4.01	347.72	20.04		clear nice day	1.75
9/9	23.80	0	0	0	0	172	138	310	11	12	23	15	9	0.00	312.61	23.19		rain and cold, water has been coming up for about 5 days	1.75
9/10	23.94	0	0	0	0	223	199	422	20	13	33	12	10	0.00	423.06	33.08		2 rpm, rain again, water has been rising for about 5 days now	2
9/11	23.93	0	0	0	0	199	153	352	20	17	37	5	1	0.00	353.03	37.11		nicer	2
9/12	23.93	0	0	0	0	176	142	318	26	9	35	3	3	0.00	318.93	35.10		rainy day	2
9/13	21.57	0	0	0	0	124	122	246	19	16	35	1	1	0.00	273.71	38.94		kay and aye are here checked out operation, lost part of one file, water dropping	2
9/14	23.96	0	0	0	0	122	109	231	19	18	37	5	1	0.00	231.39	37.06		rain in AM. turning nice, water dropping for 2 days	2
9/15	23.96	0	0	0	0	96	123	219	22	20	42	8	2	0.00	219.37	42.07		2 prm, did last video comparison, dreary day, water still falling ever so slightly	2
9/16	23.96	0	0	0	0	116	165	281	11	21	32	10	5	0.00	281.47	32.05		2 prm, nicest day in a long time, sprinkles in the PM, 1st day with no drift in a long tir	2
9/17	23.96	0	0	0	0	123	185	308	19	33	52	6	3	0.00	308.51	52.09		2 rpm	1.5
9/18	23.96	0	0	0	0	89	163	252	21	31	52	10	5	0.00	252.42	52.09		2 rpm, another miserable day, one broad whitefish	1.5
9/19	23.96	0	0	0	0	107	158	265	40	44	84	5	5	0.00	265.44	84.14		2 prm, not as much rain	1.5
9/20	23.96	0	0	0	0	105	130	235	45	43	88	17	6	0.00	235.39	88.15		2 rpm, water slowly coming up	1.5
9/21	23.96	0	0	0	0	88	100	188	43	38	81	15	4	0.00	188.31	81.14		2 rpm, started raining again in the PM	1.5
9/22	23.86	0	0	0	0	96	122	218	34	43	77	14	4	0.00	219.28	77.45		2 rpm	1.5
9/23	23.94	0	0	0	0	85	141	226	24	33	57	16	7	0.00	226.57	57.14		I am hunting	2
9/24	23.87	0	0	0	0	43	112	155	18	36	54	4	0	0.00	155.84	54.29		windy, rainy of coarse I am hunting, wind blew the door open 2 or 3 times	2.5
9/25	23.97	0	0	0	0	32	72	104	31	37	68	12	1	0.00	104.13	68.09		2 rpm, nasty no change	3
9/26	23.97	0	1	0	1	53	69	122	18	29	47	5	1	1.00	122.15	47.06		water still raising, nicer day, male chums closed gap on females	3
9/27	23.97	0	0	0	0	33	48	81	10	31	41	0	0	0.00	81.10	41.05		1.5 rpm, nasty wind out of the northeast but no rain	3
9/28	23.98	0	0	0	0	18	51	69	17	38	55	5	1	0.00	69.06	55.05		1.5 rpm, snowing and cold water, steady	3
9/29	23.98	0	0	0	0	21	34	55	18	21	39	4	1	0.00	55.05	39.03		1.5 rpm, cold and cloudy, brief periods of sun	3
9/30	12.00	0	0	0	0	8	17	25	6	13	19	1	1	0.00	50.00	38.00		1.5 rpm, snowing and calm, goodbye	3

Table 3. Comparisons between video system and VCR tape counts, 2005.

Tape #	Date	Review Time (hr)	Video count	Tape count	Comments
1	Jun 25	12.00	2 Chinook 1 broad WF 5 cisco	2 Chinook 1 broad WF 5 cisco	
2	Jul 13	13.02	2 Chinook 20 chum 4 cisco	2 Chinook 20 chum 4 cisco	
3	Aug 1	>12.00	20 chum 1 humpback WF 0 cisco	20 chum 1 humpback WF 2 cisco	2 very small cisco slide under crack in door missed by video system
4	Aug 16	15.61	7 chum 1 sheefish 1 cisco	7 chum 1 sheefish 1 cisco	
5	Aug 31	2.48	50 chum 2 coho 0 cisco	50 chum 2 coho 1 cisco	Door malfunction resulted in 1 cisco missed by video system
6	Sep 15	3.75	40 chum 10 coho 2 broad WF 2 cisco	40 chum 10 coho 2 broad WF 2 cisco	
Total		>58.86	4 Chinook 137 chum 12 coho 3 broad WF 12 cisco 1 humpback WF 1 sheefish	4 Chinook 137 chum 12 coho 3 broad WF 15 cisco 1 humpback WF 1 sheefish	Total missed by video system was 3 cisco

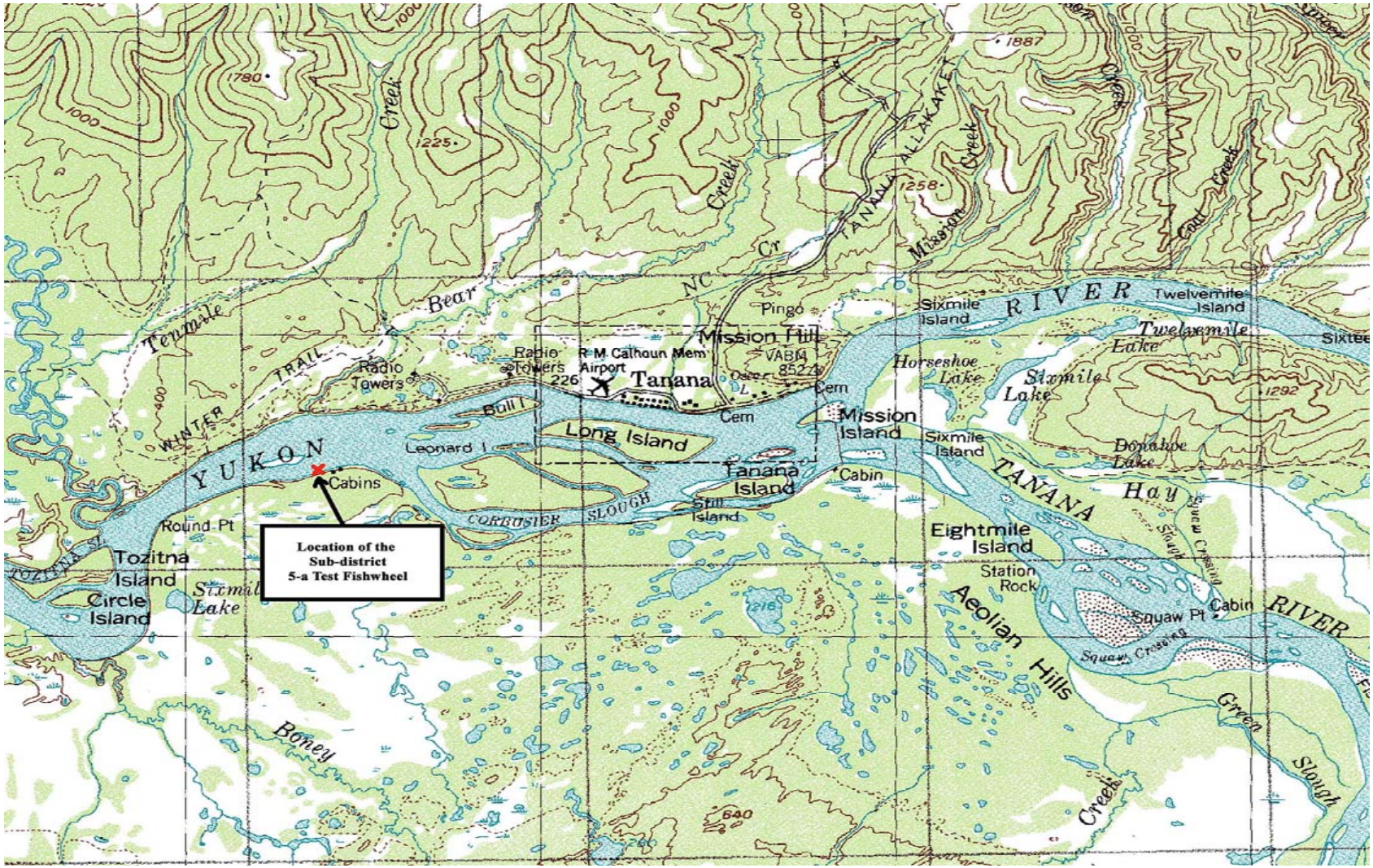


Figure 1. Map and location of the Y5A test fish wheel, 2005.

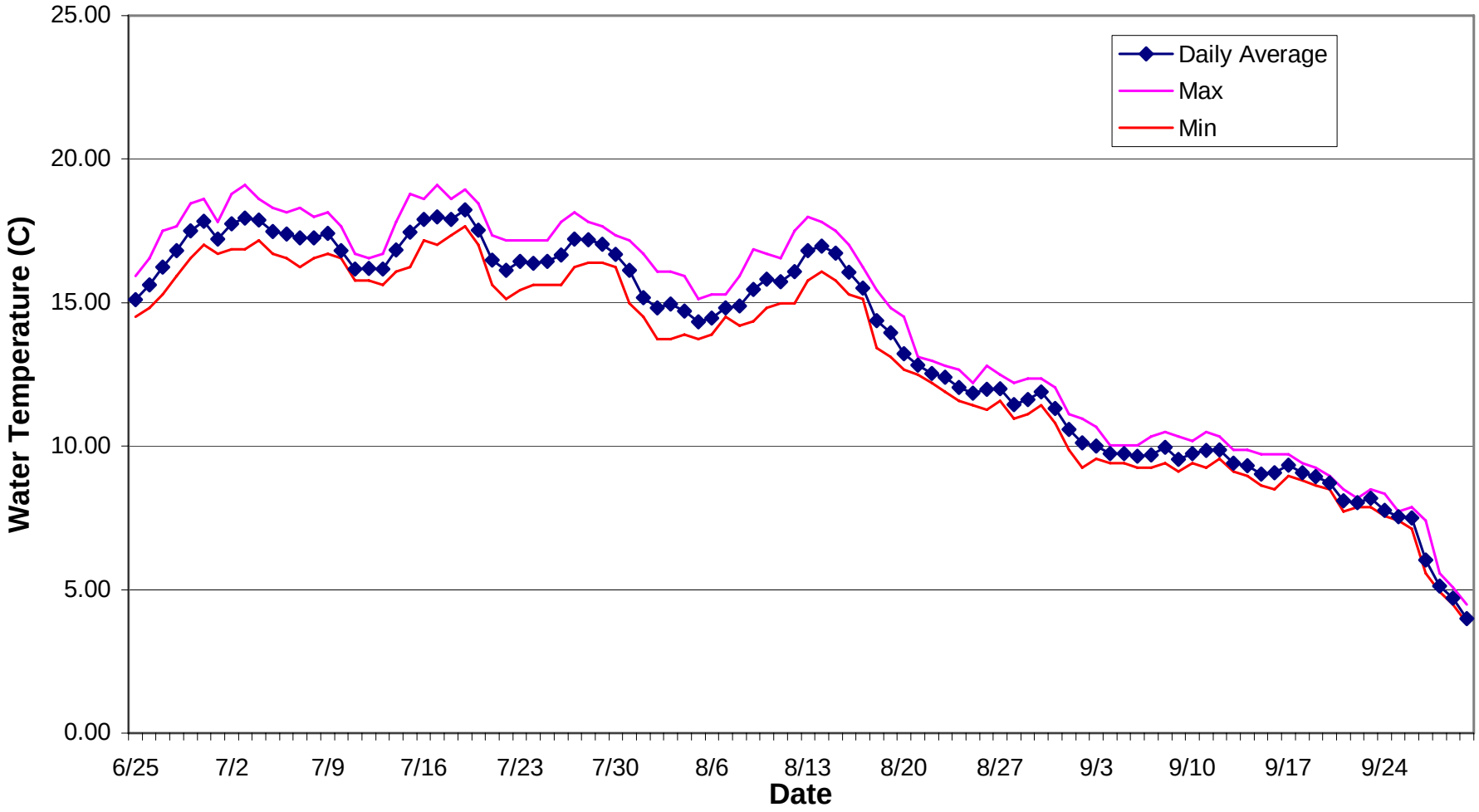


Figure 2. Daily water temperature from Tanana Y5A video fish wheel, 2005.

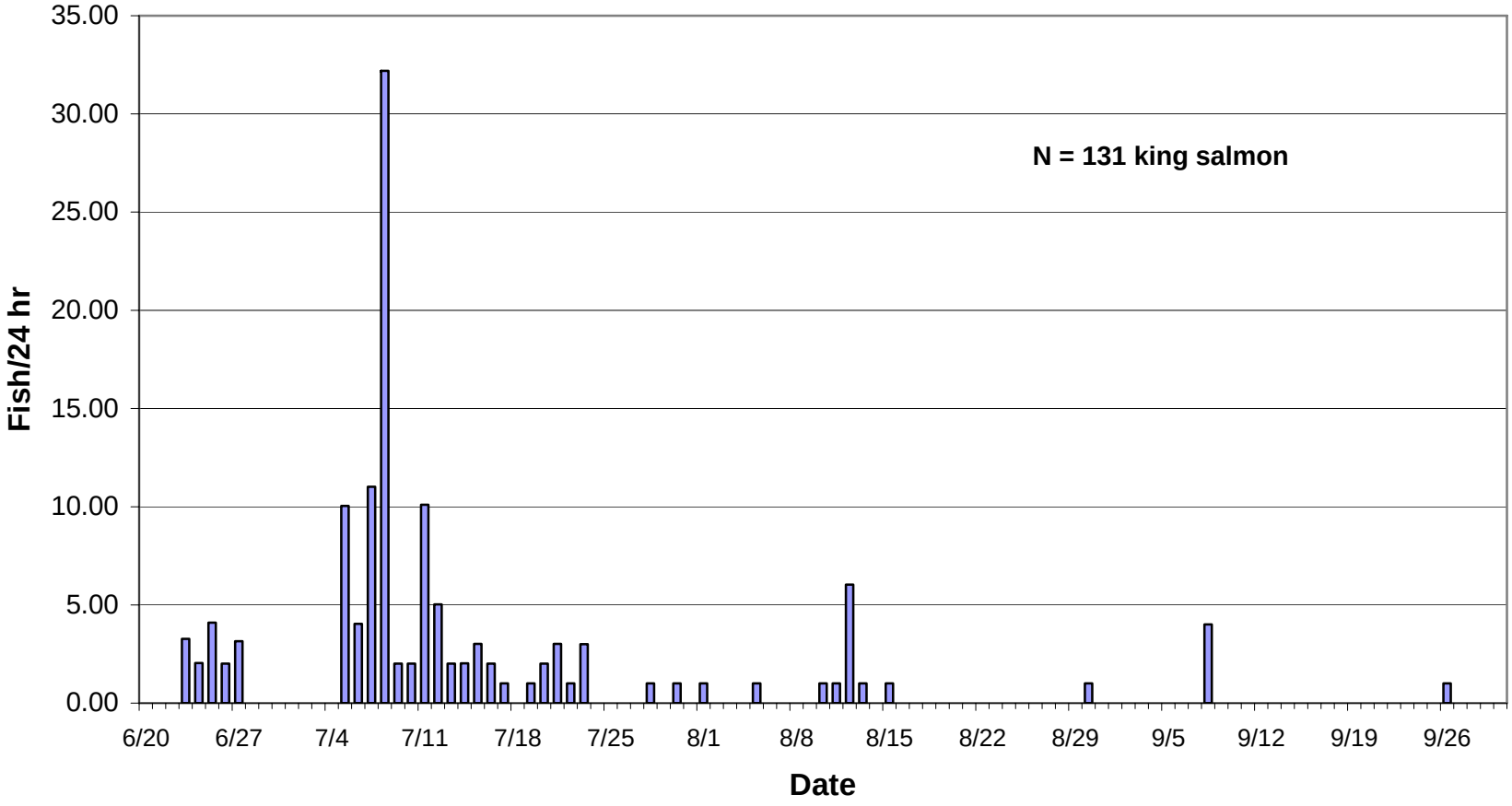


Figure 3. Chinook salmon per 24 hours (video), Tanana, Y5A, 2005.

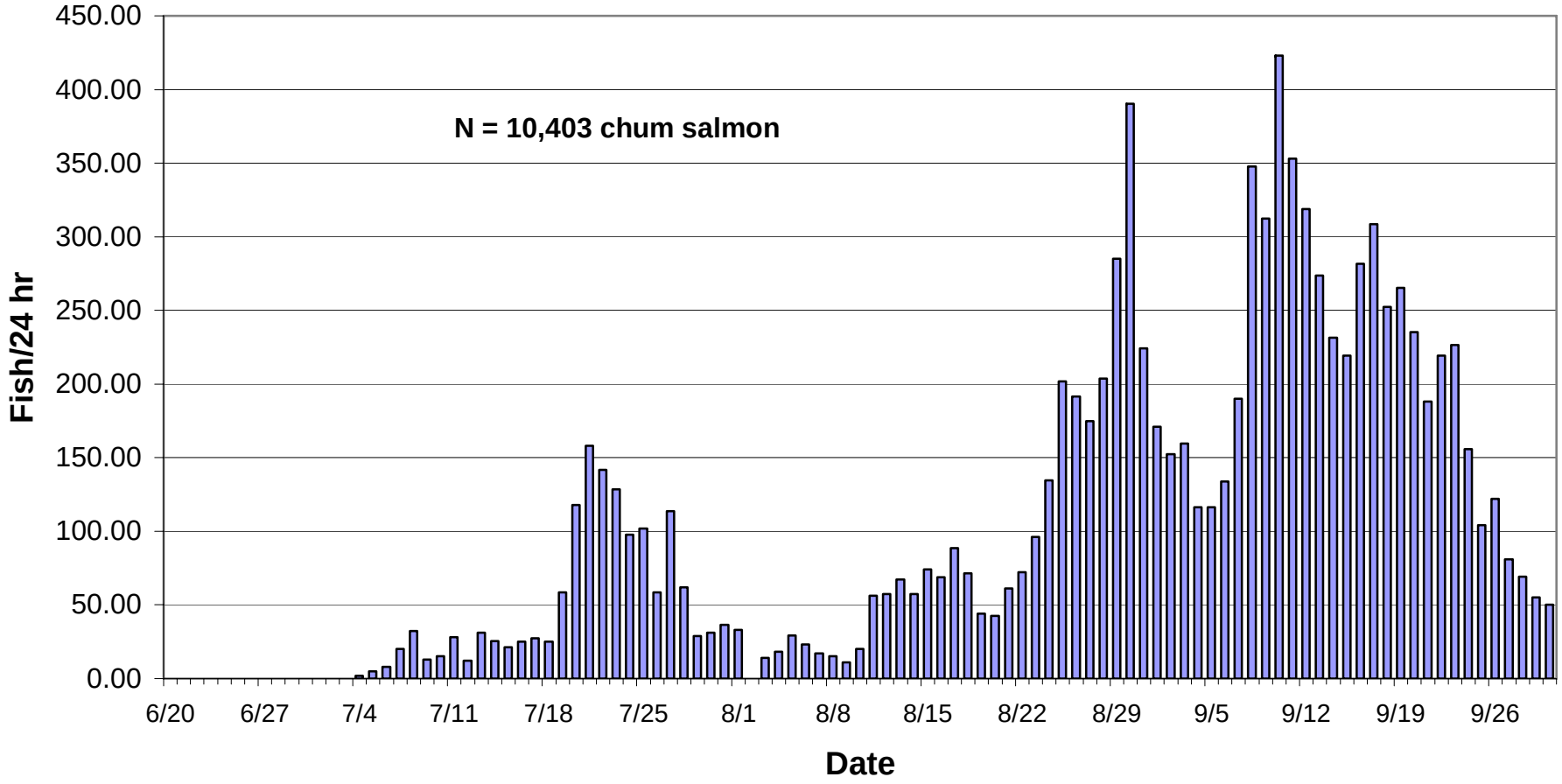


Figure 4. Chum salmon per 24 hours (video), Tanana Y5A, 2005.

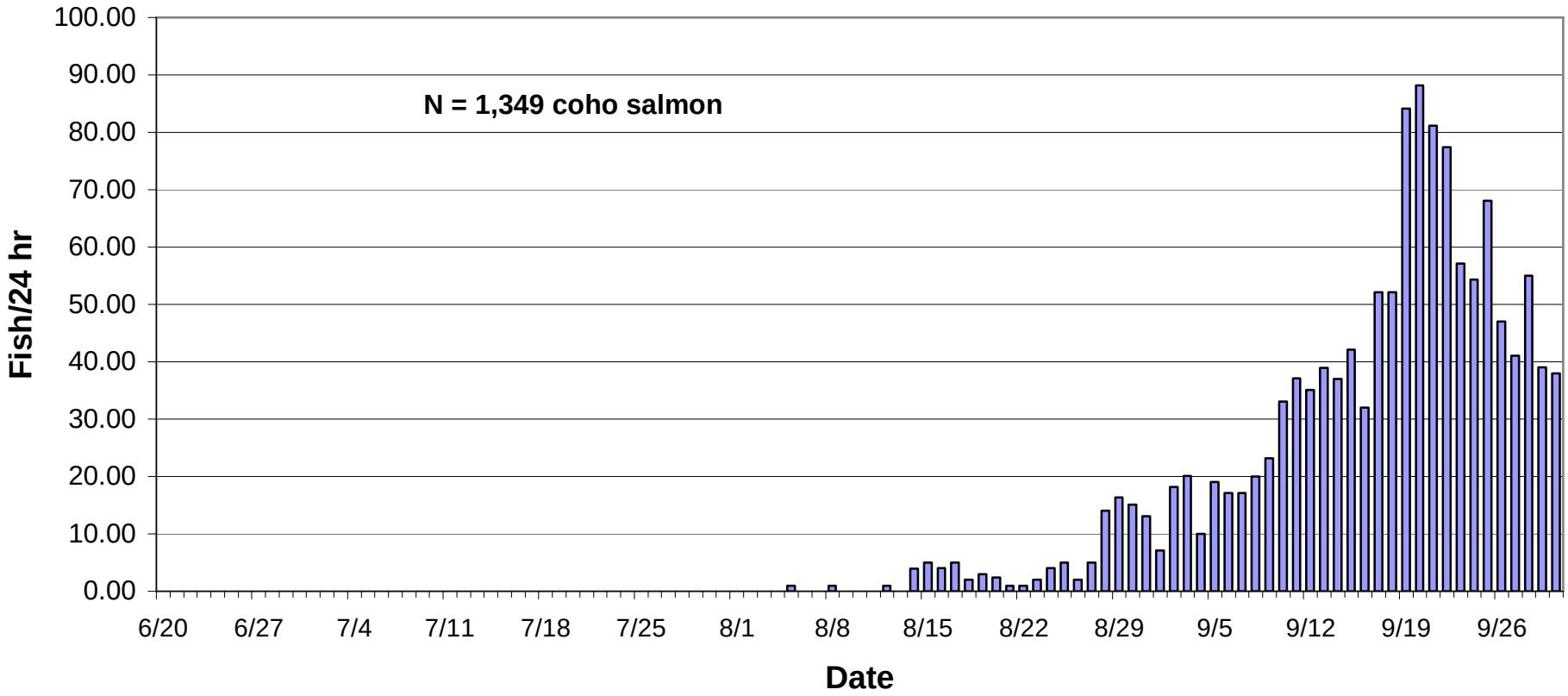


Figure 5. Coho salmon per 24 hours (video), Tanana Y5A, 2005.

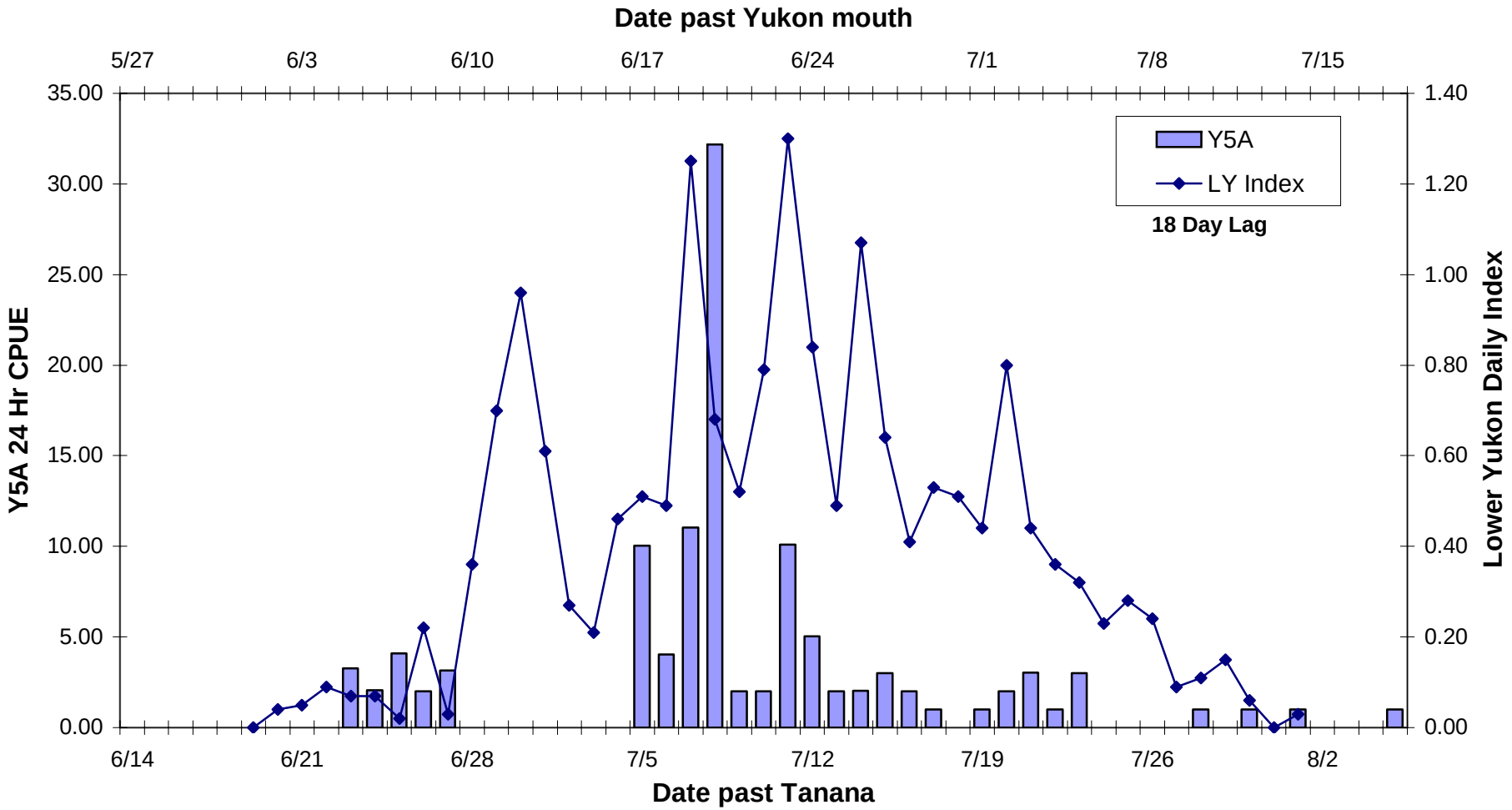


Figure 6. Y5A test wheel CPUE compared to Lower Yukon set net CPUE, Chinook salmon, 2005.

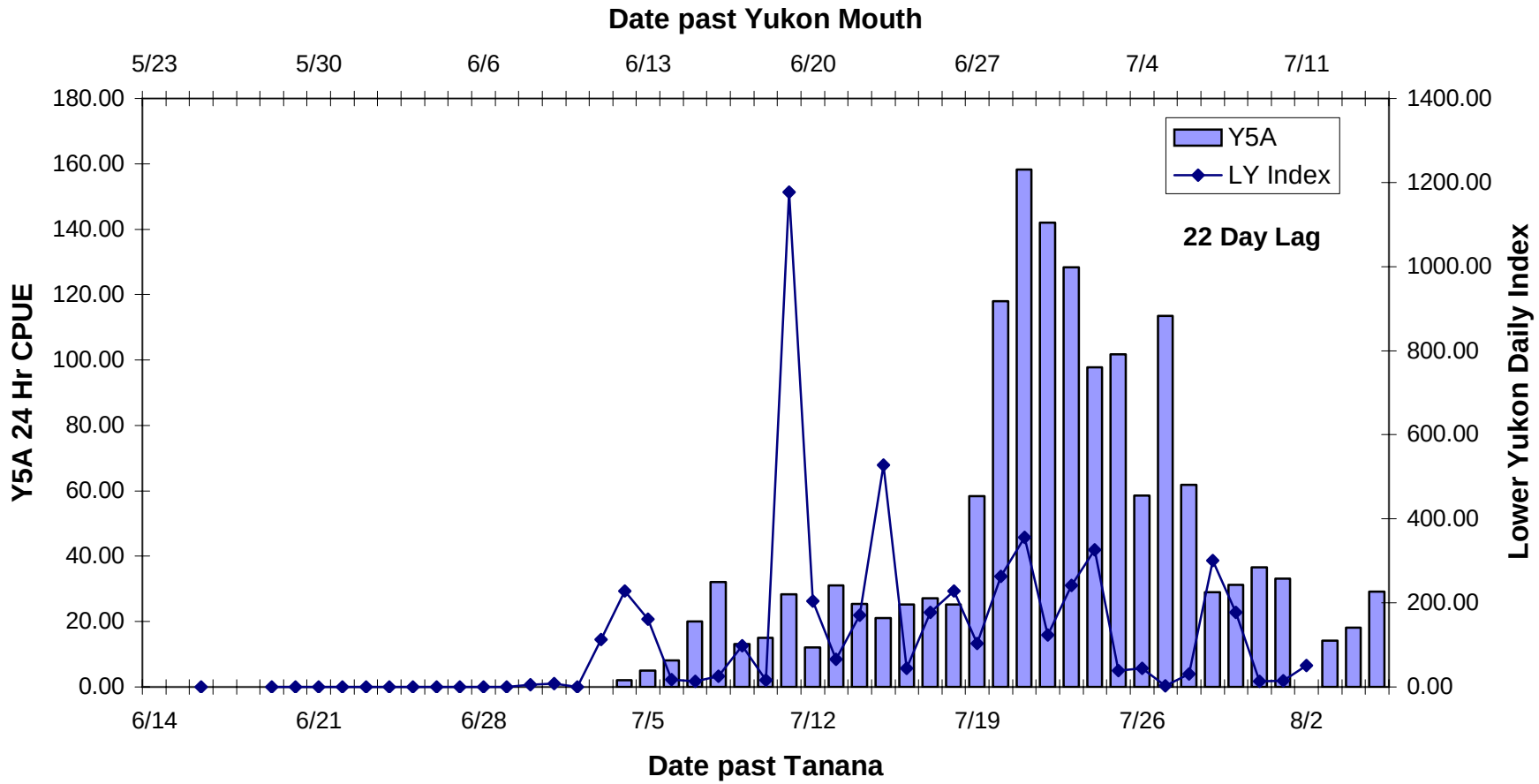


Figure 7. Y5A test wheel CPUE compared to Lower Yukon drift net CPUE, summer chum salmon, 2005.

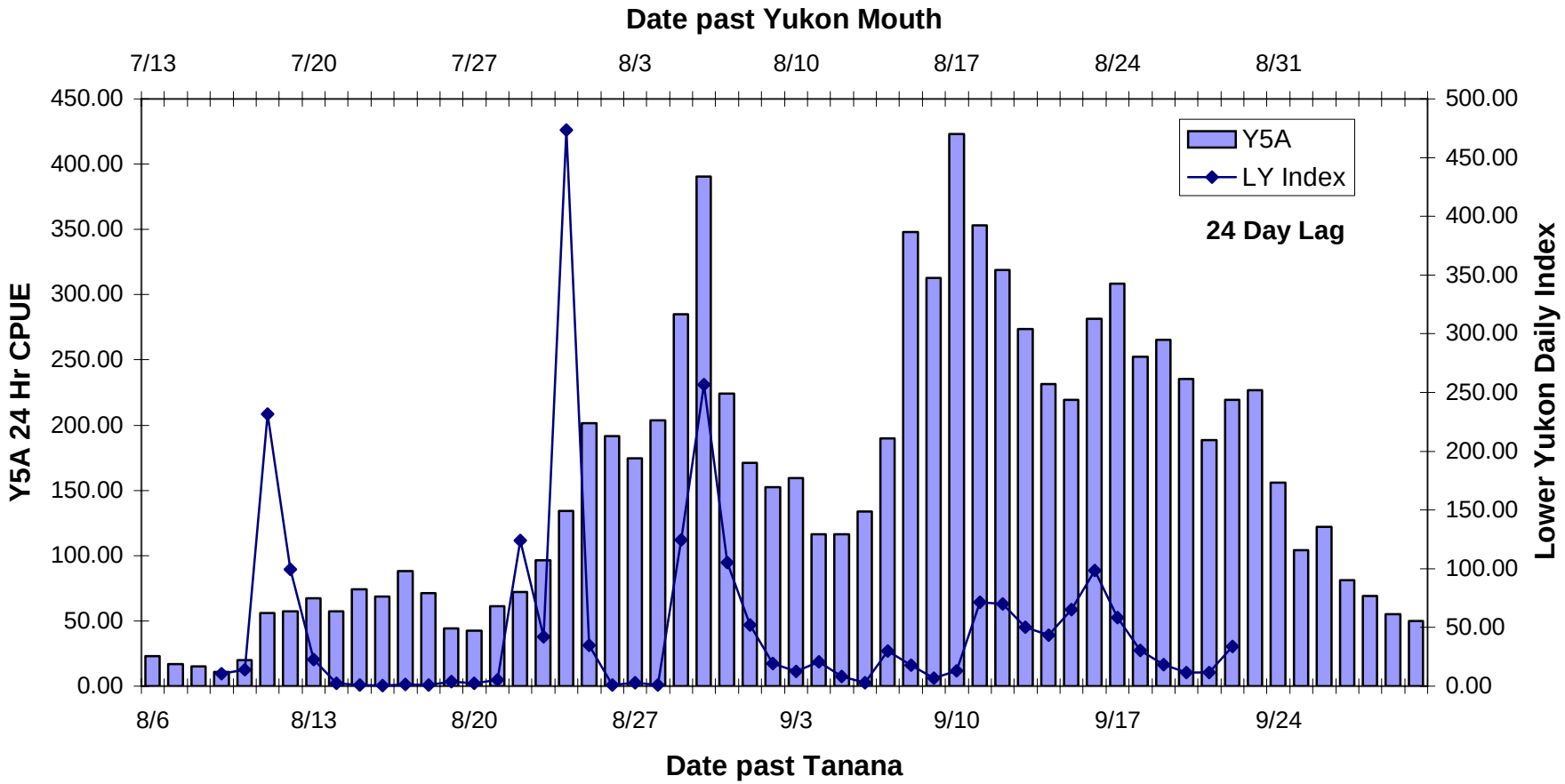


Figure 8. Y5A test wheel CPUE compared to Lower Yukon drift net CPUE, fall chum salmon, 2005.

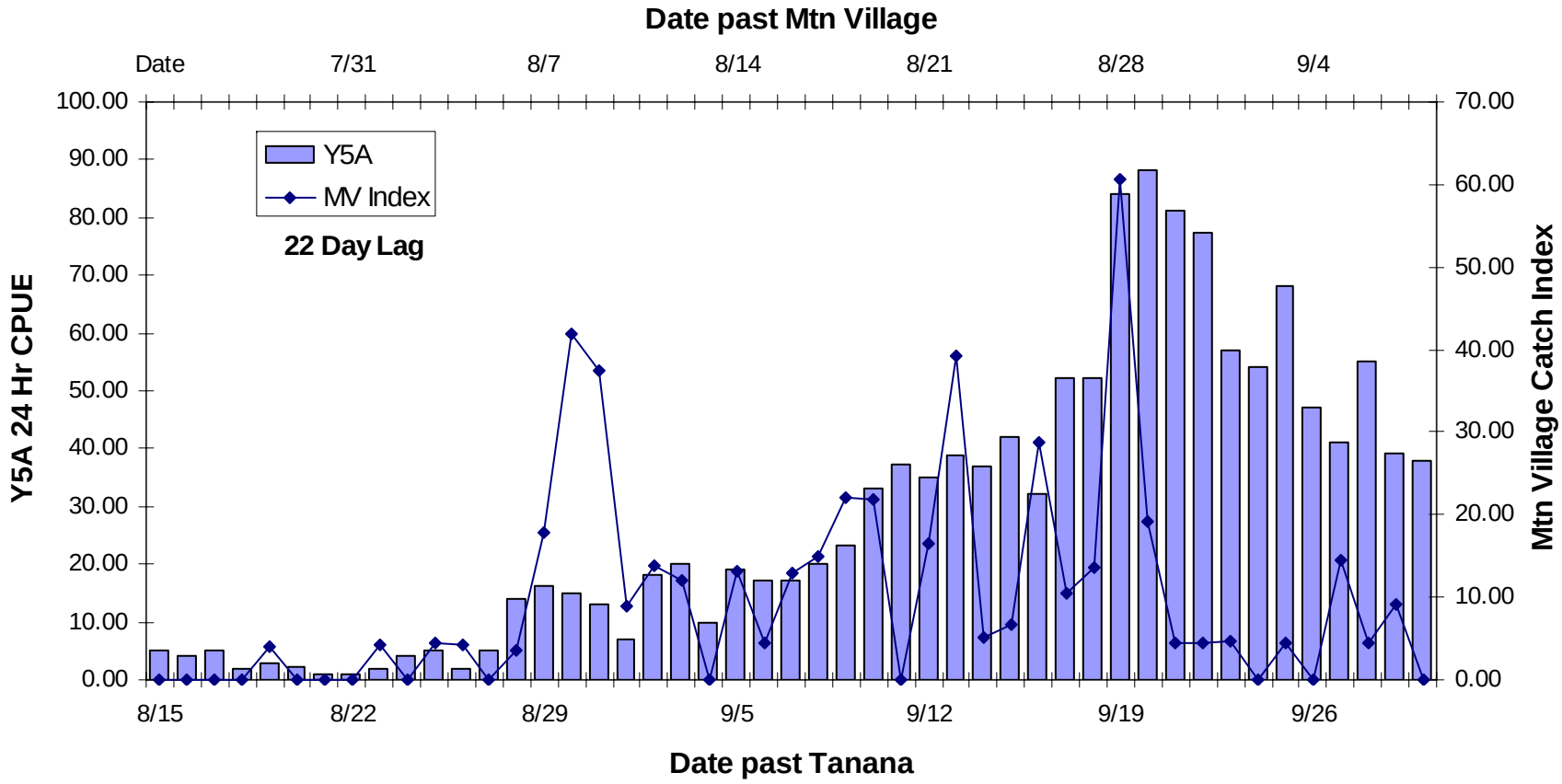


Figure 9. Y5A test wheel CPUE compared to Mountain Village drift net CPUE, coho salmon, 2005.

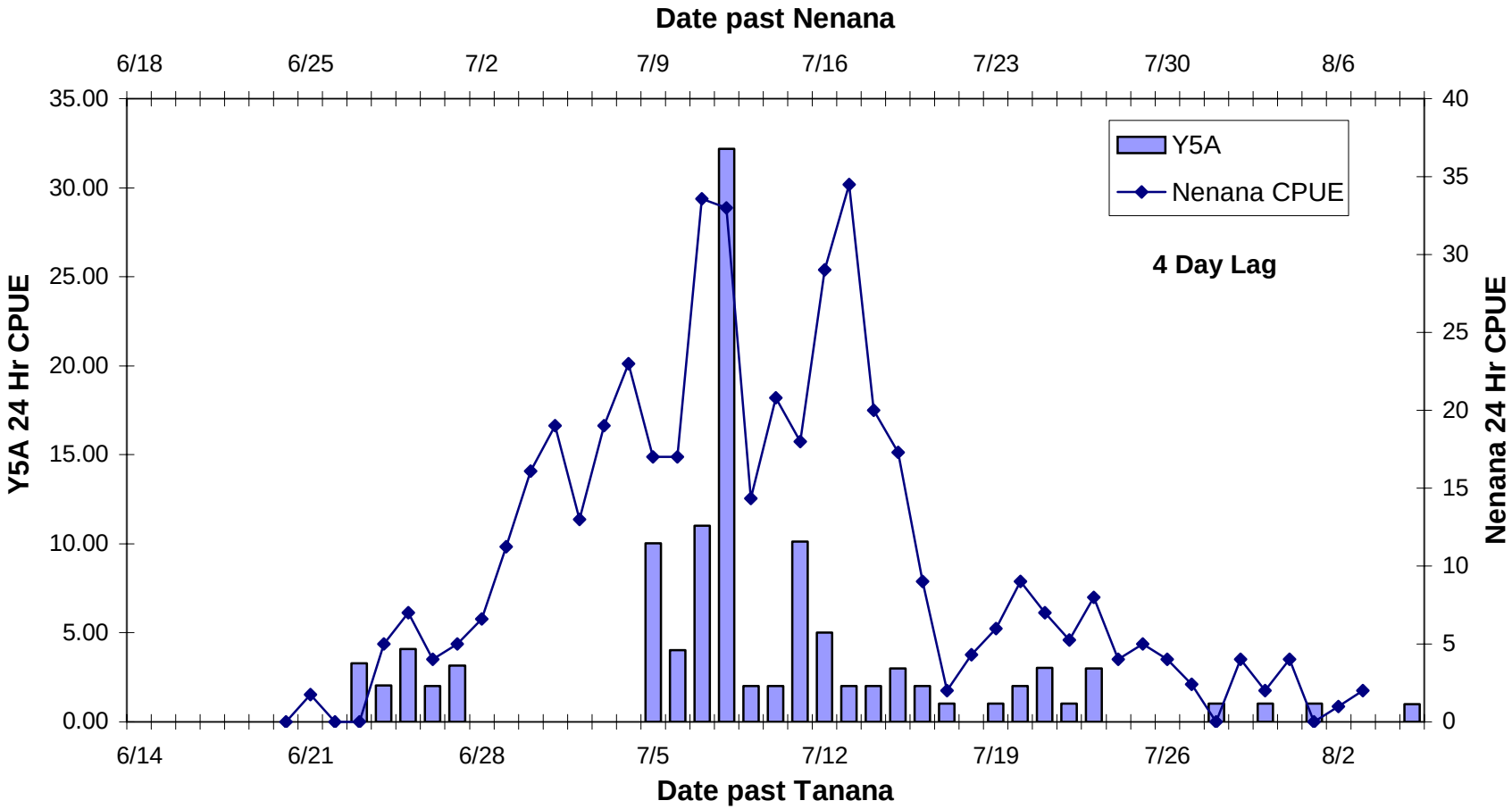


Figure 10. Y5A test wheel CPUE compared to Nenana video CPUE, Chinook salmon, 2005.

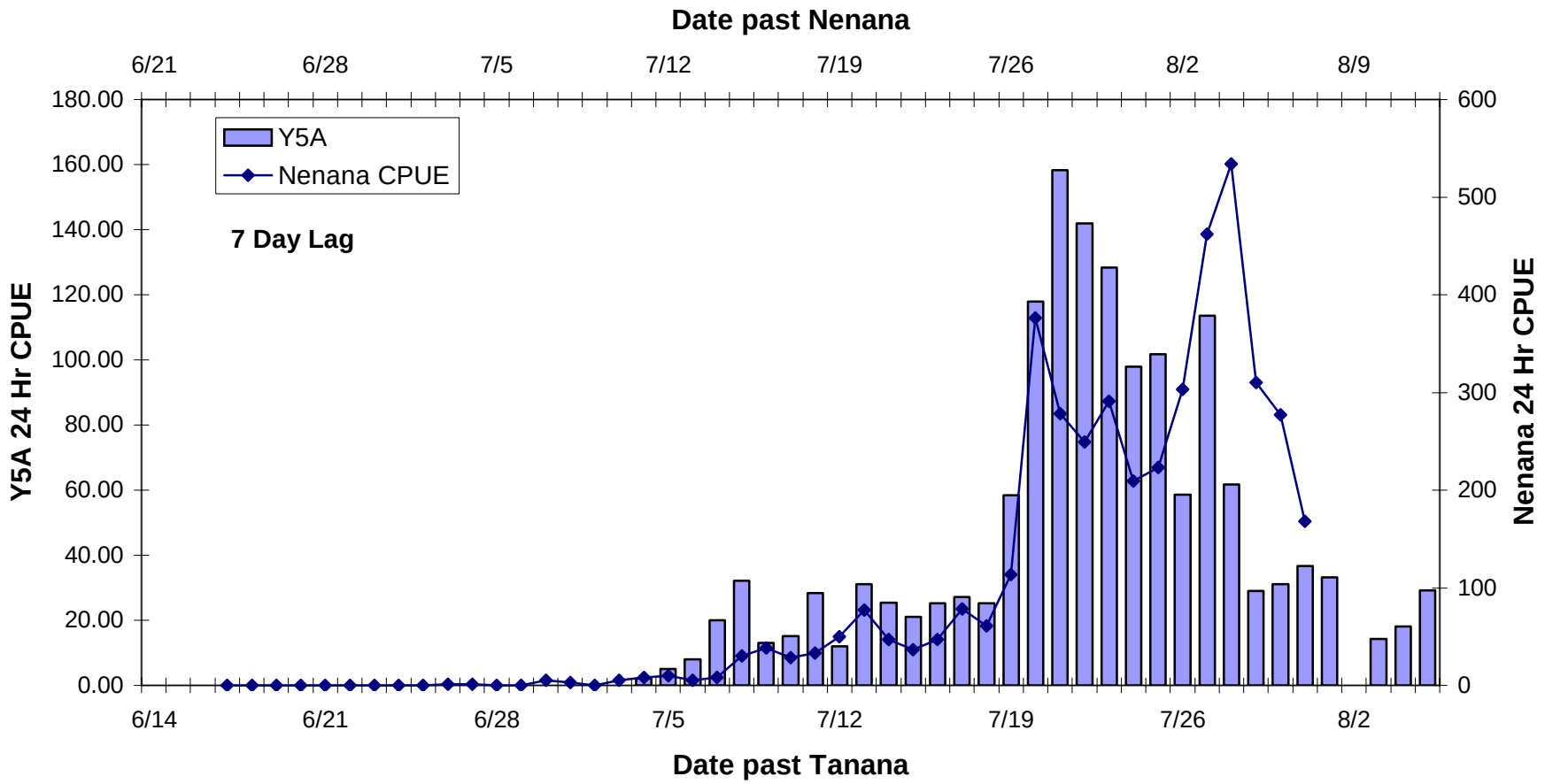


Figure 11. Y5A test wheel CPUE compared to Nenana video CPUE, summer chum salmon, 2005.

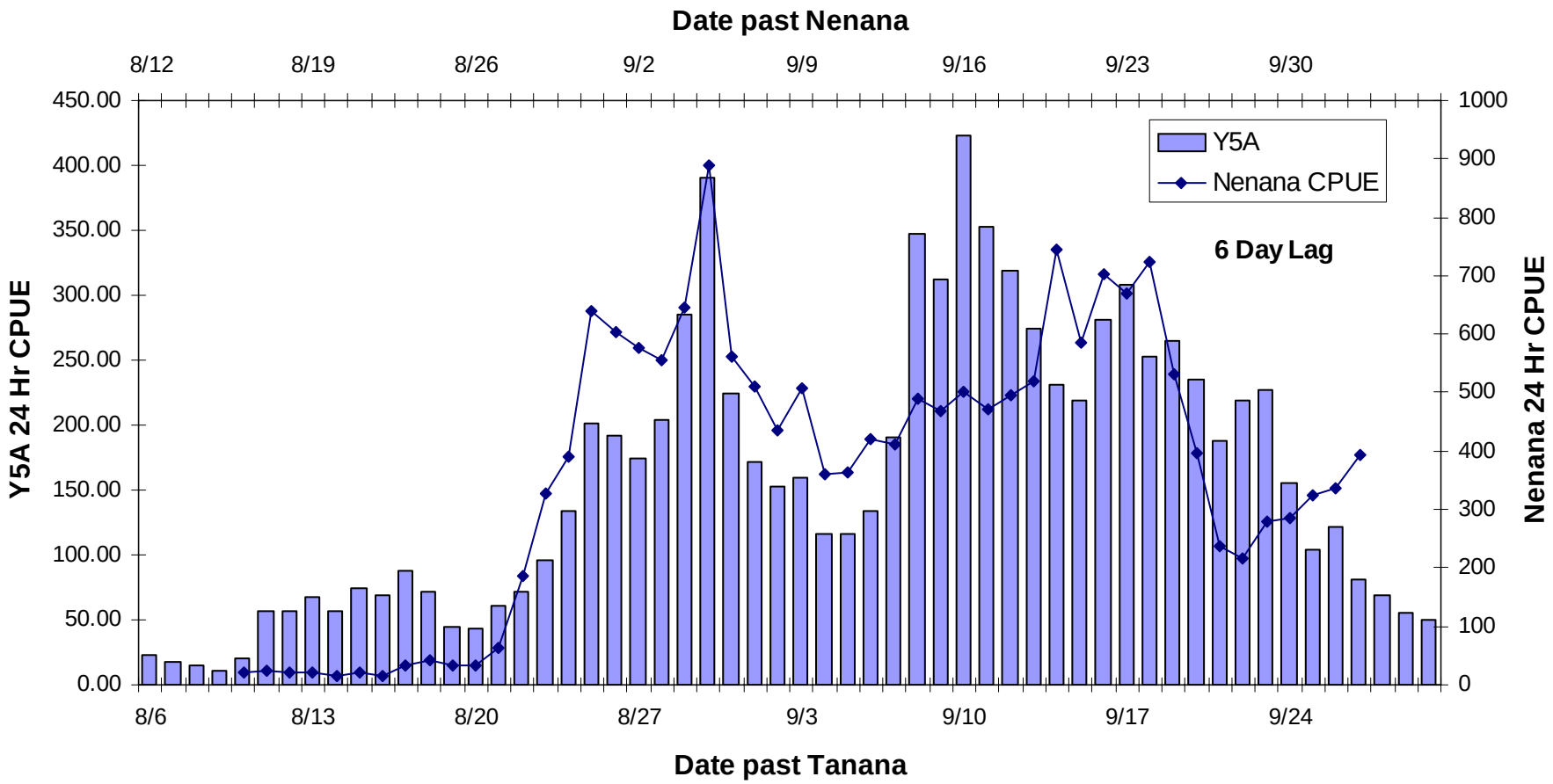


Figure 12. Y5A test wheel CPUE compared to Nenana video CPUE, fall chum salmon, 2005.

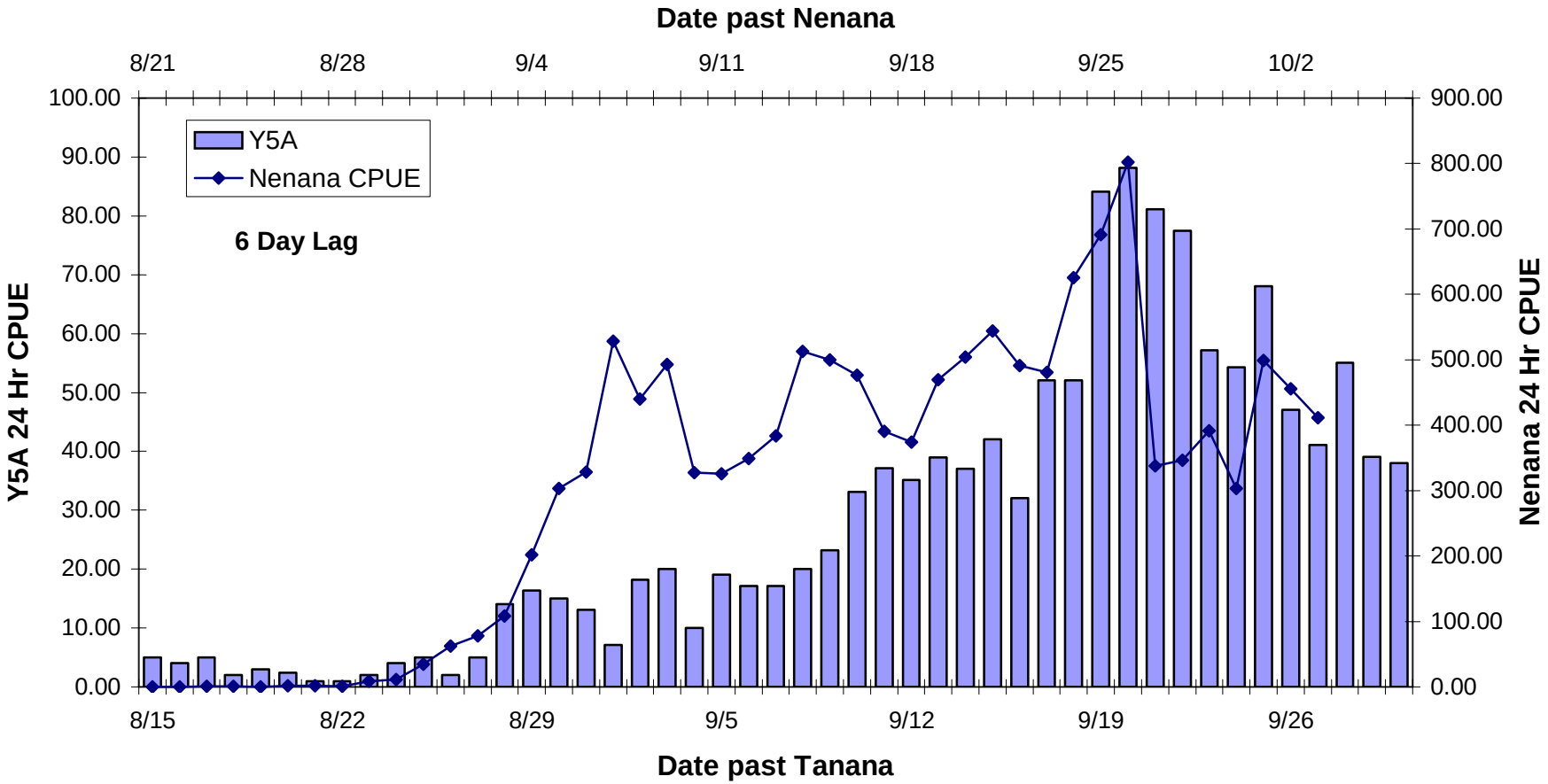
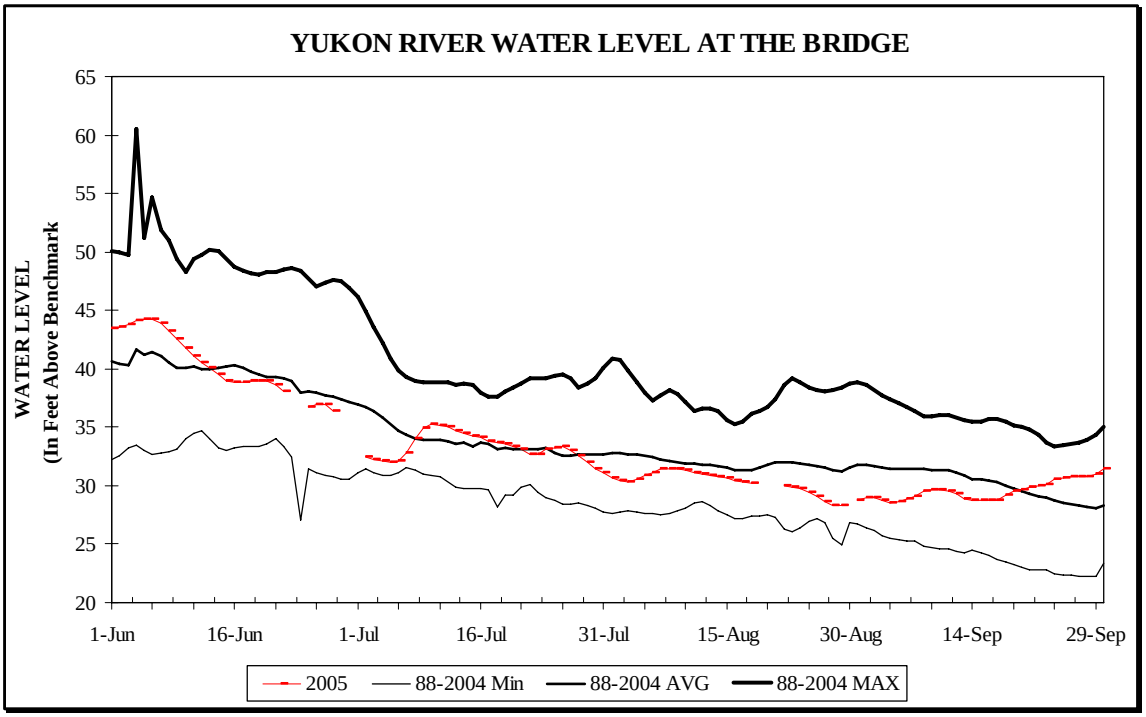


Figure 13. Y5A test wheel CPUE compared to Nenana video CPUE, coho salmon, 2005.



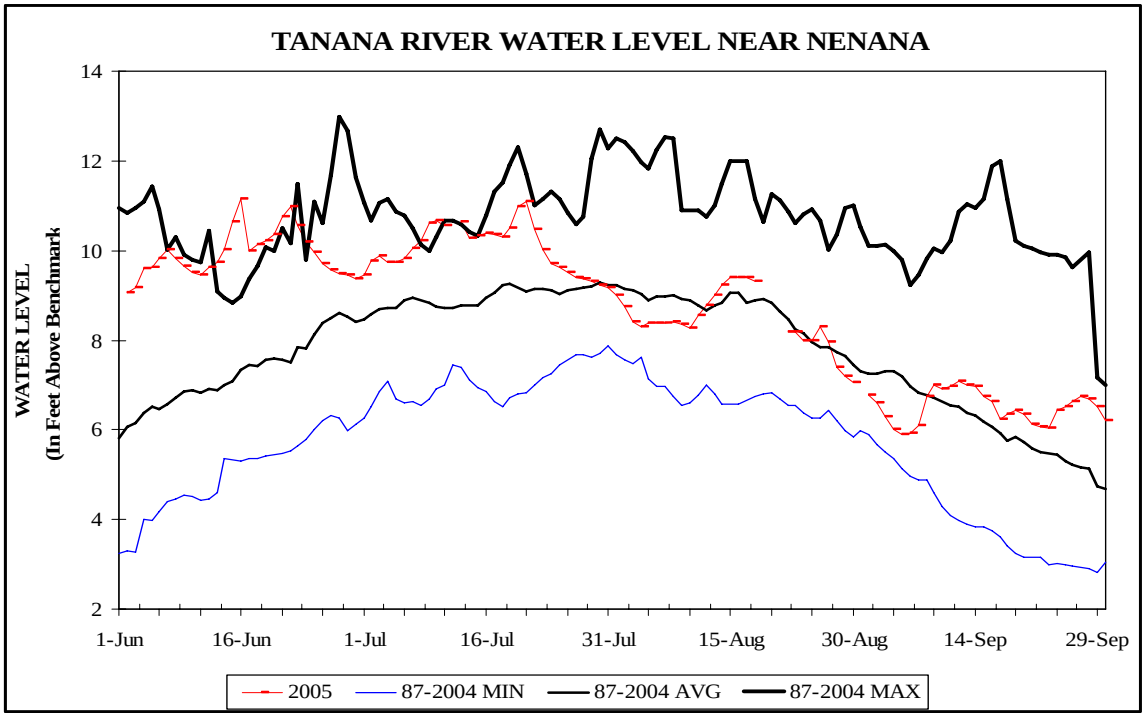


Figure 14. Water gauge data from the Yukon River Bridge and Tanana River at Nenana, 2005. Data are preliminary, graphs supplied by Bonnie Borba, ADF&G.