Appendix I. Letter from U.S. Fish and Wildlife Service on Nooksack spring chinook recovery program.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fisheries Assistance Office
2625 Parkmont Lane, Bldg. A
Olympia, Washington 98502

January 10, 1983

Larry Kinley, Chairman
Lummi Tribe
2616 Kwina Road
Bellingham, WA 98225

LUMMI INDIAN FISHERIES

Dear Larry:

In August 1980, the Olympia Fisheries Assistance Office (FAO) of the U.S. Fish and Wildlife Service (FWS) drafted a plan for restoring Puget Sound spring chinook populations. We have made progress in meeting the goals outlined in that plan through cooperative efforts with the Washington Department of Fisheries (WDF) and the Nooksack and Lummi Tribes. At this time, we would like to express our appreciation for the cooperation we have received from the tribes, and briefly describe the project status and what we hope to accomplish in restoration of Puget Sound spring chinook salmon.

The restoration plan outlined three main goals for restoring spring chinook in the Puget Sound region. These goals were:

1) Protect existing stocks through habitat protection and enhancement efforts.

2) Perform technical support or applied research by collecting data on critical information voids in spring chinook life history, management, and husbandry.

3) Develop a broodstock program at Quilcene National Fish Hatchery (NFH) to provide eggs or smolts for reestablishing spring chinook into suitable habitat.

The following are highlights of activities relating to these goals and also proposed activities concerning each.

Protection of Existing Stocks

A cooperative program to enhance the population of native spring chinook in the Nooksack River system was initiated by FAO, WDF, and the Lummi and Nooksack Tribes. We are now in the third year of at least a four-year broodstock collection effort to augment natural spring chinook production in this system, which supports one of the few viable populations remaining in Puget Sound. This year, because of unexpectedly low escapement, only 15 adult spring chinook were captured in the south fork for use as broodstock at the Lummi Tribe's Skookum Creek Hatchery, compared to 38 captured in 1980 and 48 captured in 1981. Because of extremely difficult access to most capture sites in the south fork and the need to minimize handling stress, we again airlifted

broodstock to the hatchery by helicopter. Presently, 28,000 eyed eggs are incubating at Skookum Creek Hatchery from this effort. We anticipate continuing this cooperative work at least one additional year, depending on returns to Skookum Hatchery.

Technical Support and Applied Research

For the past two years we have examined migratory behavior of Nooksack River juvenile spring chinook in order to help define an optimal size and time of release for hatchery production of these fish. Preliminary findings suggest that, contrary to conventional wisdom, at least a portion of the native Nooksack population emigrates during their first spring. Available data from scale analysis of returning spawners also indicate a predominance of subyearling outmigrants from this system.

All Skookum Creek Hatchery releases have been coded wire tagged to help define marine contribution and interception of Nooksack spring chinook. In addition, in 1982 we captured and implanted half-tags in nearly 10,000 native north fork Nooksack spring chinook. Based on trial half-tagging tests conducted before our 1982 work, we anticipate that survival and tag retention of these wild Nooksack springs will be high. Although we hope to continue half-tagging wild Nooksack juveniles in 1983, the poor escapement experienced this year may preclude next year's work. Nevertheless, we intend to continue tagging Skookum Creek Hatchery releases of spring chinook.

Broodrun Development at Quilcene NFH

A major part of our efforts to restore Puget Sound spring chinook has been to develop a broodstock program at Quilcene NFH. Our original goal was to use a Puget Sound origin stock. However, after a thorough investigation, we concluded that no native Puget Sound spring chinook eggs were available and the next best alternative was to use a Cowlitz female, Nooksack male cross. Accordingly, for the past two years we have fertilized Cowlitz Hatchery spring chinook eggs with sperm from Nooksack River springs. Approximately half the Cowlitz eggs have been crossed with earlier-timed north fork males and the remainder with later-timed south fork males to provide a range of spawning timing at Quilcene NFH. Eyed eggs were initially transferred to a quarantine facility at Quilcene NFH until viral disease surveys were completed.

In each of the past two years, approximately 450,000 Nooksack X Cowlitz eggs have been transferred to Quilcene NFH, where group separation has been maintained through coded wire tagging of all releases. This year, due to low abundance of Nooksack males and timing differences between Nooksack and Cowlitz stocks, fertilization rates were not high. Accordingly, we are now conducting short-term sperm storage trials to improve the quality and quantity of sperm available if poor Nooksack escapements continue.

With the continued cooperation of WDF and the tribes, we propose to continue development of this brood run for at least two additional years in order to complete a full cycle. The eventual goal of this program is restoration of spring chinook populations in at least part of their historic range. This would be accomplished with plants into appropriate Puget Sound stream systems. We would, of course, continue close coordination with WDF and concerned tribes in selecting appropriate planting streams and resolving potential management and fish health concerns.

We would be happy to discuss any aspects of this program in more detail with you or your staff at your convenience. We wish to again express appreciation for the cooperation received thus far.

Sincerely,

Ralph

Ralph S. Boomer
Project Leader

RCW:dem

cc: NWIFC
BIA, Olympia, Portland
Mike Barclay, Nooksack Tribe
Steve Seymour, Lummi Tribe
Paul Hage, Lummi Tribe

Appendix II. South Fork Nooksack August streamflows at the Wickersham gauging station, 1969-1986. Streamflows in cubic feet per second.

Date	August Mean	August Max.	August Min.
1986	121	161	97
1985	151	210	118
1984	195	419	135
1983	204	311	131
1982	304	1480	200
1981	151	233	112
1980	174	473	122
1979	NA	NA	NA
1978	194	910	110
1977	211	670	110
1976	461	1600	316
1975	341	1850	151
1974	397	804	257
1973	118	185	84
1972	307	490	179
1971	289	609	167
1970	125	202	86
1969	159	286	123

Appendix III. Letter from Washington Department of Fisheries and Game to Tom Nesset, 1928.

DEPARTMENT OF FISHERIES AND GAME
CHARLES R. MAYBURY, DIRECTOR
DIVISION OF FISHERIES
414 BELL STREET TERMINAL P. O. BOX 384
SEATTLE, WASHINGTON

CHARLES R. POLLOCK,
SUPERVISOR OF FISHERIES

August 3, 1928

Mr. Tom Nesset
Fire Warden & Forest Ranger
Wickersham, Washington

Dear Sir:

Our Mr. Horr has just turned in a report with a sketch showing the work done in blasting out some rock in the South Fork of the Nooksack and called our attention to the fact of the very fine cooperation and work which you extended to him in his work in taking care of this fish obstruction, which has been reported to the office on several occasions and which it has been impossible to remove prior to this time due to congestion of other work or height of water in the stream which would prevent operation.

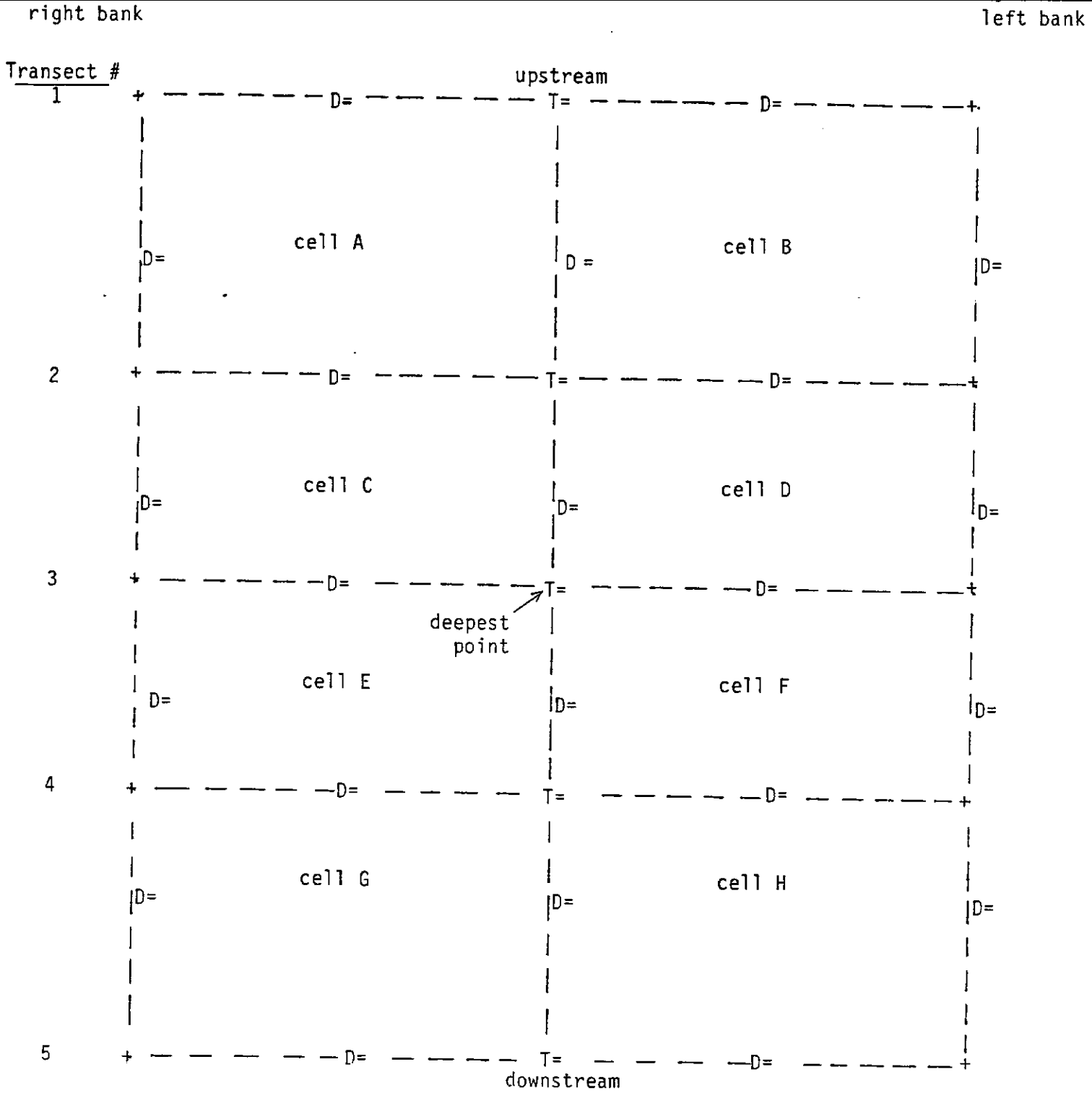
The department certainly appreciates the cooperation and hard work which you put in on this matter and wishes to advise that, if you have had any expenses over and above those taken care of by Mr. Horr, the office would like to be advised so that proper remuneration may be made.

Thanking you in the name of the department.

Yours very truly,

Chas R Pollock
Chas. R. Pollock
Supervisor of Fisheries

CRP:T



Appendix IV. Example diagram of a site measurement form.

Appendix V. Multiple regression model for data from RM 2.0 - 30.7 (n = 42), with number of fish in sites as the dependent variable. The only independent variable selected was sumco (sum of cover instances) which had an adjusted correlation of 0.26371.

Stepwise Selection for D:NEWSTEP.numberfish

Selection: Forward — Maximum steps: 500 — F-to-enter: 4.00
Control: Manual — Step: 1 — F-to-remove: 4.00

R-squared: .28167 — Adjusted: .26371 — MSE: 10.8571 — d.f.: 40

Variables in Model	Coeff.	F-Remove	Variables Not in Model	P.Corr.	F-Enter
4. D:NEWSTEP.sumco	0.52328	15.6847	1. D:NEWSTEP.sited	.0070	.0019
			2. D:NEWSTEP.sitea	.0409	.0653
			3. D:NEWSTEP.sitev	.0135	.0071
			5. D:NEWSTEP.pcell	.0750	.2204
			6. D:NEWSTEP.pcell	.0199	.0154
			7. D:NEWSTEP.pcell	.0991	.3871
			8. D:NEWSTEP.pcell	.0825	.2675
			9. D:NEWSTEP.pcell	.0344	.0462
			10. D:NEWSTEP.pcell	.0460	.0828
			11. D:NEWSTEP.pcell	.0704	.1945

Appendix VI. Estimated spring chinook preference for instream habitat factors in the South Fork Nooksack River. Based on Newman (1987).

Habitat factor	Preference
Undercut bank	0.86
Large organic debris	1.3
Root wad	1.52
Woody debris	1.55
Boulder	1.63
Bedrock	1.88
Turbulence	2.38
Water depth >5 ft	6.5

1 Where preference = $\frac{\text{number of sites without factor}}{\text{number of sites with factor}}$

$$\times \quad \frac{\text{number of fish in sites with factor}}{\text{number of fish not in sites with factor}}$$

2 Preference values greater than 1. indicate fish preference, and preference increases as the value increases.

Appendix VII. Lummi stream stability index project form.

LUMMI STREAM STABILITY INDEX PROJECT (NOOKSACK BASIN)

Survey Date_____ Time_____ Observers_____ Stream_____

WRI#_____ Trib. To_____ RM Lower End_____ RM Upper End_____ .Other Info._____

_____

_____

ITEM RATED	STABILITY INDICATORS BY CLASSES							
	EXCELLENT		GOOD		FAIR		POOR	
I. UPPER BANKS								
Landform Slope	Bank slope gradient <30%	(2)	Bank slope gradient 30-40%	(4)	Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	(8)
Mass Wasting (Existing or Potential)	No evidence of past or potential for future mass wasting into channels.	(3)	Infrequent and/or very small Mostly healed over. Low future potential.	(6)	Moderate frequency & size, with some raw spots eroded by water during high flows.	(9)	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	(12)
Debris Jam Potential (Floatable Objects)	Essentially absent from immediate channel area.	(2)	Present but mostly small twigs and limbs.	(4)	Present, volume and size are both increasing.	(6)	Moderate to heavy amounts, predominantly larger sizes.	(8)
Bank Protection from Vegetation	90% + plant density. Vigor and variety suggests a deep, dense root mass.	(3)	70-90% density. Fewer plant species or lower vigor suggests a less dense or deep root mass.	(6)	50-70% density. Lower vigor and still fewer species form a somewhat shallow and discontinuous root mass.	(9)	<50% density plus fewer species & less vigor indicate poor, discontinuous, and shallow root mass.	(12)
II. LOWER BANKS								
Channel capacity	Ample for present plus some increases. Peak flows contained. W/D ratio <7.	(1)	Adequate. Overbank flows rare. Width to Depth (W/D) ratio 8-15.	(2)	Barely contains present peaks. Occasional overbank floods. W/D ratio 15-25.	(3)	Inadequate. Overbank flows common. W/D ratio >25.	(4)
Bank Rock Content	65% + with large angular boulders 12" + numerous.	(2)	40 to 65%, mostly small boulders to cobble 6-12".	(4)	20 to 40%, with most in the 3-6" diameter class.	(6)	<20% rock fragments of gravel sizes, 1-3" or less.	(8)
Obstructions Flow Deflectors Sediment Traps	Rocks, old logs firmly embedded. Flow pattern of pool & riffles stable without cutting or deposition.	(2)	Some present, causing erosive cross currents and minor pool filling. Obstructions and deflectors newer and less firm.	(4)	Moderately frequent, moderately unstable obstructions & deflectors move with high water causing bank cutting and filling of pools.	(6)	Frequent obstructions and deflectors cause bank erosion yearlong. Sed. traps full, channel migration occurring.	(8)
Cutting	Little or none evident. Infrequent raw banks less than 6" high generally.	(4)	Some, intermittently at outcurves & constrictions. Raw banks may be up to 12".	(8)	Significant. Cuts 12"-24" high. Root mat overhangs and sloughing evident.	(12)	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	(16)
Deposition	Little or no enlargement of channel or point bars.	(4)	Some new increase in bar formation, most from coarse gravels.	(8)	Moderate deposition of new gravel & coarse sand on old and some new bars.	(12)	Extensive deposits of predominately fine particles. Accelerated bar development.	(16)
III. BOTTOM								
Rock Angularity	Sharp edges and corners, plane surfaces roughened.	(1)	Rounded corners & edges, surfaces smooth & flat.	(2)	Corners & edges well rounded in two dimensions.	(3)	Well rounded in all dimensions, surfaces smooth.	(4)
Brightness	Surfaces dull, darkened, or stained. Gen. not "bright".	(1)	Mostly dull but may have up to 35% bright surfaces.	(2)	Mixture, 50-50% dull and bright, + 15, i.e. 35-65%.	(3)	Predominately bright, 65% +, exposed or scoured surfaces.	(4)
Consolidation or Particle Packing	Assorted sizes tightly packed and/or overlapping.	(2)	Moderately packed with some overlapping.	(4)	Mostly a loose assortment with no apparent overlap.	(6)	No packing evident. Loose assortment, easily moved.	(8)
Bottom Site Distribution Percent Stable Materials	No change in sites evident. Stable materials 80-100%.	(4)	Distribution shift slight. Stable materials 50-80%.	(8)	Moderate change in sizes. Stable materials 20-50%.	(12)	Marked distribution change. Stable materials 0-20%.	(16)
Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition.	(6)	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	(12)	30-50% affected. Deposits & scour at obstructions, constrictions, and bends. Some filling of pools.	(18)	More than 50% of the bottom in a state of flux or change nearly yearlong.	(24)
Clinging Aquatic Vegetation (Moss & Algae)	Abundant. Growth largely moss like, dark green, perennial. In swift water too.	(1)	Common. Algal forms in low velocity & pool areas. Moss here too and swifter waters.	(2)	Present but spotty, mostly in backwater areas. Seasonal blooms make rocks slick.	(3)	Perennial types scarce or absent. Yellow-green, short term bloom may be present.	(4)
COLUMN TOTALS -->			-->		-->		-->	

Appendix VII. Lummi stream stability index project form.

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COLUMN TOTALS -->			-->		-->		-->	

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
90986	0.02	43.7	3.2	2.78	0.7	46	85	3910
90986	0.09	43.7	3.2	1.58	1.9	44	120	5280
90986	0.09	43.7	3.2	2.98	1.7	22	146.7	3227.4
90986	0.09	34.6	3.2	1.67	0.7	16	146.7	2347.2
90986	0.09	43.6	3.2	2.29	1.2	52	146.7	7628.4
90986	0.09	45.5	4.2	2.78	1.7	46	146.7	6748.2
90986	0.09	54.4	3.2	1.98	1.5	50	120	6000
90986	0.2	43.7	2.2	1.11	0.8	10	95	950
90986	0.2	43.5	4.2	2.33	1.7	33	70	2310
90986	0.2	43.9	4.2	1.8	0.9	21.5	95	2042.5
90986	0.2	43.7	3.2	3.01	1.2	21.5	95	2042.5
90986	0.2	43.6	2.2	0.63	0.5	33	70	2310
90986	0.36	43.8	3.2	2.18	1.1	65	180	11700
90986	0.36	43.8	3.2	2.46	1.2	60	180	10800
90986	0.36	43.5	2.2	1.96	1.1	25	176	4400
90986	0.36	43.6	3.2	1.83	1.8	22	55	1210
90986	0.53	34.8	3.2	2.65	0.6	88	134.5	11836
90986	0.53	43.6	3.2	1.87	1.5	22.5	134.5	3026.25
90986	0.53	45.7	3.2	1.7	1.8	16.5	165	2722.5
90986	0.53	45.6	3.2	1.38	1.8	16.5	165	2722.5
90986	0.53	43.5	4.2	2.84	0.9	22.5	134.5	3026.25
90986	0.53	54.4	3.2	1.22	2	12	165	1980
90986	0.7	54.6	4.2	2.79	1.9	13.3	166.3	2211.79
90986	0.7	43.7	3.2	3.25	1.8	18.75	71	1331.25
90986	0.7	45.4	4.2	2.67	0.8	39.5	71	2804.5
90986	0.7	54.6	3.2	2.57	1.4	49	166.3	8148.7
90986	0.7	45.7	4.2	4.17	0.8	39.5	71	2804.5
90986	0.7	43.7	4.2	2.93	1.5	13.3	166.3	2211.79
90986	0.7	54.7	4.2	4.08	0.6	6.25	71	443.75
90986	0.7	45.5	4.2	3.21	1.8	28	55	1540
90986	0.7	54.5	3.2	0.58	0.5	13.3	166.3	2211.79
90986	0.7	43.5	3.2	2.1	1.1	18.5	166.3	3076.55
90986	0.7	45.5	3.2	1.91	1.9	18.5	166.3	3076.55
90986	0.91	43.7	4.2	3.1	0.7	3	40	120
90986	0.91	45.6	3.2	1.04	2.2	35	65	2275
90986	0.95	54.7	3.2	1.61	1.5	22	97.5	2145
90986	0.95	54.5	3.2	1.16	1.4	17	64.7	1099.9
90986	0.95	45.5	3.2	1.01	0.9	32	97.5	3120
90986	0.95	54.7	4.2	1.99	1.6	18.5	64.7	1196.95
90986	0.95	45.7	3.2	1.06	0.8	45	136	6120
90986	0.95	43.6	3.2	1.09	0.8	45	136	6120
90986	0.95	54.8	4.2	2.27	0.9	18.5	64.7	1196.95
90986	0.95	56.6	4.2	1.59	0.6	17	112	1904
90986	0.95	54.7	3.2	2.01	1.5	21	64.7	1358.7
90986	0.95	54.5	3.2	0.87	0.6	18	112	2016
90986	0.95	45.5	3.2	2.34	0.8	21	64.7	1358.7
90486	1.04	54.4	3.2	2.57	0.8	18	89.5	1611
90486	1.04	56.7	3.2	2.35	0.9	64	140	8960
90486	1.04	56.8	3.2	3.15	1.1	16	89.5	1432
90486	1.04	56.8	3.2	2.71	0.9	18	46	828
90486	1.04	56.6	3.2	3.01	1.6	46	140	6440

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
90486	1.14	56.8	4.2	2.12	1.6	15	162.5	2437.5
90486	1.14	56.5	3.2	1.59	1.8	55	162.5	8937.5
90486	1.14	54.6	3.2	2.32	0.7	45	162.5	7312.5
90486	1.29	54.7	3.2	4.35	0.9	24	122.5	2940
90486	1.29	56.6	3.2	3.04	1.2	20	80	1600
90486	1.29	54.6	3.2	2.45	1.9	19	77	1463
90486	1.29	56.6	3.2	1.67	1.3	15	160	2400
90486	1.29	54.4	4.2	3.3	2.1	20	122.5	2450
90486	1.29	56.8	3.2	2.89	1.6	18.5	53	980.5
90486	1.29	54.9	4.2	2.67	0.8	18.5	53	980.5
90486	1.29	54.8	4.2	3.44	1.4	16	70	1120
90486	1.29	54.7	3.2	3.45	1.1	24	122.5	2940
90486	1.51	54.4	3.2	1.51	1.4	20	62	1240
90486	1.51	54.7	4.2	3.7	0.9	31.1	112.5	3498.75
90486	1.51	54.7	4.2	3.87	0.7	105	112.5	11812.5
90486	1.51	56.5	4.2	3.33	2.5	6.6	112.5	742.5
90486	1.51	54.6	3.2	2.74	2	21.5	178	3827
90486	1.51	45.5	3.2	1.5	2.1	20	62	1240
90486	1.51	54.5	3.2	2.44	0.6	21.5	178	3827
90486	1.51	54.8	4.2	4	1.1	13.3	112.5	1496.25
90486	1.63	54.4	3.2	1.64	1.7	42.75	74.5	3184.875
90486	1.63	54.5	3.2	0.98	1.6	14.25	74.5	1061.625
90486	1.63	54.6	3.2	1.71	1.5	43	74.5	3203.5
90486	1.78	54.5	3.2	2.19	0.8	34	68	2312
90486	1.83	54.5	3.2	1.93	1.5	40	96	3840
90486	1.83	56.6	3.2	1.8	1.1	44	133	5852
90486	1.83	54.4	3.2	2.06	1.1	44	133	5852
90486	1.83	56.6	4.2	2.48	1.6	46	81	3726
90486	1.83	54.6	4.2	2.83	2	33	96	3168
90486	1.83	54.7	4.2	3.95	0.5	12	19	228
90486	1.83	54.7	3.2	2.36	1.1	56	81	4536
82186	1.92	54.6	4.2	2	1.6	40	131	5240
82186	1.92	54.6	3.2	1.21	0.4	19.5	82	1599
82186	1.92	45.6	3.2	1.45	0.8	60	158	9480
82186	1.92	54.5	3.2	1.47	1.1	69	340	23460
82186	1.92	43.6	3.2	2.31	1.2	19.5	82	1599
82186	1.92	45.5	3.2	1.77	0.5	37	170	6290
82186	2.25	54.5	4.2	1.08	1.8	53	129.5	6863.5
82186	2.25	43.7	3.2	1.64	1.4	67	129.5	8676.5
82186	2.33	45.6	3.2	0.85	0.9	42	217.5	9135
82186	2.33	45.7	3.2	2.12	1.2	10	265	2650
82186	2.33	54.8	3.2	2.96	1	40	200	8000
82186	2.33	45.5	3.2	2.2	1	37	217.5	8047.5
82186	2.33	45.4	3.2	2.32	0.8	26	75	1950
82186	2.33	54.6	3.2	2.47	1.4	35	200	7000
82186	2.59	45.5	3.2	2.08	2.1	14.5	67	971.5
82186	2.59	54.6	3.2	1.28	1	14.5	67	971.5
82186	2.63	54.5	3.2	2.98	1.4	50	250	12500
82186	2.78	45.7	3.2	3.54	1.1	31.3	110	3443
82186	2.78	54.5	3.2	4.29	2.4	15.7	110	1727
82186	2.78	45.8	3.2	2.19	1.5	20	110	2200

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
82186	2.78	54.4	3.2	2.29	2.1	20	110	2200
82186	2.78	54.5	3.2	4.95	2.6	12	110	1320
82186	2.9	54.6	4.2	2.35	1.5	47	147.5	6932.5
82186	2.9	54.7	4.2	1.74	1.8	41	270	11070
82186	2.9	56.5	3.2	3.16	2	31	147.5	4572.5
82186	3.07	54.6	3.2	1.95	2.2	28.5	155	4417.5
82186	3.07	56.4	3.2	1.28	2.4	39	325	12675
82186	3.07	54.6	3.2	2.54	1.8	51	155	7905
82186	3.07	54.7	4.2	1.65	0.8	39.3	325	12772.5
82186	3.07	45.6	4.2	1.08	2	28.5	155	4417.5
82186	3.07	56.6	4.2	1.06	0.8	13	325	4225
82186	3.07	54.5	3.2	1.73	1.8	19.7	325	6402.5
82186	3.22	54.5	3.2	1.99	1.1	32	183.3	5865.6
82186	3.22	54.6	3.2	2.53	2	25	183.3	4582.5
82186	3.22	56.5	4.2	2.02	1	32	183.3	5865.6
82186	3.22	56.6	3.2	2.92	2.8	25	183.3	4582.5
82186	3.22	43.6	3.2	1.95	1.3	19	75.5	1434.5
82186	3.22	45.5	3.2	1.89	2	19	75.5	1434.5
82186	3.22	54.5	4.2	1.87	1	25	183.3	4582.5
82186	3.22	54.5	3.2	1.93	2.1	17	75.5	1283.5
82186	3.39	43.7	3.2	1.49	1.8	57	103.3	5888.1
82186	3.39	43.6	3.2	1.58	1.8	37	103.3	3822.1
82186	3.39	54.5	4.2	2.72	1.3	23	103.3	2375.9
82186	3.39	45.8	3.2	3.11	0.8	23	103.3	2375.9
82186	3.69	54.6	3.2	1.68	0.7	52.5	125	6562.5
82186	3.69	54.4	3.2	2.29	1.3	52.5	125	6562.5
82186	3.69	56.6	4.2	3.88	1	36	125	4500
82186	3.69	56.6	3.2	4.46	0.9	36	125	4500
82186	3.9	54.4	3.2	1.96	1	30.5	141.5	4315.75
82186	3.9	54.6	3.2	2.09	1.2	84	141.5	11886
82186	3.9	54.6	4.2	1.75	0.8	30.5	141.5	4315.75
82186	4.05	54.5	3.2	1.06	0.8	40	170	6800
82186	4.13	45.6	3.2	1.64	0.8	17	102.5	1742.5
82186	4.13	45.7	3.2	2.01	1	20.5	102.5	2101.25
82186	4.13	43.5	3.2	2	1.8	20.5	102.5	2101.25
82186	4.13	56.6	4.2	2.51	2.5	16	130	2080
82186	4.13	45.6	3.2	1.99	1.8	17	102.5	1742.5
82186	4.13	56.5	4.2	2.29	2.2	33	130	4290
82186	4.13	54.6	3.2	1.01	2	16	130	2080
82186	4.22	43.6	3.3	1.54	1	16	62.5	1000
82186	4.22	54.6	3.2	2.76	0.6	41.25	62.5	2578.125
82186	4.22	54.4	3.2	1.1	1.5	16	62.5	1000
82186	4.22	54.5	3.2	2.13	1.3	48	62.5	3000
82186	4.22	54.5	3.2	3.08	2.1	16	90	1440
82186	4.22	45.6	3.2	4.34	2.5	16	90	1440
82186	4.22	54.5	3.2	5.81	2.5	13.75	62.5	859.375
82186	4.22	45.8	3.2	4.18	0.6	13	118	1534
82186	4.32	54.6	3.2	2.37	0.6	19	147.5	2802.5
82186	4.32	54.6	4.2	3.42	1.3	22	45	990
82186	4.32	54.7	4.2	4.38	2.4	23	139.5	3208.5
82186	4.32	56.6	3.2	1.13	1.4	28.5	45	1282.5

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
82186	4.32	54.6	3.2	2.28	1.5	38	139.5	5301
82186	4.32	65.6	3.2	2.32	1.8	28.5	45	1282.5
82186	4.32	56.5	3.2	1.84	0.8	22	45	990
82186	4.32	54.5	3.2	3.48	2.8	19	147.5	2802.5
82186	4.32	54.6	4.2	3.07	2.8	19	147.5	2802.5
82186	4.53	56.6	3.2	2.33	1.5	39.5	50	1975
82186	4.53	67a.6	4.2	2.36	0.8	25	50	1250
82186	4.53	7a6.4	3.2	2.03	0.8	39.5	50	1975
82186	4.67	56.6	4.2	2.42	1.2	29.3	100	2930
82186	4.67	43.8	3.2	2.8	1.3	53	100	5300
82186	4.67	64.6	4.2	2.41	1.5	14.7	100	1470
82186	4.67	45.8	3.2	2.09	2.3	14	100	1400
82186	4.67	43.7	3.2	2.12	1.5	14	100	1400
82186	4.76	45.6	3.2	1.86	1.2	26.7	170	4539
82186	4.76	54.5	3.2	1.82	1.4	26.7	170	4539
82186	4.76	43.6	3.2	1.82	0.6	26.7	170	4539
82186	4.76	45.6	3.2	1.41	1.3	42	170	7140
82186	4.76	43.6	3.2	1.42	1.6	21	170	3570
82186	4.86	54.6	3.2	1.08	0.5	11.5	46.7	537.05
82186	4.86	54.6	4.2	3.09	0.5	12	97	1164
82186	4.86	54.7	3.2	3.5	0.8	27.5	113.3	3115.75
82186	4.86	54.4	3.2	3.77	2	20.5	46.7	957.35
82186	4.86	56.6	4.2	3.54	1.8	27.5	113.3	3115.75
82186	4.86	45.5	3.2	2.88	1.4	20.5	46.7	957.35
82186	4.86	43.8	3.2	4.54	1.4	33	46.7	1541.1
82186	4.86	45.5	4.2	3.18	1.5	9	56	504
82186	4.86	54.7	4.2	3.6	2.8	9	56	504
82186	4.86	56.5	4.2	2.55	1.8	39	226.7	8841.3
82186	4.86	54.5	4.2	4	2.4	19	56	1064
82186	4.86	56.4	3.2	1.86	2.8	11.5	46.7	537.05
82086	5	56.6	4.2	2.92	1	105	230	24150
82086	5	56.7	4.2	3.26	1.7	32	230	7360
82086	5.36	54.5	3.2	2.05	1.6	30.5	186	5673
82086	5.36	54.7	4.2	2.39	0.9	36	186	6696
82086	5.36	54.6	3.2	1058	1.1	30.5	186	5673
82086	5.39	54.7	4.2	3.16	1.2	13	108.5	1410.5
82086	5.39	54.7	4.2	1.52	1.4	13	108.5	1410.5
82086	5.39	45.7	3.2	2.71	1.5	13	108.5	1410.5
82086	5.39	54.6	4.2	2.45	0.8	81	108.5	8788.5
82086	5.6	56.6	4.2	3.2	2	33	207.5	6847.5
82086	5.6	56.6	3.2	1.46	1.6	48	207.5	9960
82086	5.6	46.4	3.2	1.79	1.4	93	102	9486
82086	5.86	45.4	3.2	1.21	0.8	71	92	6532
82086	6	65.4	4.2	2.93	1.4	48	191.7	9201.6
82086	6	56.5	3.2	1.91	1.5	67	191.7	12843.9
82086	6	56.5	4.2	2.46	1.4	81	191.7	15527.7
82086	6.1	56.5	4.2	4.29	2	17	125	2125
82086	6.1	45.6	4.2	4.6	1.5	17	125	2125
82086	6.15	56.6	4.2	7.12	1.5	28	54	1512
82086	6.15	54.6	3.2	2.68	1.3	40	54	2160
82086	6.15	54.8	4.2	4.31	0.8	28	8	224

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
82086	6.15	56.7	4.2	6.1	2	21	163	3423
82086	6.15	54.6	3.2	1.67	0.6	40	54	2160
82086	6.4	56.6	3.2	2.32	0.8	36	144	5184
82086	6.4	54.7	4.2	0.94	1	67	144	9648
82086	6.54	56.7	3.2	2.62	0.6	42.7	142	6063.4
82086	6.54	56.5	4.2	2.44	2.2	21.3	142	3024.6
82086	6.54	56.7	4.2	4.65	1.8	37	255	9435
82086	6.54	54.5	4.2	1.33	1.2	38	142	5396
82086	6.54	56.5	4.2	2.27	2	42	255	10710
82086	6.7	45.6	3.2	1.98	1.1	32	103	3296
82086	6.78	54.7	4.2	2.73	2.8	21	98	2058
82086	6.78	45.6	3.2	2.34	1.4	44	98	4312
82086	6.83	54.6	4.2	2.09	1.8	37	193.5	7159.5
82086	6.83	54.7	4.2	3.77	0.8	67	193.5	12964.5
82086	6.83	54.6	3.2	2.11	1	17	133	2261
82086	6.83	54.7	3.2	1.21	0.6	57.3	65	3724.5
82086	6.83	54.6	3.2	2.2	0.8	10	129	1290
82086	6.83	56.6	3.2	2.74	1.1	13	129	1677
82086	6.83	65.4	4.2	1.1	1.5	52	192.5	10010
82086	6.83	45.5	4.2	3.25	0.8	16	121	1936
82086	6.83	56.5	4.2	4.7	1.8	24	192.5	4620
82086	6.83	56.6	2.2	1.41	1.4	28.7	65	1865.5
82086	6.83	54.7	3.2	1.69	1	10	129	1290
82086	7.1	45.5	3.2	1.54	1.5	27	83.5	2254.5
82086	7.1	54.5	4.2	2.07	1.9	31	83.5	2588.5
82086	7.2	52.6	3.2	3.01	1.8	11.5	148	1702
82086	7.2	54.6	4.2	2.15	1.4	15	148	2220
82086	7.2	56.6	4.2	2.99	2	11.5	148	1702
82086	7.23	54.5	3.2	4.58	2.8	6.7	34	227.8
82086	7.23	45.6	3.2	3.34	0.8	18.7	34	635.8
82086	7.23	45.6	3.2	2.86	1	3.3	34	112.2
82086	7.23	54.4	4.2	3.26	1.6	9.3	34	316.2
82086	7.23	54.5	3.2	1.16	0.8	66	67.5	4455
82086	7.23	54.6	4.2	3.89	0.8	30	67.5	2025
82086	7.33	56.7	4.2	2.63	0.8	56	113	6328
82086	7.4	54.6	3.2	1.92	0.8	45	135	6075
82086	7.5	56.5	4.2	2.65	1.1	19.5	72.5	1413.75
82086	7.5	54.6	3.2	3.43	1.8	19.5	72.5	1413.75
82086	7.5	56.7	4.2	2.42	1.8	26	72.5	1885
82086	7.6	56.7	4.2	3.1	0.8	46	124	5704
82086	7.6	54.7	4.2	2.42	1.6	63	124	7812
82086	7.7	54.6	4.2	3.27	1	55	112	6160
82086	7.7	56.7	4.2	5.3	1.9	26.7	132	3524.4
82086	7.7	56.6	4.2	3.39	1.8	50	132	6600
82086	7.7	56.5	4.2	2.54	1	13.3	132	1755.6
81986	7.86	56.7	4.2	3.36	1.7	40	110	4400
81986	7.86	56.7	4.2	4.39	1	34	110	3740
81986	7.86	56.6	3.2	2.49	1.4	60	127.7	7662
81986	7.86	56.6	4.2	1.49	0.5	23	74	1702
81986	7.86	65.4	3.2	1.95	2.4	34	127.7	4341.8
81986	7.86	56.7	4.2	1.91	0.6	18	111.7	2010.6

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
81986	7.86	54.5	4.2	1.58	0.6	14	166	2324
81986	7.86	56.7	4.2	4.96	2	19	110	2090
81986	7.86	56.6	4.2	2.2	1	11	111.7	1228.7
81986	7.86	54.4	4.2	1.16	0.8	19	111.7	2122.3
81986	7.86	65.6	4.2	3.88	1.3	42	166	6972
81986	7.86	54.8	4.2	2.89	1.8	65	166	10790
81986	7.86	56.7	4.2	2.2	0.8	10	74	740
81986	7.86	65.6	4.2	3.99	2.8	31	127.7	3958.7
81986	7.86	56.4	4.2	1.94	0.6	127	151	19177
81986	8.42	56.5	4.2	1	3	14	152	2128
81986	8.47	65.6	4.2	2.73	1.1	46	75.5	3473
81986	8.47	56.6	4.2	2.28	2	22	75.5	1661
81986	8.52	43.6	3.2	2.14	0.6	37	153.3	5672.1
81986	8.52	56.6	4.2	4.82	1.9	44	53	2332
81986	8.52	43.5	3.2	1.75	0.9	92	153.3	14103.6
81986	8.52	64.7	3.2	3.88	1.9	27.3	153.3	4185.09
81986	8.52	43.6	3.2	1.18	1.5	13.7	8	109.6
81986	8.65	45.5	3.2	2.18	1.4	26	96	2496
81986	8.65	45.5	4.2	1.53	1	52	83	4316
81986	8.84	56.7	4.2	4.86	2	8.5	77	654.5
81986	8.84	54.6	4.2	3.48	1.9	70	77	5390
81986	8.84	56.7	3.2	1.62	1	8.5	77	654.5
81986	8.84	56.5	4.2	3.95	1.5	17	77	1309
81986	8.84	34.8	4.2	3	1	11.5	42	483
81986	8.84	56.8	4.2	7.02	2.5	11.5	42	483
81986	8.92	56.6	4.2	4.27	1.1	44	155	6820
81986	8.92	64.5	4.2	3.02	1.8	34	155	5270
81986	8.92	56.6	4.2	2.01	1.8	17	155	2635
81986	8.92	56.7	3.2	2.86	1.6	57	149.5	8521.5
81986	8.92	65.6	4.2	2.01	1.8	50	149.5	7475
81986	9.05	65.5	3.2	2.85	1.2	56	136.7	7655.2
81986	9.05	65.6	3.2	2.65	1	44	192	8448
81986	9.05	56.4	4.2	3.41	1.3	63	192	12096
81986	9.05	65.6	4.2	2.41	1.5	49.5	136.7	6766.65
81986	9.05	65.5	4.2	2.02	1.4	117	80	9360
81986	9.05	65.6	4.2	2.96	1.2	107	136.7	14626.9
81986	9.05	65.6	4.2	3.42	1	44	192	8448
81986	9.05	56.4	3.2	1.95	1	49.5	136.7	6766.65
81986	9.23	54.6	3.2	1.89	1	135	102.5	13837.5
81986	9.23	45.6	3.2	2.67	1.1	83	102.5	8507.5
81986	9.23	65.7	4.2	3.7	1.4	49	71	3479
81986	9.23	67a.6	4.2	2.38	1.8	26	71	1846
81986	9.46	65.5	4.2	2.51	1.3	24	79	1896
81986	9.46	65.6	3.2	2.3	2	51	210	10710
81986	9.46	65.7	3.2	3.07	1.8	51	210	10710
81986	9.46	67a.6	5.1	2.69	1	48	79	3792
81986	9.51	65.7	4.2	3.72	1.5	25	51	1275
81986	9.51	67a.6	4.2	5.42	1.6	25	155	3875
81986	9.51	54.6	3.2	2.42	1.3	25	51	1275
81986	9.51	65.6	4.2	5	1.1	25	155	3875
81986	9.53	65.6	3.2	0.95	0.7	21	58	1218

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
81986	9.53	65.6	4.2	4.16	1	42	58	2436
81986	9.53	65.5	3.2	1.61	1.3	78	58	4524
81986	9.57	54.5	3.2	2.86	0.8	33	68	2244
81986	9.6	56.6	3.2	3.46	1.8	27.5	125	3437.5
81986	9.6	56.6	4.2	3.2	1.5	27.5	125	3437.5
81986	9.6	65.5	4.2	3.24	1.1	66	125	8250
81986	9.61	45.6	4.2	4.95	1	9	49	441
81986	9.61	54.7	3.2	4.58	0.6	17	142	2414
81986	9.61	56.7	4.2	0.85	1.2	9	49	441
81986	9.76	65.6	4.2	0.51	1.5	16	126.5	2024
81986	9.76	65.6	3.2	2.8	1	31.7	107.5	3407.75
81986	9.76	54.4	4.2	2.42	1	46	107.5	4945
81986	9.76	67a.5	4.2	3.04	1.5	22	126.5	2783
81986	9.76	65.5	3.2	1.75	2.5	8	126.5	1012
81986	9.76	56.4	4.2	3.89	0.8	63.3	107.5	6804.75
81986	9.76	56.5	4.2	1.41	1.6	46	107.5	4945
81986	9.83	65.6	2.2	0.81	1.3	16.3	96.5	1572.95
81986	9.83	65.6	4.2	1.63	2.3	32.7	96.5	3155.55
81986	9.83	65.6	4.2	1.52	1.5	12	96.5	1158
81986	9.83	65.7	3.2	2.8	3.2	24	96.5	2316
81986	9.9	54.4	2.2	1.42	1.1	76	125.5	9538
81986	9.9	7a6.6	4.2	3.2	1.4	25.3	300	7590
81986	9.9	67a.6	4.2	3.1	1.8	37	300	11100
81986	9.9	56.6	4.2	3.02	1	27.5	117.5	3231.25
81986	9.9	67a.4	4.2	2.45	0.6	66.7	150	10005
81986	9.9	56.6	3.2	2.5	0.8	62.5	300	18750
81986	9.9	67a.6	4.2	4.3	1.8	33.3	150	4995
81986	9.9	67a.6	3.2	2.87	1.4	50.7	300	15210
81986	9.9	65.7	5.1	4.8	1.1	14.5	117.5	1703.75
81986	9.9	56.6	4.2	3.51	1.9	27.5	117.5	3231.25
81986	9.9	67a.5	5.2	6.2	2	14.5	117.5	1703.75
81986	9.9	45.7	2.2	3.82	1.5	62.5	300	18750
81986	9.9	56.6	3.2	1.4	1.8	84	125.5	10542
80886	10.26	7a7b.3	2.2	3.22	0.7	40.5	180	7290
80886	10.26	7a7b.3	3.2	3.1	1.3	40.5	180	7290
80886	10.26	7a5.4	3.2	1.74	1.1	84	60	5040
80886	10.44	7b7a.3	3.2	2.31	1.6	31.3	78	2441.4
80886	10.44	7a6.4	2.2	1.9	1.3	31.3	78	2441.4
80886	10.44	7a6.3	2.2	3.04	1	34.3	78	2675.4
80886	10.44	65.3	4.2	2.53	1	31.3	78	2441.4
80886	10.44	7a6.3	3.2	2.8	1	34.3	78	2675.4
80886	10.44	7b6.3	3.2	2.75	0.8	34.3	78	2675.4
80886	10.63	67a.3	3.2	2.27	0.7	27.7	105	2908.5
80886	10.63	67a.3	2.2	2.5	1.8	27.7	105	2908.5
80886	10.63	7a6.4	4.2	2.19	1.1	27.7	105	2908.5
80886	10.72	7b7a.3	4.2	3.2	1.5	22.7	105	2383.5
80886	10.72	65.4	3.2	3.22	1.3	53.25	105	5591.25
80886	10.72	7a6.3	4.2	4.03	1.3	88	52.5	4620
80886	10.72	7a6.6	4.2	5.35	2	54	262.5	14175
80886	10.72	7a6.4	4.2	3.91	1.5	45.3	105	4756.5
80886	10.72	7a6.3	3.2	3.9	1.4	17.75	105	1863.75

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Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
80886	10.97	7b6.6	1.2	5.15	1.1	32.8	54	1771.2
80886	10.97	65.3	4.2	1.96	0.6	8.2	54	442.8
80886	10.97	7a7b.5	1.2	6.01	1.3	44	54	2376
80886	10.97	7b6.4	3.2	3.46	1.4	64	40	2560
80886	11.06	56.3	2.2	2.64	0.7	59	119.25	7035.75
80886	11.06	65.3	4.2	2.35	0.8	44	39.75	1749
80886	11.06	65.3	3.2	3.21	1.3	29	49	1421
80886	11.28	67a.3	3.2	2.07	1.2	25	61	1525
80886	11.28	7a6.7	4.2	2.79	1	75	61	4575
80886	11.28	67a.3	3.2	1.92	0.9	31.7	61	1933.7
80886	11.28	7a5.4	4.2	2.44	1.1	63.3	61	3861.3
80786	11.4	57a.5	4.2	1.92	1.4	31.5	212.5	6693.75
80786	11.4	65.6	4.2	2.27	1.5	44.5	212.5	9456.25
80786	11.4	64.6	4.2	1.91	0.7	44.5	212.5	9456.25
80786	11.4	7a6.4	4.2	2	2	31.5	212.5	6693.75
80786	11.4	7a6.5	5.2	3.37	1.2	69	212.5	14662.5
80786	11.4	7a6.6	4.2	3.57	1	24.5	212.5	5206.25
80786	11.4	67a.5	4.2	2.7	2	24.5	212.5	5206.25
80786	11.68	7a6.6	4.2	3.85	1	81	74.5	6034.5
80786	11.68	65.5	4.2	1.86	1.2	80	74.5	5960
80786	11.72	54.6	4.2	2.1	1	30	70.5	2115
80786	11.72	56.7	4.2	2.12	1.4	30	70.5	2115
80786	11.72	45.7	4.2	2.04	1	31.3	70.5	2206.65
80786	11.72	54.7	4.2	2.31	2.4	15.7	70.5	1106.85
80786	11.8	7a7b.6	4.2	3.97	1.8	16	81	1296
80786	11.8	67a.5	4.2	2.3	1.1	16	81	1296
80786	11.8	7a6.6	4.2	1.38	2	22.5	81	1822.5
80786	11.8	7a6.5	4.2	2.03	2.3	19.5	81	1579.5
80786	11.8	7a6.6	4.2	2.04	1.5	19.5	81	1579.5
80786	11.8	7a7b.6	4.2	2.45	1.5	22.5	81	1822.5
80786	11.89			4.5		24	40	960
80786	11.89	7A6.5	5.2	2.93	0.6	24	40	960
80786	11.89	7A6.5	4.2	2.74	1.1	75	40	3000
80786	12.2	67A.6	4.2	3.35	1	38.7	52.5	2031.75
80786	12.2	56.5	4.2	2.2	1.1	19.3	52.5	1013.25
80786	12.2	7A6.6	4.2	3.63	1	83	52.5	4357.5
80786	12.25	67A.6	4.2	2.81	1.5	40	57.5	2300
80786	12.25	56.6	4.2	2.29	1.5	36	57.5	2070
80786	12.32	65.5	4.2	2.84	2	26	127.5	3315
80786	12.32	7A6.6	4.2	2.73	1.5	45	127.5	5737.5
80786	12.42	65.6	4.2	2.07	1.5	41	75	3075
80786	12.42	56.5	3.2	1.22	1.5	14	75	1050
80786	12.42	67A.5	4.2	0.82	3	28	75	2100
80786	12.45	65.5	4.2	2.34	3.3	24	120	2880
80786	12.45	56.7	4.2	2.01	1.4	12	120	1440
80786	12.45	56.7	4.2	2.94	1.1	10	45	450
80786	12.53	65.4	4.2	3	1.3	30.5	250	7625
80786	12.53	7A6.5	4.2	2.79	1.5	15.25	250	3812.5
80786	12.53	67A.6	4.2	1.73	1.4	80	250	20000
80786	12.53			4		15.25	250	3812.5
80786	12.53	67A.6	3.2	2.01	1.2	77	250	19250

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Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
80686	12.64	54.6	4.2	2.33	0.7	37.5	109	4087.5
80686	12.64	54.5	4.2	1.55	0.8	25	109	2725
80686	12.83	34.5	3.2	1.19	0.5	75	17.5	1312.5
80686	12.83	32.6	3.2	2.27	0.9	98	82.5	8085
80686	12.83	36.5	4.2	2.43	1.1	26	82.5	2145
80686	12.83	56.6	4.2	2.95	0.6	52	82.5	4290
80686	12.93	65.4	4.2	1.77	1.5	53	67	3551
80686	12.93	65.5	4.2	1.94	1.3	53	67	3551
80686	13.08	54.4	4.2	3.25	2	14.5	108	1566
80686	13.08	45.5	4.2	2.31	1.4	15.5	108	1674
80686	13.16	7A6.6	4.2	2.94	0.8	35	31.5	1102.5
80686	13.16	65.5	5.1	2.21	0.6	25.5	31.5	803.25
80686	13.44	45.6	4.2	2.52	0.6	67	82.5	5527.5
80686	13.44	45.7	4.2	2.41	0.7	90	82.5	7425
80686	13.48	56.6	2.2	1.5	1.7	16	93	1488
80686	13.48	56.4	4.2	1.51	1.8	36	93	3348
80686	13.48	65.5	4.2	1.57	2	16	93	1488
80686	13.55	7A5.6	4.2	2.28	1.8	37.3	82	3058.6
80686	13.55	65.4	4.2	2.12	1.5	54	82	4428
80686	13.55	43.5	3.2	1.84	0.9	18.7	82	1533.4
80686	13.9	54.7	4.2	2.1	1	63.5	74.7	4743.45
80686	13.9	54.5	3.2	1.87	1.3	81	74.7	6050.7
80686	13.9	54.4	4.2	1.62	0.9	70	74.7	5229
80686	14	45.6	4.2	3.17	1.5	27	44	1188
80686	14	54.5	3.2	1.7	0.7	59	60	3540
80686	14	54.6	4.2	3.2	1.9	19	44	836
80686	14	54.4	4.2	1.85	0.9	25	128	3200
80686	14.24	54.4	4.2	1.83	1.6	10	50	500
80586	14.5	56.7	4.2	2.88	1	60	60	3600
80586	14.62	56.7	4.2	1.37	1	21	99	2079
80586	14.62	56.5	4.2	3.01	0.9	42	99	4158
80586	14.62	54.6	4.2	2	0.7	18.5	99	1831.5
80586	14.83	67A.4	4.2	2.33	1	43	121	5203
80586	14.83	54.7	4.2	1.99	1.3	62	121	7502
80586	14.83	54.6	4.2	2.37	1.2	65.5	121	7925.5
80586	14.93	67A.5	5.2	1.74	0.9	21	93.3	1959.3
80586	14.93	67B.4	5.2	2.2	1.5	59	93.3	5504.7
80586	14.93	65.4	4.2	2.05	1.3	52	93.3	4851.6
80586	15.12	54.6	4.2	1.06	1.3	47	74	3478
80586	15.12	54.6		0.53	1.3	43	74	3182
80586	15.12	53.5	5.2	1.41	1.2	57	74	4218
82286	15.19	87A.4	4.2	3.11	1.1	32.7	100	3270
82286	15.19	87B.5	4.3	3.54	1.2	16.3	100	1630
82286	15.19	7B7A.3	4.2	2.83	0.8	61	50	3050
82286	15.2	7B6.3	3.3	1.02	0.7	50	100	5000
82286	15.2	7A6.4	3.3	2.45	0.8	34	50	1700
82286	15.23	7A7B.4	3.3	2.23	0.8	35	76	2660
82286	15.23	7A2.5	3.2	1.29	1.3	25	76	1900
82286	15.23	7B7A.3	3.3	1.13	0.8	25	76	1900
82286	15.29	67A.4	2.3	1.16	0.9	39	120	4680
82286	15.32	7B7A.3	3.3	1.57	0.7	33	53.3	1758.9

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Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
82286	15.32	87A.4	3.3	1.2	0.8	58	53.3	3091.4
82286	15.32	7A6.3	3.3	1.04	0.8	26	53.3	1385.8
82286	15.32	7B6.4	3.3	1.9	0.8	32	38	1216
82286	15.33	7A7B.4	3.3	4.31	1.2	22	29	638
82286	15.35	56.6	3.3	3.69	1	13	45	585
82286	15.35	56.6	2.3	0.85	1.5	13	45	585
82286	15.54	54.4	2.3	1.09	0.8	33.5	76	2546
82286	15.54	54.4	3.3	1.94	1	36.5	76	2774
82286	15.54	54.5	2.3	1.05	0.5	36.5	76	2774
82286	15.54	54.3	3.3	1.89	1.2	33.5	76	2546
82286	15.59	54.3	2.3	1.5	0.8	42	160	6720
82286	15.68	56.3	2.3	1.79	0.8	38	55	2090
82286	15.79	67A.4	3.3	3.2	0.8	32	42	1344
82286	15.93	7A6.5	3.3	3.18	0.8	34	41.7	1417.8
82286	15.93	65.4	3.3	2.77	2	24	83.3	1999.2
82286	16.05	7A7B.4	3.3	3.56	1.1	17.5	75	1312.5
82286	16.05	7A7B.4	4.3	2.69	2	17.5	75	1312.5
82286	16.05	87B.3	2.3	1.2	1	18	8	144
81586	16.12	87b.5	2.2	4.02	2	52	59	3068
81586	16.16	7b5.5	4.2	3.88	1.4	60	89	5340
81586	16.3	7b5.3	2.3	3.83	1.6	55	27	1485
81586	16.3	7a6.4	3.3	4.36	1.2	44	27	1188
81586	16.34	87a.6	2.3	3.75	1.5	65	31	2015
81586	16.34	86.4	3.3	3	1.8	54	31	1674
81586	16.41	86.4	2.3	2.13	1.4	25	40	1000
81586	16.41	54.5	2.3	1.87	1	25	40	1000
81586	16.46	62.5	2.2	2.25	1.1	56	63.3	3544.8
81586	16.46	7b6.4	3.2	2.89	1	62	31.7	1965.4
81586	16.46	7a8.4	3.3	2.19	1.2	63	63.3	3987.9
81586	16.46	7a8.5	2.2	2.88	1.3	52	31.7	1648.4
81586	16.54	7a5.4	2.3	2.07	1	83	123.3	10233.9
81586	16.54	87a.4	3.3	2.49	1.6	69	123.3	8507.7
81586	16.54	86.4	3.3	2.12	1.6	66	123.3	8137.8
81586	16.64	7b8.4	4.3	3.42	1.1	48	165	7920
81586	16.64	87a.4	3.3	1.7	1.2	62	82.5	5115
81586	16.64	86.4	2.3	1.57	1.5	59	82.5	4867.5
81586	16.77	7a2.5	2.3	2.5	1.3	21.5	107	2300.5
81586	16.77	82.6	3.2	2.2	1.8	21.5	107	2300.5
81486	16.77	87a.3	3.3	2.89	1	52	230	11960
81586	16.77	63.5	3.3	2.36	1	57	107	6099
81486	16.77	7b6.3	3.3	3.17	1.6	61	230	14030
81486	16.91	87a.3	3.3	3.11	1.5	59	81	4779
81486	17.04	68.3	4.3	2.16	1.5	25.5	103	2626.5
81486	17.04	65.6	4.3	2.74	1	25.5	103	2626.5
81486	17.13	87b.3	2.3	1.3	0.9	73	82.5	6022.5
81486	17.13	7a8.3	2.3	1.86	0.5	66.5	93	6184.5
81486	17.13	7b7a.4	4.2	1.9	1	74	82.5	6105
81486	17.13	7a7b.3	3.3	3.02	1.2	66.5	93	6184.5
81486	17.13	58.3	2.3	1.79	1.2	63	81	5103
81486	17.27	7b6.5	3.3	2.64	0.5	131	37	4847
81486	17.28	67b.6	3.3	1.27	0.9	34	260	8840

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Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
81486	17.28	86.4	2.3	2.2	1.1	53	86.7	4595.1
81486	17.28	67b.3	3.5	1.52	1	33	173.3	5718.9
81486	17.31	36.3	2.3	1.9	1.3	71	393.7	27952.7
81486	17.31	7a7b.3	3.3	1.84	1.2	86	131.2	11283.2
81486	17.5	86.4	2.3	2.5	1.1	34.5	110	3795
81486	17.5	67b.4	3.2	1.19	1.4	60	182.5	10950
81486	17.5	65.4	2.3	1.7	0.7	34.5	110	3795
81486	17.5	84.4	2.3	1.61	1.5	45	182.5	8212.5
81486	17.72	7b6.3	4.3	2.53	2	56	68	3808
81486	17.89	7a7b.4	4.3	5.1	1.3	52	51	2652
81486	17.92	87a.6	5.3	3.87	2.1	56	85	4760
81486	18.06	65.4	3.3	2	1.7	43.5	57.5	2501.25
81486	18.06	67b.6	3.3	1.68	1	77	57.5	4427.5
81486	18.06	87b.5	4.3	2.02	1	43.5	57.5	2501.25
81486	18.14	54.4	3.3	2.46	1.2	21	46	966
81486	18.14	7a6.4	3.3	2.41	1.1	21	46	966
81486	18.21	67b.6	3.3	1.8	1.2	43	41	1763
81486	18.27	7b7a.3	4.3	1.73	1.4	63	62.5	3937.5
81486	18.27	87a.3	5.3	3.24	1.4	70	62.5	4375
81486	18.32	7b7a.4	5.3	3.52	1	51	31	1581
81486	18.36	7a7b.4	2.3	2.11	1.4	44	35	1540
81486	18.36	7a7b.4	5.3	3.18	1.3	44	35	1540
81386	18.38	7a6.6	4.2	2.48	1.3	73	143.3	10460.9
81386	18.38	67a.4	4.2	1.88	1	29	143.3	4155.7
81386	18.38	65.7	4.2	1.93	0.8	60	143.3	8598
81386	18.38	7a6.4	4.2	2.07	1.8	58	143.3	8311.4
81386	18.47	7a6.6	4.2	1.15	0.8	60	66.7	4002
81386	18.47	67a.6	3.2	2.01	0.8	78.7	90	7083
81386	18.47	67a.6	4.2	2.62	0.7	39.3	90	3537
81386	18.47	54.4	4.2	1.72	1.4	12	90	1080
81386	18.47	7a6.5	4.2	0.82	0.7	60	66.7	4002
81386	18.47	57b.5	4.2	0.97	0.9	29.5	90	2655
81386	18.47	65.5	4.2	1.78	1.5	29.5	90	2655
81386	18.47	56.5	4.2	1.52	1.9	24	90	2160
81386	18.47	67a.6	4.2	1.93	1.5	9.9	66.7	660.33
81386	18.53	65.5	4.2	1.78	1.4	18	70	1260
81386	18.53	56.7	4.2	0.55	1.2	6	40	240
81386	18.53	56.6	4.2	2.12	1.3	70	70	4900
81386	18.57	65.6	4.2	1.73	1.6	8	8	64
81386	18.58	7a6.5	4.2	1.97	2	44	34.7	1526.8
81386	18.58	65.6	4.2	2.74	1	14	34.7	485.8
81386	18.58	67a.6	4.2	2.88	1.7	44	34.7	1526.8
81386	18.62	67a.6	4.2	1.6	1	39.5	105	4147.5
81386	18.62	67a.6	4.2	3.27	1	58	105	6090
81386	18.62	7a6.7	4.2	1.8	1.3	39.5	105	4147.5
81386	18.74	7a7b.4	4.2	3.56	2	18.5	104	1924
81386	18.74	67a.6	4.2	5.22	1	34	104	3536
81386	18.74	7a6.6	4.2	3.02	1.3	18.5	104	1924
81386	18.74	7a6.5	3.2	1.85	1.5	24	104	2496
81386	18.74	7a6.6	5.2	5.2	1.3	34	104	3536
81386	18.74	7b7a.6	4.2	1.57	2.2	24	104	2496

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
81386	18.81	7a6.7	4.2	1.47	1	55.5	113	6271.5
81386	18.81	7a8.5	4.2	1.38	1.2	55.5	113	6271.5
81386	18.86	7a7b.4	4.2	2.41	1.5	30.5	197.25	6016.125
81386	18.86	67a.5	4.2	1.52	1.2	49	197.25	9665.25
81386	18.86	67a.6	4.2	1.43	1.2	49	197.25	9665.25
81386	18.86	7a7b.6	4.2	1.85	1.3	117	197.25	23078.25
81386	18.86	7b7a.6	4.2	1.76	1.5	90	197.25	17752.5
81386	18.86	7a7b.6	4.2	1.52	1.1	30.5	197.25	6016.125
81386	19.01	7b7a.5	4.2	1.78	1	17.5	62.5	1093.75
81386	19.01	7a6.5	4.2	0.52	0.6	19	62.5	1187.5
81386	19.01	7a6.5	4.2	1.39	1.8	19	62.5	1187.5
81386	19.01	7a5.6	4.2	3.34	1.7	17.5	62.5	1093.75
81386	19.04	45.6	3.2	2.1	1.5	48.7	46	2240.2
81386	19.04	54.7	3.2	1.37	1	16.5	46	759
81386	19.04	43.8	3.2	1.22	1.4	16.5	46	759
81386	19.04	7a6.6	4.2	2.41	1	24.3	46	1117.8
81386	19.07	67a.4	4.2	3.01	1.2	18.5	73.75	1364.375
81386	19.07	7a6.6	4.2	2.72	1.2	56	73.75	4130
81386	19.07	7a7b.5	4.2	1.89	1.1	56	73.75	4130
81386	19.07	7a7b.5	4.2	2.87	1.7	50	73.75	3687.5
81386	19.07	7a6.5	4.2	2.01	1.2	30	73.75	2212.5
81386	19.07	56.8	4.2	3.23	1.3	18.5	73.75	1364.375
81386	19.07	67a.4	4.2	2.69	1.3	30	73.75	2212.5
81386	19.09	65.6	3.2	1.59	0.7	14.5	147	2131.5
81386	19.09	7a5.6	3.2	1.4	0.5	17	147	2499
81386	19.12	65.6	4.2	0.51	0.9	48.7	82.3	4008.01
81386	19.12	56.6	4.2	1.26	1.2	24.3	82.3	1999.89
81386	19.12	7a6.5	4.2	4.94	1.1	17.5	82.3	1440.25
81386	19.12	65.7	4.2	0.62	1.7	42	82.3	3456.6
81386	19.12	7a6.5	4.2	3.2	0.9	17.5	82.3	1440.25
81386	19.18	7a7b.5	4.2	1.67	1.8	40	66	2640
81386	19.18	7a6.5	4.2	2.13	1.3	45	66	2970
81386	19.18	7b7a.6	4.2	1.99	1.3	62.5	66	4125
81386	19.18	7b7a.5	4.2	1.07	1.2	45	66	2970
81386	19.18	67a.5	4.2	1.06	1.2	40	66	2640
81386	19.18	7a6.6	4.2	1.81	0.8	62.5	66	4125
81386	19.27	65.6	4.2	1.92	1.7	26	63.5	1651
81386	19.27	7a6.6	4.2	2.66	0.7	26	63.5	1651
81386	19.27	67a.5	4.2	1.01	2.5	36.7	63.5	2330.45
81386	19.27	7a6.5	4.2	2.29	0.7	18.3	63.5	1162.05
81386	19.3	7a5.5	4.2	2.69	0.6	42	233.3	9798.6
81386	19.3	7a6.6	4.2	2.9	1.5	42	233.3	9798.6
81386	19.3	7a6.6	4.2	2.27	1.2	30	233.3	6999
81386	19.3	56.6	4.2	2.13	1	23.3	233.3	5435.89
81386	19.3	7b7a.5	4.2	1.5	2	23.3	233.3	5435.89
81386	19.3	7a6.5	4.2	2.77	1.2	30	233.3	6999
81386	19.3	7b7a.6	4.2	1.75	1.2	23.3	233.3	5435.89
81386	19.43	43.4	3.2	1.35	1.5	24.5	216.7	5309.15
81386	19.43	56.6	3.2	2.03	0.7	27.3	216.7	5915.91
81386	19.43	7a7b.4	4.2	2	1.4	52.5	216.7	11376.75
81386	19.43	7a6.5	3.2	1.07	1.3	24.5	216.7	5309.15

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
81386	19.43	7a6.5	3.2	2.22	1	54.7	216.7	11853.49
81386	19.43	7a6.6	4.2	1.66	0.7	52.5	216.7	11376.75
81386	19.58	45.6	3.2	1.23	1.9	27	92	2484
81386	19.63	7a6.5	4.2	2.87	1.2	15.5	117.7	1824.35
81386	19.63	7a6.6	4.2	1.89	0.8	59	117.7	6944.3
81386	19.63	7a6.7	4.2	1.51	1.5	59	117.7	6944.3
81386	19.63	7a6.5	4.2	1.55	1.3	27	117.7	3177.9
81386	19.63	7b3.6	3.2	1.38	2.2	27	117.7	3177.9
81386	19.63	7a6.7	5.2	3.04	0.7	15.5	117.7	1824.35
81386	19.63	67a.5	3.2	1.85	1.9	31	117.7	3648.7
81286	19.68	7a7b.6	4.2	1.63	1.3	53.5	140	7490
81286	19.68	67a.4	4.2	1.8	1.3	45	140	6300
81286	19.68	7a6.6	4.2	2.06	1.2	53.5	140	7490
81286	19.68	7a7b.4	4.2	1.26	1.8	45	140	6300
81286	19.74	7a6.6	4.2	1.83	1	33	227.5	7507.5
81286	19.74	7a6.6	4.2	1.45	1.3	34.5	151.7	5233.65
81286	19.74	7a7b.6	4.2	1.84	1.3	54	227.5	12285
81286	19.74	7a7b.4	4.2	1.07	1.5	34.5	151.7	5233.65
81286	19.74	7a6.6	4.2	1.96	1.3	62	151.7	9405.4
81286	19.74	58.7	4.2	2.54	1.1	40	151.7	6068
81286	19.8	67a.4	4.2	1.33	0.6	26.7	272.5	7275.75
81286	19.8	7a7b.6	3.2	2.24	1.2	65	272.5	17712.5
81286	19.8	7a6.6	3.2	1.76	1.3	53.3	272.5	14524.25
81286	19.82	67a.5	4.2	1.29	1.4	24	165	3960
81286	19.82	7a6.5	3.2	1.8	1.2	26	165	4290
81286	19.82	7a6.6	4.2	1.87	1.2	22	165	3630
81286	19.92	54.6	4.2	1.19	2	44	76	3344
81286	19.92	54.5	4.2	0.96	0.6	44	76	3344
81286	19.92	45.5	3.2	1.91	1	44	76	3344
81286	19.99	65.4	4.2	1.41	1.4	39.5	137.5	5431.25
81286	19.99	56.5	4.2	1.35	1.3	40	137.5	5500
81286	19.99	65.5	4.2	1.3	1.3	40	137.5	5500
81286	19.99	54.6	4.2	1.74	1.9	39.5	137.5	5431.25
81286	19.99	65.6	4.2	1.1	2.2	23.5	137.5	3231.25
81286	19.99	7a6.5	3.2	3.7	1	46	137.5	6325
81286	20.04	45.8	4.2	2.41	1.5	20	140.5	2810
81286	20.04	7a6.5	4.2	1.11	1.1	20	140.5	2810
81286	20.04	67a.5	3.2	1.99	3.3	31	140.5	4355.5
81286	20.14	7a7b.5	4.2	2.54	2.3	39	48.5	1891.5
81286	20.14	7a6.4	4.2	3.39	1.4	50	48.5	2425
81286	20.19	54.6	4.2	1.87	1.5	50	144	7200
81286	20.19	54.6	4.2	1.34	1.8	39	144	5616
81286	20.19	7a6.5	4.2	2.29	0.7	17.5	144	2520
81286	20.19	65.5	4.2	3.68	1	17.5	144	2520
81286	20.19	67a.5	4.2	2.79	1.1	35.5	144	5112
81286	20.19	56.6	4.2	2.49	1	35.5	144	5112
81286	20.19	67a.4	4.2	2.27	1.4	35	144	5040
81286	20.28	65.4	3.2	0.92	1	15.5	58	899
81286	20.28	56.5	4.2	2.32	2.3	15.5	58	899
81286	20.28	54.6	4.2	1.91	1	22.5	58	1305
81286	20.28	45.6	4.2	3.6	2	22.5	58	1305

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
81286	20.29	54.6	3.2	1.3	0.9	31.5	162.5	5118.75
81286	20.29	65.5	4.2	1.02	0.6	20.5	162.5	3331.25
81286	20.29	67a.5	3.2	1.39	1.5	41	162.5	6662.5
81286	20.29	54.6	4.2	1.39	1	40	162.5	6500
81286	20.29	54.7	3.2	1.96	1.3	31.5	162.5	5118.75
81286	20.29	56.6	4.2	1.11	1.1	19.5	162.5	3168.75
81286	20.29	56.6	4.2	1.23	2.3	19.5	162.5	3168.75
81286	20.29	56.4	4.2	1.85	1.4	20	162.5	3250
81286	20.58	57a.5	4.2	0.52	0.6	17	55	935
81286	20.62	43.6	2.2	0.61	0.6	40	42	1680
81286	20.62	43.6	2.2	0.61	0.6	13	42	546
90586	20.76	65.6	3.2	1.32	1.7	17	25	425
90586	20.76	67a.5	5.2	3.58	0.8	25	18	450
90586	20.76	7a6.5	4.2	3.1	1.7	20	35	700
90586	20.76	56.7	5.1	1.41	1.1	15	25	375
90586	20.76	7a7b.5	4.2	1.74	1.5	30	20	600
90586	20.76	65.6	4.2	2.76	1.2	8	15	120
90586	20.8	52.7	2.2	0.55	1	13	131.7	1712.1
90586	20.8	67a.4	3.2	1.35	0.6	35	55	1925
90586	20.8	52.4	2.2	0.47	1.4	13	131.7	1712.1
90586	20.8	54.7	3.2	0.94	0.9	35	131.7	4609.5
90586	20.8	54.4	3.2	0.64	1.3	25	131.7	3292.5
90586	20.93	68.6	3.2	1.41	0.8	37	72.5	2682.5
90586	20.93	65.5	4.2	1.92	1.9	15	72.5	1087.5
90586	20.93	58.7	3.2	1.36	1	39.5	72.5	2863.75
90586	20.93	68.5	3.2	1.86	0.8	39.5	72.5	2863.75
90586	21.07	56.7	3.2	1.64	0.9	7	20	140
90586	21.07	56.7	4.2	1.54	1.4	10	19.5	195
90586	21.07	65.5	3.2	2.75	0.8	4	20	80
90586	21.07	54.7	3.2	1.93	1.2	10	19.5	195
90586	21.14	56.5	4.2	2.01	0.8	4	20	80
90586	21.14	56.7	3.2	1.67	1.8	4	12	48
90586	21.14	65.5	3.2	2.3	1.1	29	82	2378
90586	21.14	65.6	3.2	1.86	1	8	62	496
90586	21.14	65.6	4.2	1.81	1	5	15	75
90586	21.27	67a.6	4.2	1.44	1.5	6	25	150
90586	21.27	56.6	4.2	2.41	1.2	6	49	294
90586	21.27	67a.4	4.2	2.05	1.6	6	20	120
90586	21.27	56.7	3.2	1.96	0.9	4	15	60
90586	21.27	67a.6	4.2	3.33	1.2	3	10	30
90586	21.27	67a.7	4.2	1.58	0.9	7	30	210
90586	21.27	56.6	3.2	2.59	1.1	33	83.5	2755.5
90586	21.27	67a.7	4.2	1.04	1.2	5	50	250
90586	21.27	67a.5	3.2	1.97	1.2	29	83.5	2421.5
90586	21.27	65.5	3.2	2.02	1	10	15	150
90586	21.27	67a.4	4.2	1.82	1	5	20	100
90586	21.27	7a5.5	4.2	1.48	1.2	6	15	90
90586	21.27	67a.6	3.2	1.25	1.4	8	15	120
90586	21.44	56.5	3.2	1.55	1.4	9.7	49.5	480.15
90586	21.44	56.6	3.2	1.61	1	7	40	280
90586	21.44	7a6.4	3.2	1.32	1.5	19.3	49.5	955.35

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
90586	21.44	7a6.5	4.2	2.27	1.3	58	49.5	2871
90586	21.51	67a.6	3.2	2.09	1	36	66	2376
90586	21.51	67a.5	4.2	1.83	0.9	39	66	2574
82986	21.54	65.5	4.2	1.69	1.2	2424	105	254520
82986	21.65	7a6.6	3.2	1.73	1	24	134.5	3228
82986	21.65	67a.5	3.2	2.58	0.8	28	134.5	3766
82986	21.7	7a6.7	3.2	2.73	1.5	37	200	7400
82986	21.7	7a6.6	4.2	1.45	1.2	14	200	2800
82986	21.7	56.7	3.2	1.41	1.1	36	72	2592
82986	21.7	56.6	3.2	1.63	1.4	35	45	1575
82986	21.89	7a6.5	4.2	2.01	0.8	35	73	2555
82986	22.11	67a.5	4.2	1.94	0.8	58	78.5	4553
82986	22.11	7a6.6	4.2	1.89	1.2	41	78.5	3218.5
82986	22.3	65.5	3.2	3.02	0.8	15	65	975
82986	22.3	56.7	4.2	1	1	6	10	60
82986	22.3	56.7	3.2	2.05	0.8	6	20	120
82986	22.3	56.6	3.2	1.61	1.2	10	15	150
82986	22.3	54.7	4.2	1.36	0.8	6	8	48
82986	22.3	56.7	4.2	1.74	0.8	7	20	140
82986	22.65	54.6	3.2	1.46	0.5	43	93	3999
82986	22.78	67a.5	3.2	2.02	0.8	70	125	8750
82986	22.78	67a.4	4.2	2.62	1	33	125	4125
82986	22.78	7a6.5	4.2	2.6	1.3	23	44	1012
82986	23.03	7a7b.5	4.2	2.52	1.8	38	45	1710
82986	23.03	54.5	3.2	1.68	1.6	33	45	1485
82986	23.05	54.5	3.2	2.29	1.2	9	42.5	382.5
82986	23.05	45.4	3.2	2.56	0.6	32	42.5	1360
82986	23.05	54.5	3.2	2.04	0.5	10	87	870
82986	23.05	54.7	3.2	1.61	0.8	8	12	96
82986	23.11	65.4	3.2	2.74	0.6	15	39	585
82986	23.11	7a7b.6	4.2	2.08	0.5	46	53	2438
82886	23.43	67a.5	4.2	2.89	1.2	10	30	300
82886	23.43	65.5	4.2	1.5	1.5	20	25	500
82886	23.43	67a.6	4.2	3.32	1.8	15	55	825
82886	23.43	56.7	4.2	2.32	1.2	43	30	1290
82886	23.43	7a7b.5	4.2	2.03	1.5	15	55	825
82886	23.43	67a.6	4.2	3.77	0.8	20	53	1060
82886	23.43	65.5	4.2	3.8	1.3	32	55	1760
82886	23.43	45.6	4.2	2.15	0.8	10	10	100
82886	23.43	56.7	4.2	2.32	0.5	12	24	288
82886	23.43	56.7	4.2	2.87	0.8	10	30	300
82886	23.43	56.6	4.2	4.29	0.8	10	20	200
82886	23.71	7a6.5	4.2	3.29	1.3	36	53	1908
82886	23.71	65.6	4.2	2.36	1.8	22	150	3300
82886	23.81	54.6	3.2	1.67	0.9	5	8	40
82886	23.81	7a6.5	4.2	2.19	0.8	25	20	500
82886	23.86	65.6	4.2	1.46	1.4	15	20	300
82886	23.86	54.7	4.2	1.66	0.8	5	20	100
82886	23.86	67a.5	4.2	2.5	1.5	20	20	400
82886	23.86	65.6	4.2	3	1	15	15	225
82886	24.12	65.6	4.2	1.17	1.2	22	92	2024

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Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
82886	24.12	54.7	4.2	1.91	1.4	19	125	2375
82886	24.12	56.7	4.2	2.51	0.8	20	63	1260
82886	24.12	65.6	4.2	2.06	1.2	20	66	1320
82886	24.12	56.7	4.2	2.26	0.8	31	58	1798
82886	24.12	54.5	4.2	2.33	1.1	21	125	2625
82886	24.36	65.7	4.2	3.14	0.8	23	75	1725
82886	24.36	67a.5	4.2	2.25	0.9	20	75	1500
82886	24.42	7a6.5	4.2	3.95	0.8	10	22	220
82886	24.42	65.6	4.2	2.55	1.2	8	66	528
82886	24.46	65.4	4.2	2.23	0.6	20	57	1140
82886	24.49	45.6	3.2	1.07	1	37	17	629
82886	24.49	7a7b.5	2.4	2.6	0.8	37	17	629
82886	24.58	65.7	4.2	3.47	1	12	45	540
82886	24.58	67a.6	4.2	2.9	1	8	46	368
82886	24.62	65.4	4.2	4.02	1.2	10	26	260
82886	24.62	65.6	4.2	2.85	0.8	10	37	370
82886	24.62	45.6	4.2	3.82	0.5	5	13	65
82886	24.7	45.5	4.2	1.54	0.8	36	40	1440
82886	24.7	65.6	4.2	2.2	0.6	12	18	216
82886	24.86	56.6	4.2	1.24	0.8	10	55	550
82886	25.04	45.5	2.2	1.95	0.8	8	5	40
82886	25.04	65.5	4.2	0.98	1.3	10	10	100
82886	25.06	56.6	4.2	2.16	0.8	13	38	494
91886	25.2	65.5	3.2	2.5	0.9	8	12.5	100
91886	25.2	67b.5	3.2	2.5	0.9	7	12.5	87.5
91886	25.48	54.5	2.2	3.33	0.9	36	45	1620
91886	25.54	57a.6	2.3	2.22	0.9	37	79	2923
91886	25.81	56.6	4.3	2.5	1.4	18	35	630
91086	26.12	62.4	3.2	0.5	0.9	17	47	799
91086	26.12	7a6.4	3.2	3	0.8	36	47	1692
91086	26.3	43.7	3.2	2	0.6	3	8	24
91086	26.3	54.4	3.2	1.5	0.8	42.5	39	1657.5
91086	26.3	56.6	4.2	3.5	1.2	33	42	1386
91086	26.3	67a.4	3.2	2.5	0.7	26	27	702
91086	26.3	45.8	4.2	1.5	0.5	4	16	64
91086	26.3	65.5	3.2	2	0.9	42.5	39	1657.5
91086	26.38	67a.4	3.2	1.5	0.7	15	45	675
91086	26.4	34.6	3.2	2	1.2	15	30	450
91086	26.43	54.7	3.2	2.5	0.9	19	46	874
91086	26.55	43.8	3.2	2	0.9	38	50	1900
91086	26.57	65.5	3.2	1	0.8	8	28	224
91086	26.7	45.7	3.2	1	0.1	12	28	336
91086	26.78	56.7	3.2	2	0.9	12	55	660
91086	26.88	67a.5	4.2	1.5	0.7	18	15	270
91286	27.1	67b.5	2.3	0.13	0.9	35	69	2415
91186	27.47	7a6.4	3.3	3.24	1.2	24	54	1296
91186	27.85	7a8.5	3.4	1.66	1.4	22	63	1386
91186	27.9	7a7b.4	3.3	3.29	0.9	8	41	328
91186	28.07	7a7b.5	3.3	1.81	0.9	23	18	414
91186	28.18	68.4	3.3	2.45	0.8	23	29	667
91186	28.21	7a8.4	3.3	1.81	1.4	15	55	825

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
91186	28.3	65.4	3.3	1.84	0.5	3	8	24
91186	28.36	58.5	3.5	1.37	0.9	33	85	2805
91286	28.41	65.4	3.3	2.5	1	15	33	495
91286	28.54	7a6.4	3.3	3.33	1.2	15	42	630
91286	29.16	7a6.5	2.3	1.35	0.8	12	152	1824
91286	29.21	45.4	3.3	1.67	1.3	10	20	200
91286	29.21	45.4	3.3	1.67	1.3	12	36	432
91286	29.21	45.4	3.3	1.67	1.3	10	12	120
91286	29.31	65.4	3.3	2.22	0.6	34	55	1870
91286	29.37	54.4	3.4	2.86	0.9	10	35	350
91286	29.43	56.5	2.2	1.11	0.4	10	40	400
91286	29.56	65.4	3.2	1.2	0.8	59	30	1770
91286	29.63	67a.5	3.3	2.6	1.2	8	33	264
91286	29.67	7b7a.6	3.3	1.34	1.5	22	23.5	517
91286	29.67	54.5	3.3	1.44	1.6	19	23.5	446.5
91286	29.74	7b6.4	3.3	1.61	1	62	62.5	3875
91286	29.74	65.4	3.2	1.27	0.6	28	62.5	1750
91286	29.88	67a.4	3.2	1.87	1.2	19	27	513
91286	29.88	7a7b.4	3.3	1.81	0.9	8	10	80
91286	29.96	7a6.4	3.2	1.55	1.3	12	20	240
91686	30.08	56.6	3.2	1.89	0.7	4	5	20
91686	30.12	65.6	4.2	2.02	0.8	3	7	21
91686	30.12	45.6	3.2	2.04	1	5	8	40
91686	30.15	56.6	3.2	1.58	2	5	7	35
91686	30.15	54.5	3.2	2.14	1.7	6	6	36
91686	30.15	56.5	3.1	1.69	1.6	6	7	42
91686	30.15	54.5	4.2	1.84	1.6	6	6	36
91686	30.15	56.5	4.2	2.95	1.4	4	4	16
91686	30.15	56.6	4.2	3	0.5	5	10	50
91686	30.15	65.5	3.2	1.2	2	5	6	30
91686	30.26	43.8	3.2	1.57	1	6	39	234
91686	30.26	65.5	3.2	1.52	2	5	5	25
91686	30.26	54.4	2.2	1.3	0.6	5	15	75
91686	30.26	45.5	3.2	1.56	1.6	6	6	36
91686	30.26	67a.6	4.2	1.17	1.1	5	6	30
91686	30.26	56.5	3.2	1.02	1.6	4	5	20
91686	30.26	45.5	3.2	0.92	1.4	5	10	50
91686	30.46	54.5	4.2	2.89	0.5	5	5	25
91686	30.46	54.7	3.2	1.68	0.9	6	8	48
91686	30.62	65.6	3.2	0.82	1.1	10	32	320
91686	30.69	54.7	3.2	0.5	1	3	10	30
91686	30.69	56.6	4.2	0.57	2.9	6	7	42
91786	32.16	65.6	3.2	1.27	0.5	5	20	100
91786	32.16	45.6	3.2	1.31	1.1	10	25	250
91786	32.16	56.6	3.2	1.32	0.7	15	64	960
91786	32.16	56.5	3.2	1.41	0.6	8	12	96
91786	32.41	43.8	4.2	2.13	0.5	12	15	180
91786	32.41	65.5	3.2	1.51	0.8	18	34	612
91786	32.47	65.5	4.2	1.52	0.6	15	38	570
91786	32.57	54.8	3.2	1.87	0.9	20	60	1200
91786	32.63	56.6	4.2	0.8	1.4	12	56	672

Appendix VIII. South Fork Nooksack 1986 riffle survey data.

Date	River Mile	Sub. Code	Embed Code	Velocity (Ft/Sec)	Depth (Ft)	Width (Ft)	Length (Ft)	Sur. Area (Sq. Ft.)
91786	32.63	54.6	2.1	0.9	1	25	85	2125
91786	32.68	65.6	3.1	0.77	1.8	12	90	1080
91786	32.68	67b.6	4.2	1.85	1.5	22	100	2200
91786	32.72	7a6.4	4.2	1.13	0.9	31	58	1798
91786	32.72	56.6	3.1	1.22	0.5	31	58	1798
91786	32.72	7a7b.5	4.2	0.61	1.4	31	107.5	3332.5
91786	32.72	67a.6	4.2	0.95	1.5	17	107.5	1827.5
91786	32.79	7a7b.4	4.2	1.67	1	21	55	1155
91786	32.79	56.4	4.2	1.01	1	8	80	640
91786	32.79	7a6.6	4.2	2.1	1.2	21	182	3822
91786	32.79	67a.5	4.2	1.46	0.8	8	44	352
91786	32.79	7a7b.5	4.2	1.26	0.9	35	55	1925
91786	32.79	67a.4	4.2	1.58	0.8	24	80	1920
91786	32.99	56.7	3.2	1.6	0.9	5	12	60
91786	32.99	54.6	3.2	0.93	1	20	80	1600
91786	32.99	46.4	3.2	1.51	1	10	15	150
91786	32.99	65.5	3.1	1.45	1	17	60	1020
91786	33.14	7a6.6	4.2	2.08	1.1	15	50	750
91786	33.14	67a.4	4.2	2.77	1.1	11	50	550
91786	33.14	56.7	4.2	2.72	0.6	15	6	90
91786	33.17	7a7b.4	3.2	1.5	0.9	31	84	2604
91786	33.21	7a6.6	4.2	1.41	0.7	25	30	750
91786	33.24	56.6	3.2	0.96	0.5	16	62	992
91786	33.24	56.6	3.2	0.71	1.6	8	62	496
91786	33.27	7a6.4	4.3	1.97	1	13	42	546
91786	33.27	54.6	4.2	1.53	1	22	67	1474
91786	33.27	65.4	4.3	1.1	0.6	15	49	735
91786	33.33	67a.6	3.2	1.05	1.3	25	57	1425
91786	33.35	7a7b.5	4.2	0.85	1.5	15	22	330
91786	33.45	65.4	3.2	1.57	0.9	24	140	3360
91786	33.45	45.4	3.2	1.14	1.1	11	140	1540
91786	33.45	56.6	3.1	0.86	1	22	140	3080
91786	33.45	7a7b.4	3.2	0.82	0.7	35	140	4900
91786	33.58	65.5	3.1	1.01	1	28	32.5	910
91786	33.58	45.6	2.1	0.96	1.1	3.9	32.5	126.75

Appendix IX. 1986 South Fork Nooksack redd measurements.

DATE-1986	RM	DEPTH	VELOCITY	SUBSTRATE	DIST-BANK	STRMWDTH	LOCATION
923	0.54	1.2	2.28	42.6	32L	95	HR
923	0.54	1	2.83	42.6	32L	95	HR
909	0.7	1.4	2.57	54.6	24.5	49	BR
923	1	0.6	2.55	54.6	7L	68	MG
923	1.08	1.1	2.8	63.8	28R	88	TG
923	1.1	0.6	1.78	64.8	41L	120	BG
904	1.78	1	1.29	53.5			BR
923	8.92	1.4	3.51	7A5.4	26R	65	MR
923	9.06	1.4	4.32	7B6.5	20L	105	HR
923	9.06	0.8	3.19	7A7B.4	5L	105	MR
923	9.95	0.5	3.33	7A6.4	24R	98	MG
923	10.1	1.9	3.18	67A.5	15R	55	HR
923	10.1	0.8	3.24	67A.6	4R	150	HR
922	12.28	1	2.39	64.8	20R	46	BR
922	12.28	1.2	3.55	64.8	15R	46	BR
922	12.3	1.3	2.72	65.6	13L	52	BG
922	12.3	1.1	2.39	65.8	14L	48	
922	12.3	1	3.77	64.6	14L	48	
922	12.36	1.1	3.16	64.6	9L	42	BR
922	12.36	0.8	2.61	64.8	18R	42	BR
922	12.36	1.6	3.33	64.8	13L	42	BR
922	12.38	1.1	1.51	64.6	23L	55	
922	12.38	1	2.5	65.8	19R	44	MR
922	12.38	1.2	3.39	64.6	20L	44	MR
922	12.38	0.8	2.66	65.8	15R	44	MR
922	12.38	0.7	1.22	65.8	16R	44	MR
922	12.38	1.1	2.61	64.6	9L	44	BR
922	12.48	1	3.05	53.6	4R	40	MG
922	12.5	0.7	1.57	64.5	5R	40	MG
922	12.52	0.7	2.39	65.6	41R	100	HR
922	12.52	0.5	1.73	54.7	29L	100	HR
922	12.52	0.6	2.66	64.8	40L	100	HR
922	12.58	1.2	3.5	65.8	23L	53	MG
922	12.6	0.8	1.84	65.7	26L	67	MG
922	12.7	1.1	1.35	74.4	20L	80	BG
922	12.72	1.3	1.89	63.8	9L	60	TG
922	12.76	0.6	3.05	63.9	22L	60	BR
922	12.78	0.8	1.89	63.8	27R	63	MR
922	12.78	0.8	0.9	63.6	39R	70	HR
922	12.8	0.9	1.67	45.6	19L	110	HR
922	14.2	0.7	2.75	43.4	1L	35	HR
922	14.2	0.6	2.4	45.6	12L	35	HR
922	14.52	1	2.36	56.5	28L	100	HR
922	14.52	0.9	2.33	56.7	15L	100	HR
922	14.52	0.7	2.77	56.6	35L	100	
922	14.62	0.9	1.83	56.7	10R	76	
922	14.62	0.9	3.03	54.8	10R	62	
922	14.62	0.8	2.24	56.6	15L	62	
922	14.84	0.6	1.12	52.4	15L	80	
922	14.84	0.8	2.48	56.6	25R	80	

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922	14.84	1.1	2.09	67A.5		25R	80	
922	14.84	0.9	2.6		56.5	12R	105	
922	14.84	0.6	1.37		56.6	25L	80	
922	14.84	0.7	2.25		56.7	20R	105	
922	14.84	0.8	2.69		56.6	20R	105	
922	14.84	0.8	1.63		65.6	25R	96	
922	14.84	0.7	1.87		56.5	30R	96	
922	14.96	0.7	3.52		65.5	6L	58	
922	14.96	0.8	4.58		56.7	8L	56	
922	14.96	1.2	3.14		65.5	3L	56	
922	14.96	1.2	2.79	7A6.4		20L	47	
922	14.99	0.8	3.67	67A.6		25L	73	BR
922	14.99	1.5	3.04		65.5	10L	46	TP
922	14.99	1.1	2.82	67A.6		25L	73	BR
922	14.99	0.9	2.41	67A.5		25L	87	BR
922	15.2	0.7	3.02		56.4	8L	42	MR
922	15.2	0.6	3.33		56.6	17L	42	MR
922	15.25	0.7	2.76	67A.6		14L	55	HR
922	15.25	0.9	2.41		65.4	4L	55	HR
922	15.53	0.7	1.67		54.5		86	BR
922	15.6	1.7	2.03		56.6	25R	55	MR
922	15.6	1.5	1.92		56.5	25R	55	MR
919	16.5	1	2.5		65.8	25R		
919	16.5	0.8	2.5		64.8	30R	100	
919	16.5	1	2.5		65.8	30R	80	
919	16.76	1.1	3		45.5	25L	55	
919	16.78	0.8	3		54.6	20L	60	
919	16.78	0.9	2.5		65.5	24R	60	MR
919	16.8	0.7	2.5		45.8	21L	80	MR
919	16.92	1.3	3		64.9	22R	60	MR
919	16.92	1	2		56.8	12L	60	MR
919	16.94	0.8	2.5		56.7	10L	60	MR
919	17	1.3	2.5		63.8	22R	55	HR
919	17	0.8	2.5		64.9	15L	55	HR
919	17.02	0.8	2.5	67A.8		11L	55	HR
919	17.02	1.6	2.5	7A7B.7		25R	55	HR
919	17.88	1.7	1	7A5.7		20R	70	TP
919	18.38	1.4	1	67A.5		10R	30	HR
919	18.4	1.2	1.66		45.4	10R	27	HR
919	18.45	1.3	2	27A.5		7R		G
919	18.6	0.8	2.01	67A.6		7L	100	MR
919	18.7	1.2	1.27		42.5	12R	77	HR
919	18.7	1.15	3.09	67A.7		5R	40	MR
919	18.82	1.1	1.56	47A.7		10L	32	MR
919	19.06	1.7	2.91		42.8	7L	27	TP
919	19.1	1.2	1.65	7A5.6		11L	50	MR
919	19.1	1.1	1.75		62.6	9L	50	HR
919	19.1	0.7	3.63		62.8	9L	50	HR
919	19.1	0.75	3.51		64.8	30L	65	MR
919	19.1	1.25	2.34	7B2.7		11L	30	BR
919	19.1	1	1.45		64.8	15L	65	MR
919	19.1	0.7	4.05		52.8	15R	38	MR

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919	19.45	1.4	3.3	7A6.6		8L		37	BR
919	19.63	0.8	1.71		54.8	5L		65	HR
919	19.68	0.6	2.5	7A6.4		25L		90	MR
919	19.68	1	2.86	7A7B.3			45	90	MR
919	19.71	0.75	2.05	67A.6		22R		50	MR
919	19.71	0.75	3.3		56.7	22R		45	MR
919	19.96	1.8	2.5	7A4.4		12R		49	HR
919	20.02	1.1	3.33	7B7A.6		3R		44	HR
919	20.05	1.1	4.44	7A7B.4		5L		55	BR
919	20.06	1.2	5	7B6.5		25L		78	BR
919	20.06	0.8	3.33	7B6.5			39	78	MR
919	20.07	1.3	4	7A5.5		12L		78	MR
919	20.07	1.2	4	7A7B.4		25L		78	MR
919	20.07	1.1	4	7B7A.4			39	78	MR
919	20.2	1.4	4	7A2.4		15L		48	MR
919	20.2	0.8	2		63.4	25L		48	HR
919	20.27	0.9	2.86		64.4	30L		65	MG
919	20.27	1.5	2.86		65.4			57	MG
919	20.73	1	4	7B6.4		5L		25	HR
919	20.73	1.5	4	7B6.				25	HR
918	25.22	2.4	2.5		65.6		18	50	TP
918	25.31	1.5	4	7B6.4		8R		40	HR,MR
918	25.31	1.5	2.5		65.4		12	50	TP,GP,HR
918	25.33	1.8	2.5	7A6.4			12	50	GP
912	29.56	0.8	1.43		65.4		25	70	
912	29.63	1.3	2.6	67A.5			25	70	
912	29.63	1.2	0.78	67A.5			12	70	
912	29.67	1.6	1.44		65.4			41	
912	29.67	1.6	1.44		65.4			41	
912	29.74	0.9	3.05	7B6.4			10	85	
912	29.74	1.1	3.41	7B6.6			8	85	
912	29.74	0.9	3.25	7B6.4			10	85	
916	30.12	1	2.04		45.6	15R			GP
916	30.12	0.8	2.02		65.6	12R			GP
916	30.15	2	1.2		65.5	8R			BR
916	30.15	1.6	1.84		54.5	8R			BR
916	30.15	1.7	2.14		54.5	6R			GP
916	30.15	2	1.58		56.6	9R			BR
916	30.15	1.6	1.69		56.5	7R			BR
916	30.15	1.4	2.95		56.5	5R			GP
916	30.27	1	1.57		43.8	12L			TP
916	30.27	2	1.52		65.5	25L			TP
916	30.27	1.6	1.02		56.5	6L			TP
916	30.27	1.6	1.56		45.5	15L			TP
916	30.27	1.1	1.17	67A.6		7R			TP
916	30.36	0.9	1.68		54.7	15R			TP
916	30.62	1.1	0.82		65.6	8L			TP
916	30.69	2.9	0.57		56.6				GP

Appendix X. Mean distance of spring chinook redds to the nearest stream bank, by 5-mile reach.* Number of observations is shown in parantheses. Total observations=150.

River mile	Distance to bank (ft) Left		Right	
0-5	28	(4)	24	(1)
5-10	12	(2)	25	(2)
10-15	18	(32)	19	(22)
15-20	13	(23)	19	(19)
20-25	18	(8)	3	(1)
25-30	-	(0)	8	(1)
30-35	13	(5)	9	(10)
Overall mean	16.5	(74)	17	(56)

* No distance recorded for seven observations. Bank not identified for 13 observations.

Appendix XI. Estimated wetted width of the South Fork at locations of spring chinook redds. Number of observations is shown in parantheses.

River mile	Width (ft)	
0-5	85.8	(6)
5-10	93.2	(4)
10-15	68.2	(54)
15-20	57.2	(42)
20-25	58.2	(13)
25-30	61.4	(12)
30-35	-	(0)*

* Widths not recorded.

Appendix XII. Frequency of occurrence of redds within areas of stream habitat types.

River mile	Number of redds in habitat types								
	Pool			Riffle			Glide		
	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower
0-5				2		2		1	2
5-10				1	2			1	
10-15			1	11	5	10		4	3
15-20			2	13	20	3		1	
20-25				4	5	2		2	
25-30			2	1					
30-35			7			4			
Total			12	32	32	21		9	5

Appendix XIII. South Fork Nooksack spawning gravel compositions.

1987 S.F. NOOKSACK SPAWNING GRAVEL COMPOSITION

REACH	YEAR	SAMPLE#	>77.0mm	>26.5mm	>6.7mm	>3.35mm	>1.7mm	>0.85mm	>0.425mm	>0.106mm	<0.106mm	TOTAL	FINES	%FINES	AVG%FINE
STRAND ROAD	1987	2C6/2C7	0	789	1498	490	341	183	305	233	67	3906	605	15.49%	13.38%
STRAND ROAD	1987	2C5	0	556	1247	371	365	354	245	123	56	3317	424	12.78%	
STRAND ROAD	1987	2B6/2B7	0	1108	950	262	260	425	189	60	170	3424	419	12.24%	
STRAND ROAD	1987	2B8/2B9	0	1398	1075	349	304	246	109	84	179	3744	372	9.94%	
STRAND ROAD	1987	2C8/2D2	0	1025	1400	573	581	330	201	243	219	4572	663	14.50%	
STRAND ROAD	1987	2D1	261	658	1209	272	345	292	134	102	107	3380	343	10.15%	
STRAND ROAD	1987	2D3	0	706	1075	279	269	253	175	87	96	2940	358	12.18%	
STRAND ROAD	1987	2C9/2D9	0	1100	1448	290	225	210	189	150	469	4081	808	19.80%	

1986 S.F. NOOKSACK SPAWNING GRAVEL COMPOSITION

REACH															
LARSON BRIDGE	1986	E9	418	1051	1372	565	456	314	256	180	105	4717	541	11.47%	13.17%
LARSON BRIDGE	1986	L5	0	1870	560	276	224	191	202	152	56	3531	410	11.61%	
LARSON BRIDGE	1986	D8	0	1168	847	265	194	137	63	77	42	2793	182	6.52%	
LARSON BRIDGE	1986	J1/I2	0	630	981	336	344	319	244	138	429	3421	811	23.71%	
LARSON BRIDGE	1986	J7/H1	0	1115	746	332	207	124	114	270	86	2994	470	15.70%	
LARSON BRIDGE	1986	D9/J9	356	1241	911	481	475	528	335	227	161	4715	723	15.33%	
LARSON BRIDGE	1986	Z-1	559	896	770	254	215	180	107	84	54	3119	245	7.86%	
ACME	1986	M2	381	1015	940	296	384	418	241	78	73	3826	392	10.25%	9.74%
ACME	1986	F1	318	1649	818	225	224	224	150	90	41	3739	281	7.52%	
ACME	1986	J8	0	1031	928	260	242	318	209	42	29	3059	280	9.15%	
ACME	1986	B4	1580	546	337	112	115	130	80	57	42	2999	179	5.97%	
ACME	1986	J4/K5	459	1087	738	217	275	486	370	175	68	3875	613	15.82%	
SKOOKUM EDFRO	1986	G3	1328	440	562	163	150	292	151	55	28	3169	234	7.38%	10.49%
SKOOKUM EDFRO	1986	G6	443	670	616	150	258	557	216	69	34	3013	319	10.59%	
SKOOKUM EDFRO	1986	L4	795	935	700	229	253	288	122	49	56	3427	227	6.62%	
SKOOKUM EDFRO	1986	F4	0	1083	815	279	270	351	233	82	55	3168	370	11.68%	
SKOOKUM EDFRO	1986	F8	290	1348	979	449	226	151	375	325	153	4296	853	19.86%	
SKOOKUM EDFRO	1986	G4	569	994	571	153	215	220	165	51	45	2983	261	8.75%	
SKOOKUM EDFRO	1986	I9	326	1091	602	193	317	406	185	79	112	3311	376	11.36%	
SKOOKUM EDFRO	1986	K9	710	880	581	166	273	341	145	57	44	3197	246	7.69%	

1985 S.F. NOOKSACK SPAWNING GRAVEL SAMPLES COMPOSITION

LARSON BRIDGE	1985	A9	0	910	513	258	319	363	183	99	207	2852	489	17.15%	13.23%
LARSON BRIDGE	1985	H2	286	548	1290	451	246	83	114	280	139	3437	533	15.51%	
LARSON BRIDGE	1985	A7	0	1043	814	234	281	340	239	125	56	3132	420	13.41%	

LARSON BRIDGE	1985 L7	0	1096	770	422	325	172	189	323	65	3362	577	17.16%	
LARSON BRIDGE	1985 E3	0	781	1220	330	195	45	13	91	107	2782	211	7.58%	
LARSON BRIDGE	1985 K1	0	1140	1112	539	501	219	165	120	250	4046	535	13.22%	
LARSON BRIDGE	1985 E4	490	1114	1176	470	311	90	33	235	212	4131	480	11.62%	
LARSON BRIDGE	1985 N1	0	1136	710	215	235	280	173	91	29	2869	293	10.21%	
SKOOKUM EDFRO	1985 C1	0	1184	955	356	485	409	173	70	46	3678	289	7.86%	13.31%
SKOOKUM EDFRO	1985 I3	530	1065	725	226	170	210	183	131	133	3473	447	12.87%	
SKOOKUM EDFRO	1985 D6	0	898	892	355	351	305	218	85	32	3136	335	10.68%	
SKOOKUM EDFRO	1985 I4	265	1016	919	255	290	409	268	103	96	3621	467	12.90%	
SKOOKUM EDFRO	1985 A1	0	1065	975	271	307	420	194	85	60	3377	339	10.04%	
SKOOKUM EDFRO	1985 D1	0	994	1276	455	261	179	149	125	63	3502	337	9.62%	
SKOOKUM EDFRO	1985 E5	0	480	1063	295	298	360	702	364	93	3655	1159	31.71%	
SKOOKUM EDFRO	1985 E7/J2	0	960	861	288	473	430	224	96	45	3377	365	10.81%	

1984 S.F. NOOKSACK SPAWNING GRAVEL COMPOSITION

LARSON BRIDGE	1984 C1	0	1281	714	226	327	263	144	60	45	3060	249	8.14%	10.76%
LARSON BRIDGE	1984 A2	0	1047	692	294	217	213	201	102	99	2865	402	14.03%	
LARSON BRIDGE	1984 N3	954	606	957	245	185	66	33	55	75	3176	163	5.13%	
LARSON BRIDGE	1984 N5	0	476	1061	427	362	375	320	110	42	3173	472	14.88%	
LARSON BRIDGE	1984 J6	275	1045	854	361	505	286	130	65	126	3647	321	8.80%	
LARSON BRIDGE	1984 A9	0	1088	896	313	200	91	60	163	115	2926	338	11.55%	
LARSON BRIDGE	1984 I7	0	1195	952	254	266	272	200	91	44	3274	335	10.23%	
LARSON BRIDGE	1984 E2	1258	758	692	191	187	151	84	55	159	3535	298	8.43%	
LARSON BRIDGE	1984 G1	0	906	670	393	499	433	350	182	57	3490	589	16.88%	
LARSON BRIDGE	1984 B7	452	933	680	225	232	251	150	74	68	3065	292	9.53%	

1983 S.F. NOOKSACK SPAWNING GRAVEL COMPOSITION

LARSON BRIDGE	1983 D5	774	491	679	112	99	130	180	86	30	2581	296	11.47%	10.45%
LARSON BRIDGE	1983 E2	0	1128	808	210	182	218	188	70	25	2829	283	10.00%	
LARSON BRIDGE	1983 G5	443	855	694	209	140	71	47	39	36	2534	122	4.81%	
LARSON BRIDGE	1983 E3	0	786	1151	432	253	141	60	93	128	3044	281	9.23%	
LARSON BRIDGE	1983 H5	0	592	1217	363	207	190	119	57	190	2935	366	12.47%	
LARSON BRIDGE	1983 F8	0	745	961	309	249	330	327	96	25	3042	448	14.73%	

1982 S.F. NOOKSACK SPAWNING GRAVEL COMPOSITION

LARSON BRIDGE	1982 L7	0	1000	825	413	315	194	186	126	49	3108	361	11.62%	10.66%
LARSON BRIDGE	1982 K2	0	763	975	465	544	498	292	95	52	3684	439	11.92%	
LARSON BRIDGE	1982 M4/L1	363	968	1016	256	172	126	71	65	60	3097	196	6.33%	
LARSON BRIDGE	1982 M5/K8	663	786	689	315	355	323	164	63	75	3433	302	8.80%	
LARSON BRIDGE	1982 K9	1032	444	695	249	302	340	216	80	151	3509	447	12.74%	
LARSON BRIDGE	1982 J7	583	966	665	280	220	259	291	114	42	3420	447	13.07%	
LARSON BRIDGE	1982 J8	789	1064	581	258	237	173	252	133	39	3526	424	12.02%	
LARSON BRIDGE	1982 L2/M3	803	641	778	354	308	186	119	99	79	3367	297	8.82%	

Appendix XIV. South Fork Nooksack spring chinook 1984-5 scour monitor study results.

SOUTH FORK NOOKSACK SPRING CHINOOK 1984 - 85 SCOUR MONITOR RESULTS.
Rivermiles 14.8 - 15.5 -- Lummi Fisheries Data
Monitors placed 12/6/84 and 12/11/84. Monitors recovered 8/12/85.

MONITOR RECOVERED ?	ESTIMATED REDD SURVIVAL	SCOUR AND DEPOSITION	HABITAT CHANGE AND TYPE	NOTES (8/12/85)
Yes	Yes	None	None	Water flowing although channel mostly dry (inside island).
Yes	Yes	None	None	As above. (inside island).
Yes	Yes	None	None	As above. (inside island).
Yes	Yes	Scour = 4" followed by 3" of rock deposition.	None	Outside of island.
Yes	Yes	None	None	Outside of island.
Yes	No	Scour = 4" followed by 24" of deposition.	Riffle changed to sand and gravel bar. Dewatered.	Deposition likely occured before allevin emerged.
Yes	No	Scour not known, deposition >24".	Riffle changed to sand and gravel bar. Dewatered.	Deposition likely occured before allevin emerged.

Appendix XV. 1986 South Fork Nooksack inner gorge landslide inventory.

LANDSLIDE NUMBER	1	2	3	4	5	6	7	8	9	10
LOCATION										
SIDE OF STREAM	LB	LB	LB	LB	LB	RB	RB	RB	LB	LB
LOWER RIVERMILE	5.28	13.95	14.97	15.08	15.25	15.44	16.21	16.68	19.6	20.26
UPPER RIVERMILE	5.33	14.02	15.02	15.12	15.34	15.47	16.3	16.75	19.63	20.29
DATE	08/20/86	08/06/86	08/05/86	08/05/86	07/24/86	08/22/86	08/15/86	08/15/86	08/13/86	08/12/86
OBSERVERS	DSH,DM	DSH	DSH	DSH	JSH,KD,DM	JSH,DM	JSH,DM	JSH,DM	DSH,DM	DSH,DM
LENGTH (FT)	165	180	100	116	714	125	340	300	150	168
MAXIMUM HEIGHT (FT)	102	60	20	30	28	37	16	26	60	80
AVERAGE HEIGHT (FT)	78	45	15	25	24.6	35	11	17	48	60
SURFACE AREA (SQFT)	12870	8100	1500	2900	17564.4	4375	3740	5100	7200	10080
COMPOSITION										
% BOULDER	0	100	3	0	0	15	25	25	0	0
% ROCK	0	0	5	5	10	25	5	5	0	0
% GRAVEL	20	0	40	20	15	10	5	10	5	5
% SAND	20	0	50	50	75	50	45	55	35	10
% CLAY	60	0	2	25	0	0	20	5	60	85
EROSION CATEGORY	ACTIVE	REVEG	SOME	SOME	SOME	SOME	SOME	SOME	ACTIVE	ACTIVE
UNDERCUTTING										
AT HIGH FLOW	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES
AT MED FLOW	YES	NO	NO	YES	NO	YES	NO	NO	YES	YES
AT LOW FLOW	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
ARMORING	?	YES	YES	NO	YES	YES	YES	NO	NO	NO
SEDIMENT TO STREAM	LARGE	LITTLE	SOME	SOME	SOME	SOME	SOME	SOME	LARGE	LARGE
PHOTO NUMBER	R6;16,17	R8;11	NONE	R2;24	R2,19	NONE	?3	?24,1,2	R11;13	R11;10,11
COMMENTS		VAN ZYGERT HOLE	SMALL	JUST BELOW OLD EDFRO CR CHANNEL	SOMEWHAT SELF ARMORED AT MOD FLOW				PLUMBAGO HOLE	

LANDSLIDE NUMBER	11	12	13	14	15	16	17	18	19	20
LOCATION										
SIDE OF STREAM	LB	RB	RB	LB	LB	LB	RB	RB	RB	LB
LOWER RIVERMILE	22.05	22.35	22.65	23.05	23.07	23.13	23.32	24.09	24.29	25.09
UPPER RIVERMILE	22.18	22.4	22.74	23.05	23.07	23.28	23.36	24.19	24.38	25.11
DATE	08/29/86	08/29/86	08/29/86	08/29/86	08/29/86	08/28/86	08/28/86	08/28/86	08/28/86	09/18/86
OBSERVERS	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	JSH,DM
LENGTH (FT)	670	385	605	400	240	740	155	675	676	400
MAXIMUM HEIGHT (FT)	60	124	160	40	75	60	44	130	75	180
AVERAGE HEIGHT (FT)	55	124	110	20	30	40	36	65	31	180
SURFACE AREA (SQFT)	36850	47740	66550	8000	7200	29600	5580	43875	20956	160000
COMPOSITION										
% BOULDER	0	0	0	10	0	0	0	0	0	0
% ROCK	5	0	0	0	0	2	5	5	0	50
% GRAVEL	5	10	5	5	0	8	15	5	10	25
% SAND	70	30	10	25	30	20	20	20	30	25
% CLAY	20	60	85	60	70	70	60	70	60	0
EROSION CATEGORY	ACTIVE	SOME	ACTIVE	SOME	SOME	ACTIVE	ACTIVE	SOME	ACTIVE	SOME
UNDERCUTTING										
AT HIGH FLOW	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
AT MED FLOW	YES	NO	YES	YES	NO	YES	YES	YES	YES	NO
AT LOW FLOW	YES	NO	YES	NO	NO	YES	NO	NO	NO	NO
ARMORING	NO	YES	NO	YES	YES	NO	NO	YES	NO	YES
SEDIMENT TO STREAM	LARGE	LITTLE	LARGE	SOME	LITTLE	LARGE	SOME	SOME	SOME	SOME
PHOTO NUMBER	R7;18,19	R7;17	R7;14-16	R7;12,13	R7;11	R7;9,10	R7;8	R7;5,6	R7;4	R12;23,24
COMMENTS										

Appendix XV. 1986 South Fork Nooksack inner gorge landslide inventory (cont.).

LANDSLIDE NUMBER	21	22	23	24	25	26	27	28	29	30
LOCATION										
SIDE OF STREAM	LB	LB	LB	LB	RB	RB	LB	LB	RB	RB
LOWER RIVERMILE	26.32	26.73	26.8	27	27.11	27.13	27.8	28.36	29.07	29.44
UPPER RIVERMILE	26.43	26.77	26.83	27	27.13	27.17	27.92	28.37	29.13	29.46
DATE	09/10/86	09/10/86	09/10/86	09/10/86	09/11/86	09/11/86	09/11/86	09/12/86	09/12/86	09/12/86
OBSERVERS	DSH,DM	DSH,DM	DSH,DM	DSH,DM	JSH,DM	JSH,DM	JSH,DM	JSH,DM	JSH,DM	JSH,DM
LENGTH (FT)	840	250	243	250	280	705	625	125	375	240
MAXIMUM HEIGHT (FT)	170	79	130	40	?	400	30	200	100	70
AVERAGE HEIGHT (FT)	150	60	91	20	?	?	18	?	80	40
SURFACE AREA (SQFT)	126000	15000	22113	5000	ERR	ERR	11250	ERR	30000	9600
COMPOSITION										
% BOULDER	0	1	0	2	5	5	0	0	0	0
% ROCK	0	9	5	3	5	5	0	0	0	0
% GRAVEL	5	10	10	5	20	40	0	0	0	0
% SAND	5	15	5	30	20	40	0	90	0	0
% CLAY	90	65	80	60	50	10	100	10	100	100
EROSION CATEGORY	ACTIVE	ACTIVE	SOME	SOME	ACTIVE	REVEG	ACTIVE	SOME	ACTIVE	ACTIVE
UNDERCUTTING										
AT HIGH FLOW	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES
AT MED FLOW	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES
AT LOW FLOW	YES	YES	NO	NO	YES	NO	YES	NO	YES	NO
ARMORING	NO	NO	-	NO	NO	YES	NO	YES	NO	NO
SEDIMENT TO STREAM	LARGE	LARGE	LITTLE	LARGE	LARGE	LITTLE	LARGE	SOME	LARGE	LARGE
PHOTO NUMBER	R13;8,9	R13;2	R13;3	R13;1	R13;23	R13;22	R13;12	R14;8-13	R14;5	R14;4
COMMENTS										

LANDSLIDE NUMBER	31	32	33	34	35	36	37
LOCATION							
SIDE OF STREAM	LB	RB	RB	LB	LB	RB	LB
LOWER RIVERMILE	29.67	30.13	30.68	32.55	32.73	32.93	33.38
UPPER RIVERMILE	29.71	30.17	30.9	32.61	32.8	33.02	33.44
DATE	09/12/86	09/16/86	09/16/86	09/17/86	09/17/86	09/17/86	09/17/86
OBSERVERS	JSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM	DSH,DM
LENGTH (FT)	195	350	1505	420	215	530	290
MAXIMUM HEIGHT (FT)	130	40	1000	105	120	250	90
AVERAGE HEIGHT (FT)	?	30	205	30	60	175	35
SURFACE AREA (SQFT)	ERR	10500	308525	12600	12900	92750	10150
COMPOSITION							
% BOULDER	0	5	10	20	0	0	2
% ROCK	0	5	20	10	5	2	8
% GRAVEL	20	10	30	10	10	8	10
% SAND	0	10	40	10	10	10	10
% CLAY	80	70	0	50	75	80	70
EROSION CATEGORY	ACTIVE	ACTIVE	ACTIVE	ACTIVE	ACTIVE	ACTIVE	ACTIVE
UNDERCUTTING							
AT HIGH FLOW	YES	YES	YES	YES	YES	YES	YES
AT MED FLOW	YES	YES	NO	NO	YES	YES	YES
AT LOW FLOW	YES	YES	NO	NO	NO	YES	YES
ARMORING	NO	NO	YES	YES	NO	NO	NO
SEDIMENT TO STREAM	LARGE	LARGE	LARGE	SOME	SOME	LARGE	LARGE
PHOTO NUMBER	R?;24,25	R10;24	R14;14-18	R12;10	R12;9	R12;4,6-8	R12;3

Appendix XVI. Daily maximum and minimum water temperatures at South Fork Nooksack monitoring stations.

date	riv mi	inst. no.	chart no.	max	min	avg
08-Jul	23.5	30067	9808	60.9	55.14	58.02
09-Jul	23.5	30067	9808	59.15	55.76	57.455
10-Jul	23.5	30067	9808	54.14	54.14	54.14
11-Jul	23.5	30067	9808	53.5	52.47	52.985
12-Jul	23.5	30067	9808	53.5	51.23	52.365
12-Jul	19.7	30061	9807	51.96	50.34	51.15
13-Jul	23.5	30067	9808	56.67	50.82	53.745
13-Jul	19.7	30061	9807	56.82	50.34	53.58
14-Jul	23.5	30067	9808	54.88	52.26	53.57
14-Jul	19.7	30061	9807	52.89	51.73	52.31
15-Jul	23.5	30067	9808	52.06	51.75	51.905
15-Jul	19.7	30061	9807	51.04	51.04	51.04
16-Jul	23.5	30067	9808	50.2	50.2	50.2
16-Jul	19.7	30061	9807	48.96	48.96	48.96
17-Jul	23.5	30067	9808	51.65	48.77	50.21
17-Jul	19.7	30061	9807	48.72	47.57	48.145
18-Jul	23.5	30067	9808	58.64	48.56	53.6
18-Jul	19.7	30061	9807	56.12	47.57	51.845
19-Jul	23.5	30067	9808	61.73	52.16	56.945
19-Jul	19.7	30061	9807	59.82	51.96	55.89
20-Jul	23.5	30067	9808	63.78	54.53	59.155
20-Jul	19.7	30061	9807	62.13	54.5	58.315
21-Jul	23.5	30067	9808	64.4	55.97	60.185
21-Jul	19.7	30061	9807	62.94	55.89	59.415
22-Jul	23.5	30067	9808	64.3	56.54	60.42
22-Jul	19.7	30061	9807	62.94	56.93	59.935
23-Jul	27.7	11490	9810	57.92	56.41	57.165
23-Jul	25	30064	9802	58.76		58.76
23-Jul	23.5	30067	9808	61.73	57.4	59.565
23-Jul	19.7	30061	9807	62.02	57.62	59.82
24-Jul	27.7	11490	9810	55.88	54.37	55.125
24-Jul	25	30064	9802	56.6	54.54	55.57
24-Jul	23.5	30067	9808	59.15	54.94	57.045
24-Jul	19.7	30061	9807	57.97	54.73	56.35
25-Jul	27.7	11490	9810	55.98	53.73	54.855
25-Jul	25	30064	9802	57.01	54.54	55.775
25-Jul	23.5	30067	9808	60.18	54.63	57.405
25-Jul	19.7	30061	9807	58.66	44.04	51.35
26-Jul	27.7	11490	9810	54.15	54.15	54.15

Appendix XVI.

date	riv mi	inst. no.	chart no.	max	min	avg
03-Aug	17.96	13587	9796	68.95	62.46	65.705
03-Aug	16.4	30068	8464	69.64	60.72	65.18
03-Aug	12.45	28165	9795	66	62.76	64.38
04-Aug	27.7	11490	9810	62.32	57.5	59.91
04-Aug	25	30064	9802	63.5	58.14	60.82
04-Aug	23.5	30067	9808	66.66	59.36	63.01
04-Aug	19.7	30061	9807	66.98	59.82	63.4
04-Aug	18.45	30052	9803	67.16	59.39	63.275
04-Aug	17.96	13587	9796	67.91	61.8	64.855
04-Aug	16.4	30068	8464	68.12	59.63	63.875
04-Aug	12.45	28165	9795	64.9	62.01	63.455
05-Aug	27.7	11490	9810	62.96	56.8	59.88
05-Aug	25	30064	9802	63.8	57.83	60.815
05-Aug	23.5	30067	9808	66.87	58.64	62.755
05-Aug	19.7	30061	9807	67.22	59.13	63.175
05-Aug	18.45	30052	9803	67.59	58.95	63.27
05-Aug	17.96	13587	9796	68.48	61.24	64.86
05-Aug	16.4	30068	8464	68.88	58.87	63.875
05-Aug	12.45	28165	9795	65.01	61.53	63.27
06-Aug	27.7	11490	9810	63.93	57.59	60.76
06-Aug	25	30064	9802	65.24	58.66	61.95
06-Aug	23.5	30067	9808	68.51	59.77	64.14
06-Aug	19.7	30061	9807	68.83	60.28	64.555
06-Aug	18.45	30052	9803	69.21	59.93	64.57
06-Aug	17.96	13587	9796	69.98	62.31	66.145
06-Aug	16.4	30068	8464	70.5	60.18	65.34
06-Aug	12.45	28165	9795	66.7	62.65	64.675
07-Aug	32.8	FP		66		66
07-Aug	27.7	11490	9810	65.11	58.67	61.89
07-Aug	25	30064	9802	66.26	59.48	62.87
07-Aug	23.5	30067	9569	69.75	61.73	65.74
07-Aug	19.7	30061	9807	67.5	61.44	64.47
07-Aug	18.45	30052	9803	70.51	61.22	65.865
07-Aug	17.96	13587	9796	71.07	63.31	67.19
07-Aug	16.4	30068	8464	71.81	61.8	66.805
07-Aug	12.45	28165	9795	67.82	63.78	65.8
08-Aug	32.8	FP		67	54	60.5
08-Aug	27.7	11490	9810	65.97	59.1	62.535
08-Aug	25	30064	9802	66.88	60.05	63.465
08-Aug	23.5	30067	9569	70.45	62.34	66.395
08-Aug	19.7	30061	9807	70.68	62.13	66.405
08-Aug	18.45	30052	9803	71.27	61.65	66.46
08-Aug	17.96	13587	9796	71.49	64	67.745
08-Aug	16.4	30068	8464	72.47	62.35	67.41
08-Aug	12.45	28165	9795	68.72	64.67	66.695
09-Aug	32.8	FP		67	55	61
09-Aug	27.7	11490	9810	65.86	60.39	63.125
09-Aug	25	30064	9802	67.19	60.71	63.95
09-Aug	23.5	30067	9569	70.98	63.47	67.225

Appendix XVI.

date	riv mi	inst. no.	chart no.	max	min	avg
09-Aug	19.7	30061	9807	71.14	62.6	66.87
09-Aug	18.45	30052	9803	71.42	62.3	66.86
09-Aug	17.96	13587	9796	72.14	64.44	68.29
09-Aug	16.4	30068	8464	72.68	62.89	67.785
09-Aug	12.45	28165	9795	68.94	65.12	67.03
10-Aug	32.8	FP		66	55	60.5
10-Aug	27.7	11490	9810	63.61	60.06	61.835
10-Aug	25	30064	9802	64.62	60.71	62.665
10-Aug	23.5	30067	9569	67.49	62.75	65.12
10-Aug	19.7	30061	9807	66.98	62.48	64.73
10-Aug	18.45	30052	9803	67.49	62.13	64.81
10-Aug	17.96	13587	9796	67.91	64.34	66.125
10-Aug	16.4	30068	8464	67.68	63	65.34
10-Aug	12.45	28165	9795	64.9	64.79	64.845
11-Aug	32.8	FP		58	55	56.5
11-Aug	27.7	11490	9810	58.67	58.67	58.67
11-Aug	25	30064	9802	59.68	59.68	59.68
11-Aug	23.5	30067	9569	61.21	61.21	61.21
11-Aug	19.7	30061	9807	60.86	60.86	60.86
11-Aug	18.45	30052	9803	60.57	60.57	60.57
11-Aug	17.96	13587	9796	62.83	62.83	62.83
11-Aug	16.4	30068	8464	61.48	61.48	61.48
11-Aug	12.45	28165	9795	62.43	62.43	62.43
12-Aug	32.8	FP		59	53	56
12-Aug	27.7	11490	9810	60.82	56.95	58.885
12-Aug	25	30064	9802	61.94	57.83	59.885
12-Aug	23.5	30067	9569	65.22	59.05	62.135
12-Aug	18.45	30052	9803	65	57.98	61.49
12-Aug	17.96	13587	9796	65.47	60.58	63.025
12-Aug	16.4	30068	8464	65.07	58.98	62.025
12-Aug	12.45	28165	9795	61.75	60.4	61.075
13-Aug	32.8	FP		65	54	59.5
13-Aug	27.7	11490	9810	63.92	58.13	61.025
13-Aug	25	30064	9802	64.82	58.86	61.84
13-Aug	23.5	30067	9569	68	60.39	64.195
13-Aug	19.7	30061	8467	68.72	60.4	64.56
13-Aug	18.45	30052	9803	68.13	59	63.565
13-Aug	17.96	13587	9796	68.76	61.52	65.14
13-Aug	16.4	30068	8464	68.88	60.18	64.53
13-Aug	12.45	28165	9795	61.75	61.08	61.415
14-Aug	32.8	FP		66	55	60.5
14-Aug	27.7	11490	9810	64.9	59.96	62.43
14-Aug	25	30064	9802	65.85	60.3	63.075
14-Aug	23.5	30067	9569	68.93	62.24	65.585
14-Aug	19.7	30061	8467	70.68	62.55	66.615
14-Aug	18.45	30052	9803	68.15	60.83	64.49
14-Aug	17.96	13587	9796	70.86	63	66.93
14-Aug	16.4	30068	8464	70.44	61.55	65.995
15-Aug	32.8	FP		64	52	58
15-Aug	27.7	11490	9810	61.46	56.95	59.205
15-Aug	25	30064	9802	62.97	57.83	60.4

Appendix XVI.

date	riv mi	inst. no.	chart no.	max	min	avg
15-Aug	23.5	30067	9569	66.05	59.67	62.86
15-Aug	19.7	30061	8467	67.22	59.82	63.52
15-Aug	18.45	30052	8884	65.97	58.95	62.46
15-Aug	17.96	13587	9570	67.35	61.05	64.2
15-Aug	16.4	30068	8463	66.21		66.21
16-Aug	32.8	FP		63	50	56.5
16-Aug	27.7	11490	9810	60.82	55.12	57.97
16-Aug	25	30064	9802	61.94	55.86	58.9
16-Aug	23.5	30067	9569	65.12	57.1	61.11
16-Aug	19.7	30061	8467	66.06	57.28	61.67
16-Aug	18.45	30052	8884	65.54	56.25	60.895
16-Aug	17.96	13587	9570	66.31	58.7	62.505
16-Aug	16.4	30068	8463	66.05	55.79	60.92
17-Aug	32.8	FP		62	51	56.5
17-Aug	27.7	11490	9810	61.07	55.98	58.525
17-Aug	25	30064	9802	62.15	56.9	59.525
17-Aug	23.5	30067	9569	65.22	58.33	61.775
17-Aug	19.7	30061	8467	66.06	58.43	62.245
17-Aug	18.45	30052	8884	64.89	57.44	61.165
17-Aug	17.96	13587	9570	66.6	59.83	63.215
17-Aug	16.4	30068	8463	65.83	56.8	61.315
18-Aug	32.8	FP		64	51	57.5
18-Aug	27.7	11490	9810	61.46	55.98	58.72
18-Aug	25	30064	9802	62.46	56.8	59.63
18-Aug	23.5	30067	9569	66.35	58.33	62.34
18-Aug	19.7	30061	8467	67.33	59.13	63.23
18-Aug	18.45	30052	8884	66.62	58.2	62.41
18-Aug	17.96	13587	9570	67.73	60.02	63.875
18-Aug	16.4	30068	8463	66.81	57.02	61.915
19-Aug	32.8	FP		63	51	57
19-Aug	27.7	11490	9810	61.25	55.98	58.615
19-Aug	25	30064	9802	62.25	56.6	59.425
19-Aug	23.5	30067	9569	65.43	58.33	61.88
19-Aug	19.7	30061	8467	66.75	58.67	62.71
19-Aug	18.45	30052	8884	66.3	57.98	62.14
19-Aug	17.96	13587	9570	67.16	59.83	63.495
19-Aug	16.4	30068	8463	66.48	56.8	61.64
20-Aug	32.8	FP		64	51	57.5
20-Aug	27.7	11490	9810	60.485	56.5	58.4925
20-Aug	25	30064	9802	62.77	57.21	59.99
20-Aug	23.5	30067	9569	66.66	59.05	62.855
20-Aug	19.7	30061	8467	67.57	59.36	63.465
20-Aug	18.45	30052	8884	69.49	59.17	64.33
20-Aug	17.96	13587	9570	68.2	60.68	64.44
20-Aug	16.4	30068	8463	68.17	57.46	62.815
20-Aug	12.45	28165	8339	63.78	61.08	62.43
20-Aug		30066	8341			ERR
21-Aug	32.8	FP		65	52	58.5
21-Aug	27.7	11490	8340	62.86	56.63	59.745
21-Aug	25	30064	9802	68.145	58.04	63.0925
21-Aug	23.5	30067	9569	67.28	59.87	63.575
21-Aug	19.7	30061	8467	68.72	60.18	64.45
21-Aug	18.45	30052	8884	68.35	59.17	63.76

Appendix XVI.

date	riv mi	inst. no.	chart no.	max	min	avg
21-Aug	17.96	13587	9570	68.57	61.11	64.84
21-Aug	16.4	30068	8463	68.33	58.28	63.305
21-Aug	12.45	28165	8339	64.79	61.42	63.105
21-Aug		30066	8341	66.23	58.66	62.445
22-Aug	32.8	FP		64	52	58
22-Aug	27.7	11490	8340	62.31	57.49	59.9
22-Aug	25	30064	8333	62.97	57	59.985
22-Aug	23.5	30067	9569	66.77	59.67	63.22
22-Aug	19.7	30061	8467	68.14	60.18	64.16
22-Aug	18.45	30052	8884	67.7	59.17	64.0425
22-Aug	17.96	13587	9570	68.38	60.92	64.65
22-Aug	16.4	30068	8463	68.3	58	63.15
22-Aug	12.45	28165	8339	70.48	61.42	65.95
22-Aug		30066	8341	65.69	58	61.845
23-Aug	32.8	FP		62	54	58
23-Aug	27.7	11490	8340	61.25	58.56	59.905
23-Aug	25	30064	8333	61.12	57.83	59.475
23-Aug	23.5	30067	9569	65.12	60.39	62.755
23-Aug	19.7	30061	8467	66.07	60.87	63.47
23-Aug	18.45	30052	8884	65.97	60.03	63.5775
23-Aug	17.96	13587	9570	66.6	61.71	64.155
23-Aug	16.4	30068	8463	66.32	59.41	62.865
23-Aug	12.45	28165	8339	70.935	62.43	66.6825
23-Aug		30066	8341	63.09	59.3	61.195
24-Aug	32.8	FP		64	54	59
24-Aug	27.7	11490	8340	61.68	58.45	60.065
24-Aug	25	30064	8333	61.64	57.93	59.785
24-Aug	23.5	30067	9569	65.63	60.18	62.905
24-Aug	19.7	30061	8467	66.99	60.87	63.93
24-Aug	18.45	30052	8884	66.19	60.29	63.8375
24-Aug	17.96	13587	9570	67.16	61.71	64.435
24-Aug	16.4	30068	8463	66.16	59.63	62.895
24-Aug	12.45	28165	8339	63.55	63.55	63.55
24-Aug		30066	8341	63.52	59.63	61.575
25-Aug	32.8	FP		65	52	58.5
25-Aug	27.7	11490	8340	62.85	57.49	60.17
25-Aug	25	30064	8333	63.18	57	60.09
25-Aug	23.5	30067	9569	66.87	59.46	63.165
25-Aug	19.7	30061	8467	68.38	59.37	63.875
25-Aug	18.45	30052	8884	67.7	58.41	63.8075
25-Aug	17.96	13587	9570	68.48	60.64	64.56
25-Aug	16.4	30068	8463	68.39	57.46	62.925
25-Aug	12.45	28165	8339	63.89	61.19	62.54
25-Aug		30066	8341	66.45	58.44	62.445
26-Aug	32.8	FP		65	53	59
26-Aug	27.7	11490	8340	64.47	59.1	61.785
26-Aug	25	30064	8333	64.72	58.24	61.48
26-Aug	23.5	30067	9569	68.51	60.96	64.735
26-Aug	19.7	30061	8467	70	61.45	65.725
26-Aug	18.45	30052	8884	69.43	60.29	65.7525
26-Aug	17.96	13587	9570	71.02	62.27	66.645
26-Aug	16.4	30068	8463	69.97	59.79	64.88

Appendix XVI.

date	riv mi	no.	no.	max	min	avg
26-Aug	12.45	28165	8339	66.7	62.88	64.79
26-Aug		30066	8341	68.5	60.5	64.5
27-Aug	32.8	FP		66	55	60.5
27-Aug	27.7	11490	8340	65	60.17	62.585
27-Aug	25	30064	8333	64.72	59.68	62.2
27-Aug	23.5	30067	9569	68.92	62.45	65.685
27-Aug	19.7	30061	8467	70.11	62.72	66.415
27-Aug	18.45	30052	8884	69.21	61.65	ERR
27-Aug	17.96	13587	9570	70.08	63.59	66.835
27-Aug	16.4	30068	8463	69.42	61.37	65.395
27-Aug	12.45	28165	8339	66.92	64.79	65.855
27-Aug		30066	8341	69.48	62.33	65.905
28-Aug	32.8	FP		60	58	59
28-Aug	27.7	11490	8340	62.32	62.32	62.32
28-Aug	25	30064	8333	62.15	62.15	62.15
28-Aug	23.5	30067	9569	68.92	65.22	67.07
28-Aug	19.7	30061	8467	65.6	65.6	65.6
28-Aug	18.45	30052	8884	64.29	64.29	65.18333
28-Aug	17.96	13587	9570	65.66	65.66	65.66
28-Aug	16.4	30068	8463	64.15	64.15	64.15
28-Aug	12.45	28165	8339	66.7	66.92	66.81
28-Aug		30066	8341			ERR
29-Aug	32.8	FP		58	56	57
29-Aug	27.7	11490	8340	59.96	59.96	59.96
29-Aug	25	30064	8333	59.58	59.58	59.58
29-Aug	19.7	30061	8467	62.6	62.6	62.6
29-Aug	18.45	30052	8884	61.18	61.18	62.33
29-Aug	17.96	13587	9570	63.21	63.21	63.21
29-Aug	16.4	30068	8463	61.15	61.15	61.15
29-Aug	12.45	28165	8339	63.33	65.57	64.45
29-Aug		30066	8341			ERR
30-Aug	32.8	FP		57	55	56
30-Aug	27.7	11490	8340	58.56	58.56	58.56
30-Aug	25	30064	8333	58.04	58.04	58.04
30-Aug	19.7	30061	8467	60.29	60.29	60.29
30-Aug	18.45	30052	8884	59.39	59.39	60.24333
30-Aug	17.96	13587	9570	61.05	61.05	61.05
30-Aug	16.4	30068	8463	59.09	58.98	59.035
30-Aug	12.45	28165	8339	61.42	61.42	61.42
30-Aug		30066	8341			ERR
31-Aug	32.8	FP		59	54	56.5
31-Aug	27.7	11490	8340	58.45	57.81	58.13
31-Aug	25	30064	8333	58.14	57	57.57
31-Aug	19.7	30061	8467	64.91	59.37	62.14
31-Aug	18.45	30052	8884	65.07	58.31	62.44166
31-Aug	17.96	13587	9570	66.32	60.67	63.495
31-Aug	16.4	30068	8463	65.07	57.56	61.315
31-Aug	12.45	28165	8339	62.43	60.63	61.53
31-Aug		30066	8341	62.44		31.22
01-Sep	32.8	FP		56	54	55
01-Sep	27.7	11490	8340	58.35	57.49	57.92
01-Sep	25	30064	8333	58.34	57	57.67

Appendix XVI.

date	riv mi	inst. no.	chart no.	max	min	avg
01-Sep	19.7	30061	8467	62.02	58.9	60.46
01-Sep	18.45	30052	8884	61.65	57.77	60.54833
01-Sep	17.96	13587	9570	62.56	60.39	61.475
01-Sep	16.4	30068	8463	60.72	57.41	59.065
01-Sep	12.45	28165	8339	60.85	60.85	60.85
01-Sep		30066	8341	61.9	59.52	60.71
02-Sep	32.8	FP		59	54	56.5
02-Sep	27.7	11490	8340	59.27	57.38	58.325
02-Sep	25	30064	8333	58.14	59.42	58.78
02-Sep	19.7	30061	8467	62.6	60.36	61.48
02-Sep	18.45	30052	8884	62.19	60.03	61.77833
02-Sep	17.96	13587	9570	63.78	61.71	62.745
02-Sep	16.4	30068	8463	61.96	59.41	60.685
02-Sep	12.45	28165	8339	61.75	60.95	61.35
02-Sep		30066	8341	62.55	61.14	61.845
03-Sep	32.8	FP		64	52	58
03-Sep	27.7	11490	8340	62.1	56.74	59.42
03-Sep	25	30064	8333	61.64	56.43	59.035
03-Sep	19.7	30061	8467	66.3	58.79	62.545
03-Sep	18.45	30052	8884	66.19	57.87	62.69
03-Sep	17.96	13587	9570	67.16	59.83	63.495
03-Sep	16.4	30068	8463	66.16	56.37	61.265
03-Sep	12.45	28165	8339	63.21	60.85	62.03
03-Sep		30066	8341	66.45	59.3	62.875
04-Sep	32.8	FP		64	52	58
04-Sep	27.7	11490	8340	62.1	57.98	60.04
04-Sep	25	30064	8333	61.64	57.21	59.425
04-Sep	19.7	30061	8467	67.1	60.29	63.695
04-Sep	18.45	30052	8884	66.6	59.02	63.65666
04-Sep	17.96	13587	9570	67.97	60.96	64.465
04-Sep	16.4	30068	8463	66.7	58.33	62.515
04-Sep	12.45	28165	8339	63.66	61.53	62.595
04-Sep		30066	8341	67.2	60.28	63.74
05-Sep	32.8	FP		63	51	57
05-Sep	18.45	30052	8884		57.33	ERR
05-Sep	17.96	13587	9570	66.6	59.83	63.215
05-Sep	16.4	30068	8463	65.65	56.8	61.225
05-Sep	12.45	28165	8339	62.43	60.85	61.64
05-Sep		30066	8341	64.71	57.57	61.14
06-Sep	32.8	FP		62	52	57
06-Sep	17.96	13587	9570	66.22	60.02	63.12
06-Sep	16.4	30068	8463	65.61	56.87	61.24
06-Sep	12.45	28165	8339	62.88	60.63	61.755
06-Sep		30066	8341	64.07	58.98	61.525
07-Sep	32.8	FP		61	51	56
07-Sep	17.96	13587	9570	65	59.45	62.225
07-Sep	16.4	30068	8463	63.55	56.59	60.07
07-Sep	12.45	28165	8339	61.08	60.52	60.8
07-Sep		30066	8341	62.98	57.14	60.06
08-Sep	32.8	FP		56	52	54
08-Sep	17.96	13587	9570		60.58	60.58
08-Sep	16.4	30068	8463		57.78	57.78

Appendix XVI.

date	riv mi	inst. no.	chart no.	max	min	avg
26-Jul	25	30064	9802	54.74	54.74	54.74
26-Jul	23.5	30067	9808	55.04	55.04	55.04
26-Jul	19.7	30061	9807	54.5	54.5	54.5
27-Jul	27.7	11490	9810	53.51	52.71	53.11
27-Jul	25	30064	9802	55.57	53.51	54.54
27-Jul	23.5	30067	9808	57.61	53.5	55.555
27-Jul	19.7	30061	9807	55.95	52.66	54.305
28-Jul	27.7	11490	9810	56.41	53.3	54.855
28-Jul	25	30064	9802	57.62	54.33	55.975
28-Jul	23.5	30067	9808	59.79	54.53	57.16
28-Jul	19.7	30061	9807	57.97	53.88	55.925
29-Jul	27.7	11490	9810	56.1	52.76	54.43
29-Jul	25	30064	9802	58.04	53.82	55.93
29-Jul	23.5	30067	9808	60.08	53.7	56.89
29-Jul	19.7	30061	9807	58.78	53.45	56.115
30-Jul	27.7	11490	9810	58.24	51.8	55.02
30-Jul	25	30064	9802	59.48	52.48	55.98
30-Jul	23.5	30067	9808	61.73	52.98	57.355
30-Jul	19.7	30061	9807	60.98	52.31	56.645
30-Jul	18.45	30052	9803	63.38		63.38
31-Jul	27.7	11490	9810	60.17	54.22	57.195
31-Jul	25	30064	9802	61.22	54.54	57.88
31-Jul	23.5	30067	9808	63.78	55.04	59.41
31-Jul	19.7	30061	9807	63.17	54.97	59.07
31-Jul	18.45	30052	9803	63.81	54.26	59.035
31-Jul	17.96	13587	9796	65.15	57.95	61.55
31-Jul	16.4	30068	8464	65.07	54.95	60.01
31-Jul	12.45	28165	9795	61.08	56.92	59
01-Aug	27.7	11490	9810	62.32	55.66	58.99
01-Aug	25	30064	9802	63.28	56.6	59.94
01-Aug	23.5	30067	9808	66.46	57.1	61.78
01-Aug	19.7	30061	9807	66.52	57.39	61.955
01-Aug	18.45	30052	9803	66.93	56.9	61.915
01-Aug	17.96	13587	9796	67.54	59.55	63.545
01-Aug	16.4	30068	8464	67.57	57.46	62.515
01-Aug	12.45	28165	9795	63.89	59.06	61.475
02-Aug	27.7	11490	9810	63.61	57.5	60.555
02-Aug	25	30064	9802	65.24	58.86	62.05
02-Aug	23.5	30067	9808	68.2	59.36	63.78
02-Aug	19.7	30061	9807	68.6	59.82	64.21
02-Aug	18.45	30052	9803	68.78	59.17	63.975
02-Aug	17.96	13587	9796	69.7	61.71	65.705
02-Aug	16.4	30068	8464	69.98	59.63	64.805
02-Aug	12.45	28165	9795	66.7	61.53	64.115
03-Aug	27.7	11490	9810	63.18	58.02	60.6
03-Aug	25	30064	9802	64.62	58.66	61.64
03-Aug	23.5	30067	9808	67.59	60.08	63.835
03-Aug	19.7	30061	9807	67.79	60.74	64.265
03-Aug	18.45	30052	9803	68.35	59.99	64.17
08-Sep		30066	8341	60.39	57.68	59.035
09-Sep	32.8	FP		55	51	53
09-Sep		30066	8341		56.49	56.49