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Redwood National
Park Files

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Fish Distribution Survey Report

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FY 2000

Fish and Wildlife Branch

Division of Resource Management and Science

Redwood National and State Parks

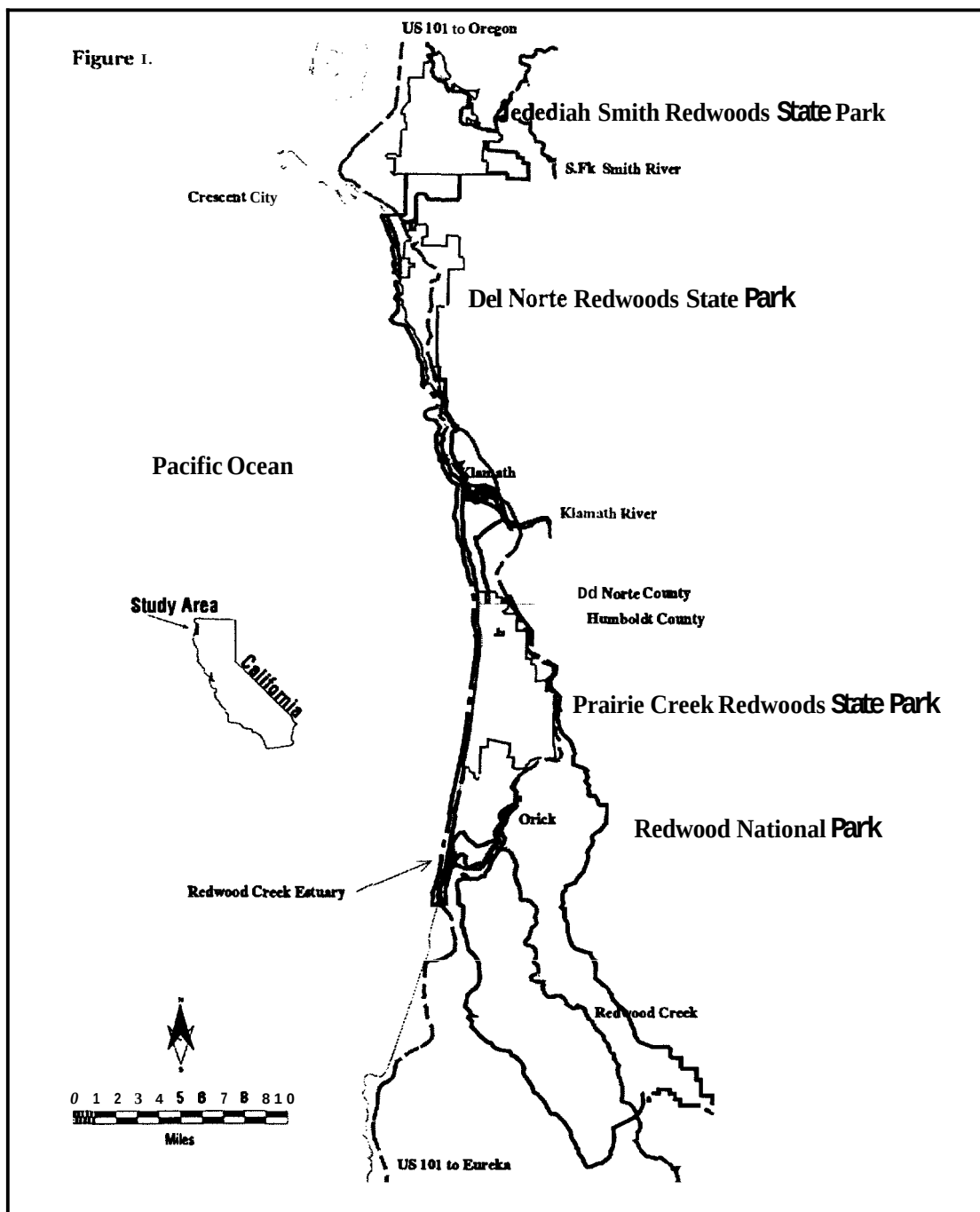
Introduction

The purpose of this report is to document the results from the distribution and status survey of threatened and non-listed salmonid species within the Redwood Creek Watershed during the FY 2000 field season.

Redwood Creek and its tributaries historically had very sizeable runs of King salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), and Steelhead trout (*Oncorhynchus mykiss*). These runs, in recent decades, have become severely depressed. The reduced numbers can be attributed to a combination of over fishing, the changing conditions of the ocean and habitat loss.

Study Area

Redwood Creek drains a narrow 720-km² 108-km long watershed. The mouth of Redwood Creek is located west of the town of Orick, California at the Pacific Ocean. The basin is steep-sided and narrow with a total basin relief of 1,616m. The climate is Mediterranean, with an estimated average precipitation of 203 cm a year. Mainstem stream flow is lowest between August and October. Vegetation in the basin consists of coast redwood and Douglas-fir forests, their associated flora, and ridgetop prairies. Commercial timber harvest is one of the major land use practices in the basin. By 1978, 66% of the basin drainage, comprising 81% of the original conifer forests, had been logged (Best 1984). Logging no longer occurs in the lower one-third of the watershed, site of Redwood National Park. The park was established in 1968 and its boundaries later expanded in 1978 to protect park resources (See Figure 1).



Methods

The Fish and Wildlife Staff, during the period of August 14th to August 24th of 2000, surveyed ten tributaries of Redwood Creek (See Figure 2). A 12-volt DC battery backpack electroshocker was used to evaluate the presence and distribution of different fish species in each tributary and identify potential barriers to anadromous migration. Fork lengths of fish were measured to nearest millimeter. Specific conductivity was

measured with a YSI model no. 33 salinity-conductivity-temperature meter (Yellow Springs Instrument Co., Yellow Springs, Ohio). Water Temperature (°C) was measured in the stream with a hand held thermometer.

The ten tributaries sampled in FY 2000 were Bridge Creek, Forty-Four Creek, Miller Creek, Tom McDonald Creek, Cole Creek, Bond Creek, Clouquet Creek, Hayes Creek, Strawberry Creek and Davison Creek (See Figure 2). The sample area in each tributary was arbitrarily selected by sampling the first pool or riffle available to anadromous salmonids. Another criteria used in selecting the sample areas were the ability of a four-person crew with a backpack electroshocker to effectively sample the pool or riffle. Captured fish were anesthetized with MS-222 (tricaine methanesulfonate), identified to species, and fork length measured to the nearest 1.0 mm.

Results

Table 1.

Distribution and status survey of threatened and non-listed salmonid species within the Redwood Creek Watershed during the FY 2000 field season.

An "X" that means at least one specimen was captured.

Distribution of Salmonid Species in Tributaries of Redwood Creek Surveyed In FY 2000

Creek Name	King	Steelhead	Cutthroat	Coho
Bridge		X		
Forty-four		X	X	
Miller		X		
Tom McDonald	X	X		X
Cole		X		X
Bond		X	X	
Clouquet		X	X	
Hayes		X		X
Strawberry			X	
Davison		X	X	X

Table 2.

Mean fork length (cm), standard deviation (Std. Dev.) of threatened and non-listed salmonid species captured during the FY 2000 Distribution and status survey.

Creek Name	Species	Mean Fork Length (mm)	Std. Dev. (mm)
Bridge	Steelhead	65	24
Forty-four	Steelhead	56	7
	Cutthroat	95	40
Miller	Steelhead	59	16
Tom McDonald	King	75	N/A
	Steelhead	63	15
	Coho	65	3
Cole	Steelhead	62	6
	Coho	71	2
Bond	Steelhead	57	16
	Cutthroat	120	26
Clouquet	Steelhead	63	12
	Cutthroat	106	N/A
Hayes	Steelhead	74	10
	Coho	75	10
Strawberry	Cutthroat	135	8
Davison	Steelhead	63	12
	Cutthroat	107	19
	Coho	67	9

Discussion

At least one species of salmonid fish was captured in every tributary surveyed in FY 2000 (See Table 1). More surveys must be completed in the following years before any statement concerning the distribution and status of threatened and non-listed salmonid species can be made with confidence.

References

Best, D. W. 1984. Land use of the Redwood Creek Basin. Technical Report No. 9. Redwood National Park, Arcata, California. 30pp.

ALL SPECIES		COHO		CUT		KING **		SHD		CUT & SHD	
Mean	65.57463	Mean	69.1	Mean	106.81081	Mean	75	Mean	62.848837	Mean	65.394368
Standard Err.	0.861147	Standard Err.	0.2688578	Standard Err.	5.0700554	Standard Err.	a	Standard Err.	0.7954125	Standard Err.	0.9003954
Median	60	Median	67.5	Median	104	Median	75	Median	58	Median	56
Mode	54	Mode	72	Mode	126	Mode	#N/A	Mode	54	Mode	54
Std. Dev.	22.29024	Std. Dev.	6.9498201	Std. Dev.	30.839943	Std. Dev.	#DIV/0!	Std. Dev.	19.515992	Std. Dev.	22.760599
Sample Var.	496.8547	Sample Var.	48.3	Sample Var.	951.1021	Sample Var.	#DIV/0!	Sample Var.	380.87395	Sample Var.	518.04488
Kurtosis	8.825922	Kurtosis	3.059219	Kurtosis	2.1559541	Kurtosis	#DIV/0!	Kurtosis	11.653173	Kurtosis	8.4843606
Skewness	2.461962	Skewness	1.4511649	Skewness	1.1333518	Skewness	#DIV/0!	Skewness	2.7127270	Skewness	2.4449884
Range	184	Range	32	Range	143	Range	a	Range	184	Range	184
Minimum	34	Minimum	58	Minimum	67	Minimum	75	Minimum	34	Minimum	34
Maximum	218	Maximum	90	Maximum	210	Maximum	75	Maximum	218	Maximum	210
Sum	43935	Sum	2073	Sum	3952	Sum	75	Sum	37835	Sum	41787
Count	670	Count	30	Count	37	Count	1	Count		Count	636

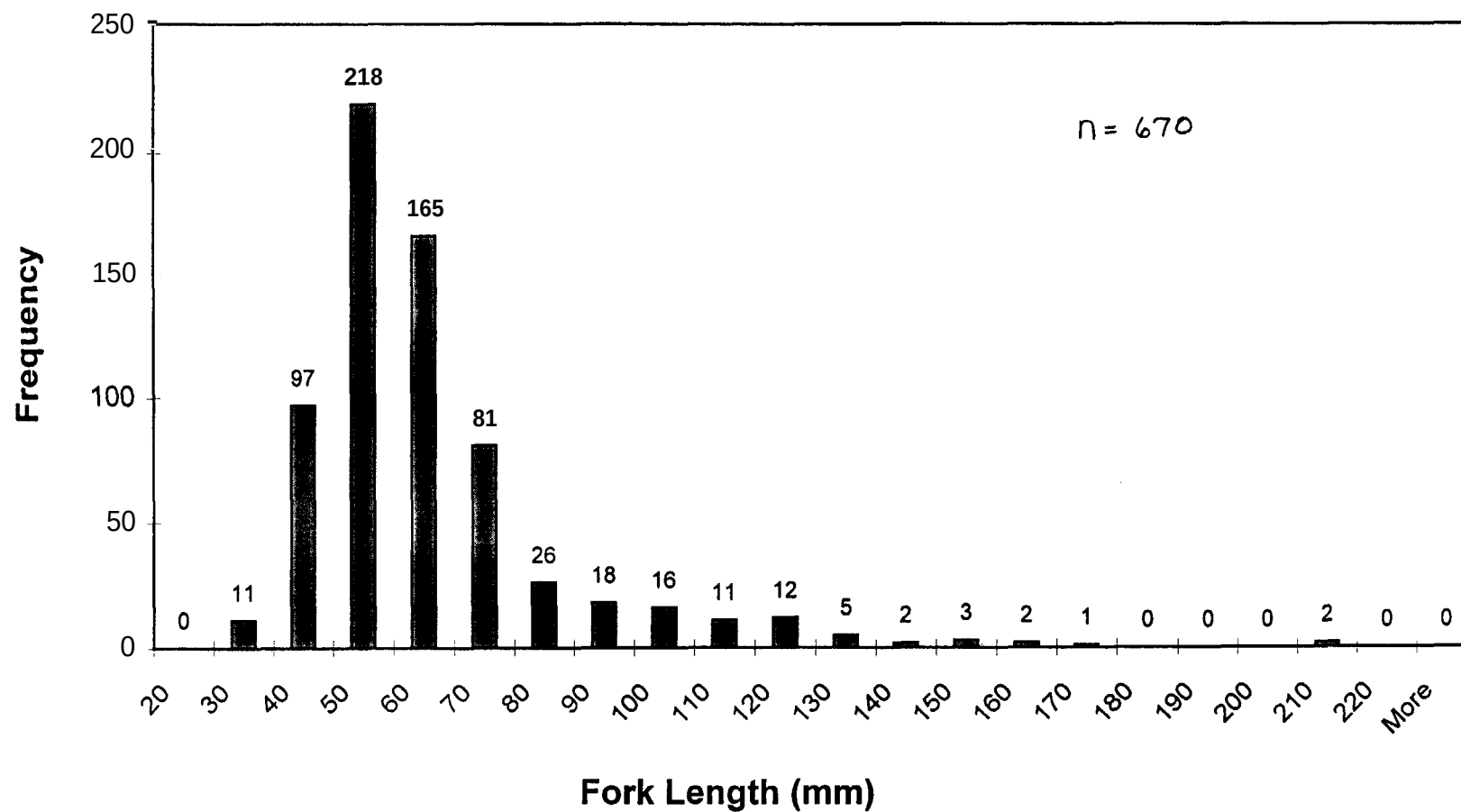
ALL		COHO		CUT		KING		SHD		CUT/SHD	
BIN	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency
20	0	0	0	0	a	a	0	0	0	0	0
30	11	0	0	0	a	a	11	11	11	11	11
40	97	0	0	0	a	a	97	97	97	97	97
50	218	1	1	0	a	a	217	217	217	217	217
60	165	16	16	2	a	a	147	147	149	149	149
70	81	11	11	6	1	1	63	63	69	69	69
80	26	1	1	3	a	a	22	22	25	25	25
90	18	1	1	6	a	a	11	11	17	17	17
100	16	0	0	5	a	a	11	11	16	16	16
110	11	0	0	3	a	a	8	8	11	11	11
120	12	0	0	6	a	a	6	6	12	12	12
130	5	0	0	2	a	a	3	3	5	5	5
140	2	0	0	1	0	0	1	1	2	2	2
150	3	0	0	1	a	a	2	2	3	3	3
160	2	0	0	1	0	0	1	1	2	2	2
170	1	0	0	0	a	a	1	1	1	1	1
180	0	0	0	0	0	0	0	0	0	0	0
190	a	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	a	a	0	0	a	a	a
210	2	0	0	1	0	0	1	1	2	2	2
220	0	0	0	0	0	0	0	0	0	0	0
More	0	0	0	0	a	a	0	0	0	0	0

** No histogram, not enough data.

Data collected on August 14- 24, 2000 from 10 Redwood Creek tributaries (Bond Crk., Bridge Crk., Clouquet Crk., Cole Crk., Davidson Crk., Fourty Four Crk., Hayes Crk., Miller Crk., Strawberry Crk., and Tom McDonald Crk.).

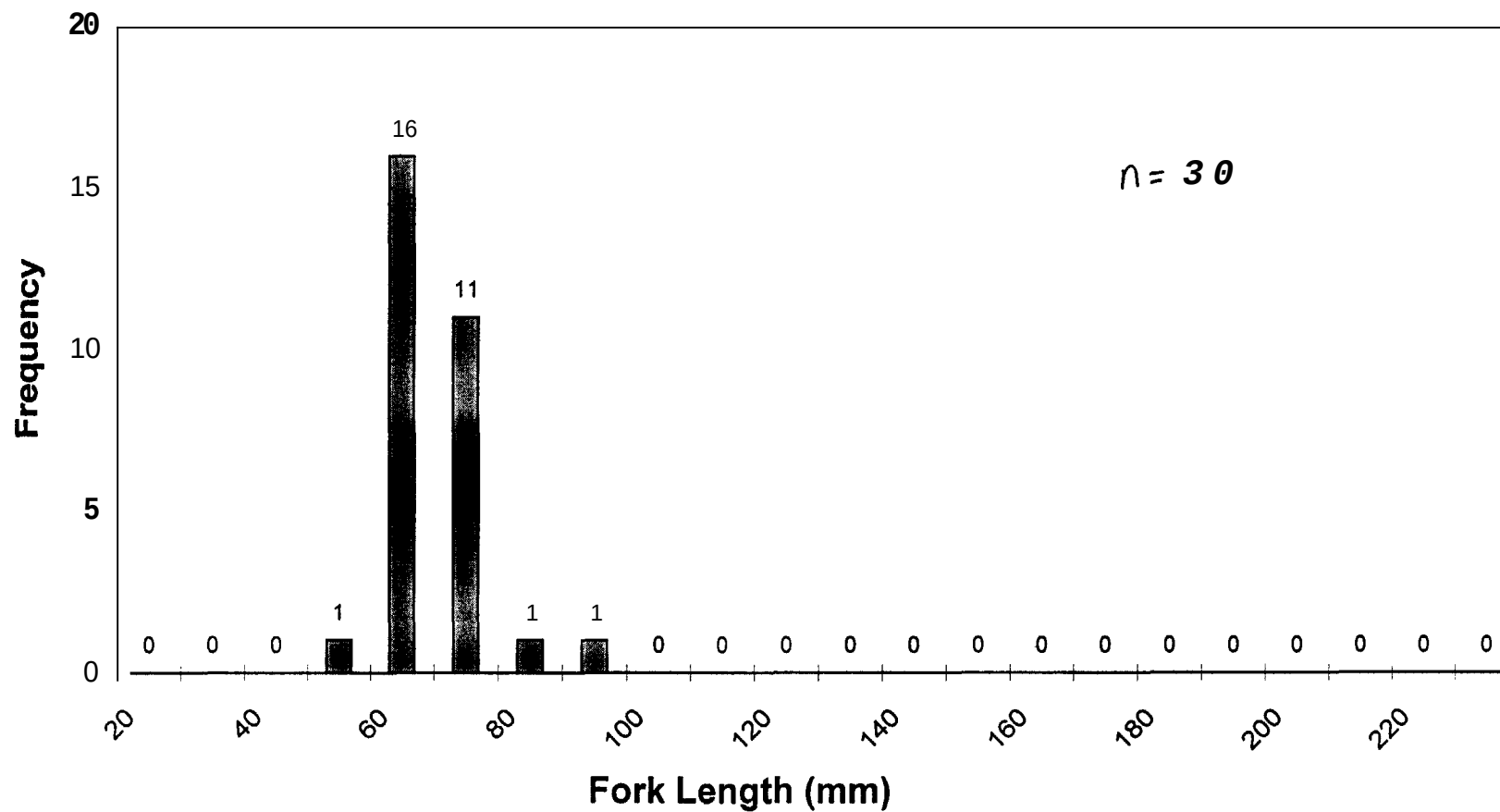
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ALL SALMONIDS



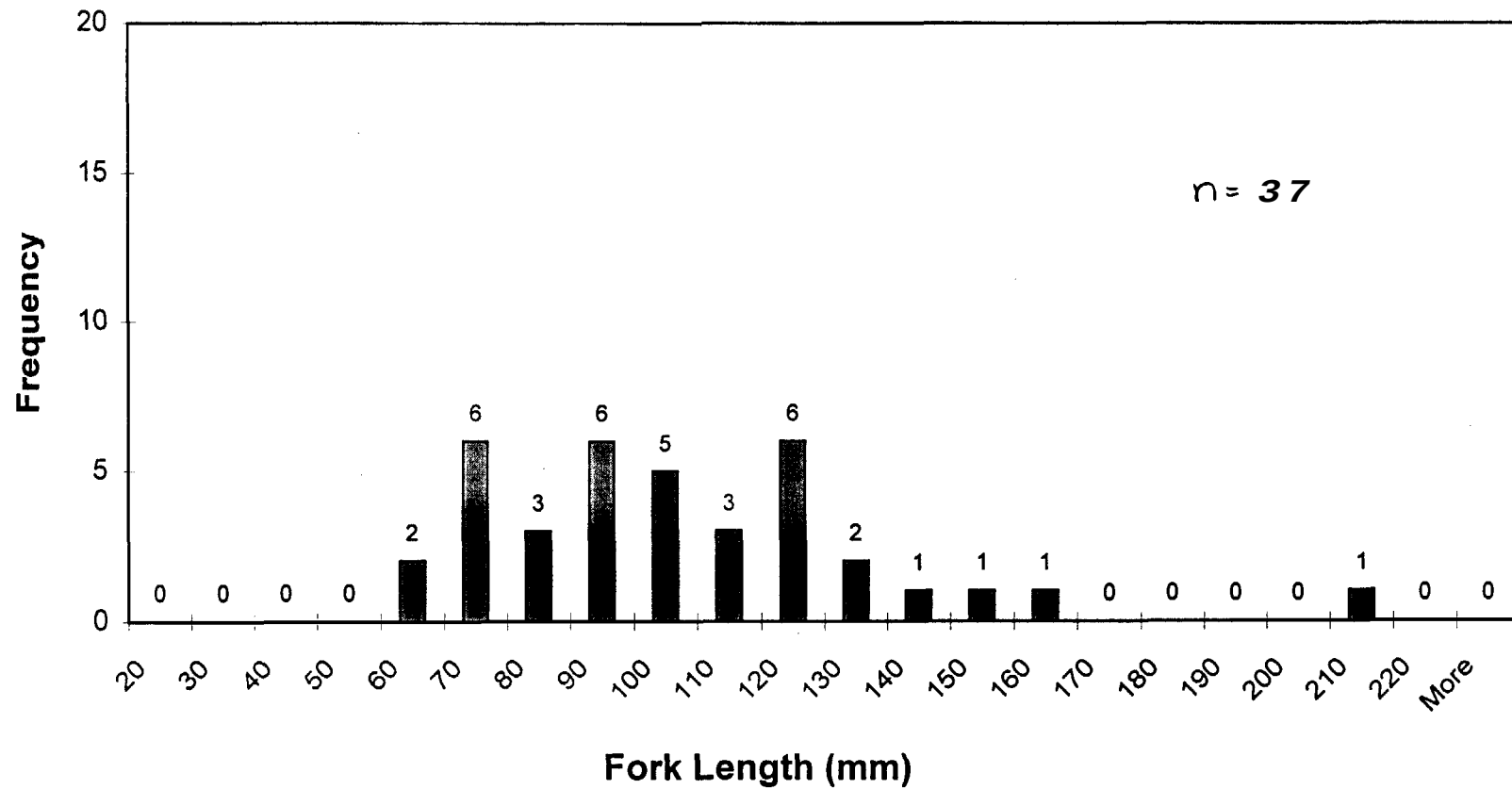
Data collected on August 14 - 24, 2000 from 10 Redwood Creek tributaries (Bond Crk., Bridge Crk., Clouquet Crk., Cole Crk., Davidson Crk., Forty Four Crk., Hayes Crk., Miller Crk., Strawberry Crk., and Tom McDonald Crk.).

COHO



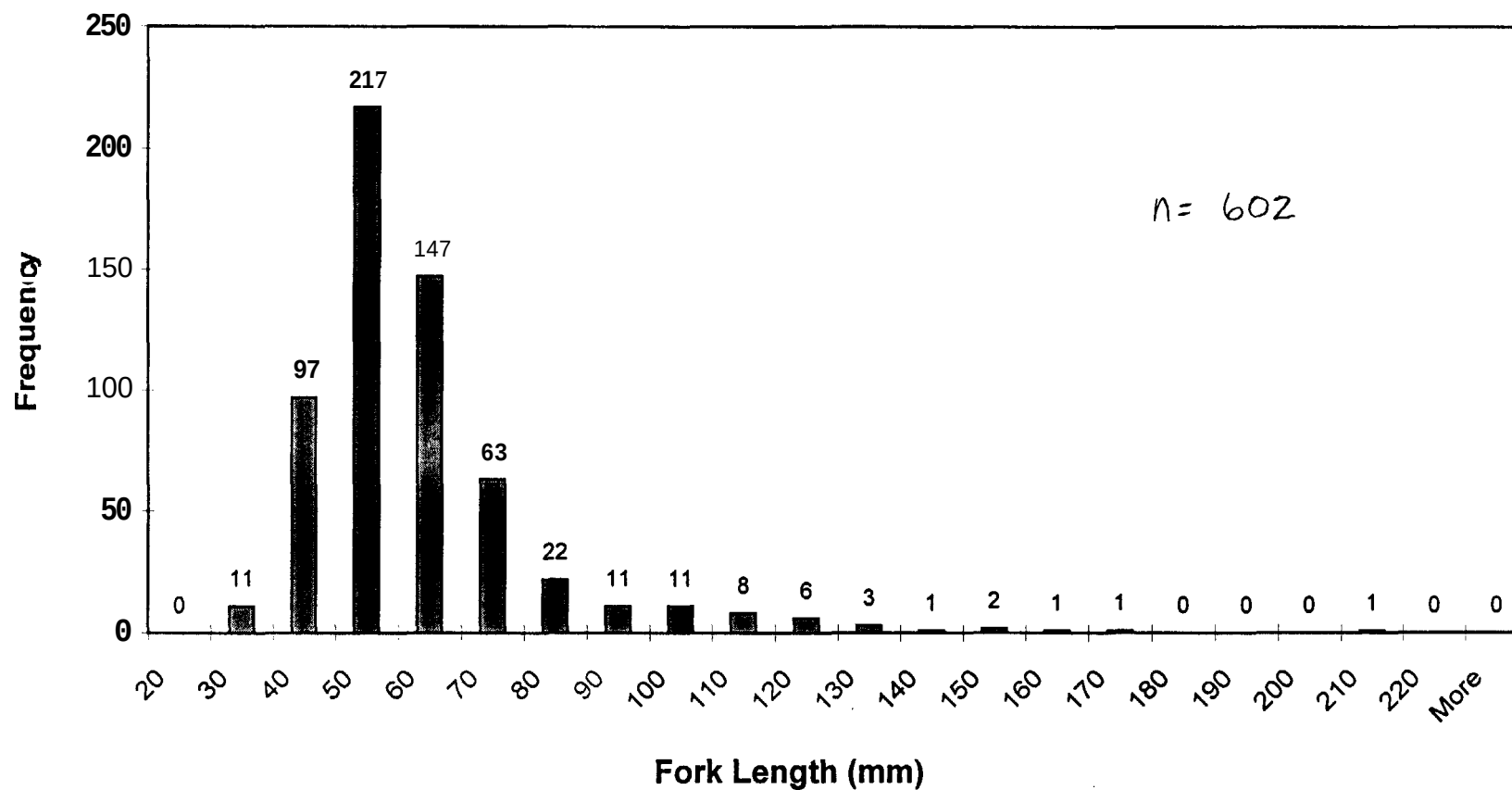
Data collected on August 14 - 24, 2000 from 10 Redwood Creek tributaries (Bond Crk., Bridge Crk., Clouquet Crk., Cole Crk., Davidson Crk., Fourty Four Crk., Hayes Crk., Miller Crk., Strawberry Crk., and Tom McDonald Crk.).

CUTTHROAT



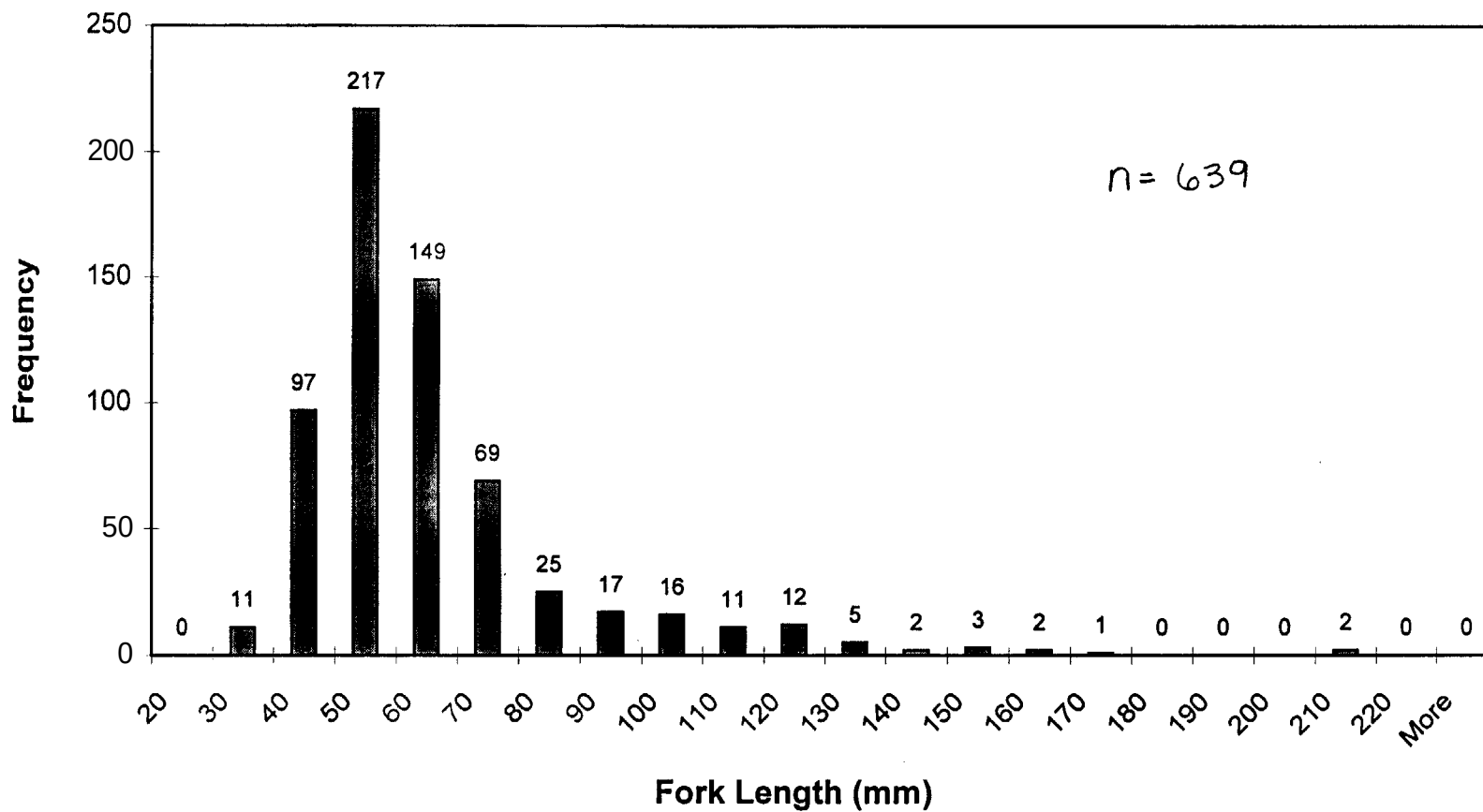
Data collected on August 14 - 24, 2000 from 10 Redwood Creek tributaries (Bond Crk., Bridge Crk., Clouquet Crk., Cole Crk., Davidson Crk., Fourty Four Crk., Hayes Crk., Miller Crk., Strawberry Crk., and Tom McDonald Crk.).

STEELHEAD



Data collected on August 14 - 24, 2000 from 10 Redwood Creek tributaries (Bond Crk., Bridge Crk., Clouquet Crk., Cole Crk., Davidson Crk., Forty Four Crk., Hayes Crk., Miller Crk., Strawberry Crk., and Tom McDonald Crk.).

COMBINED CUTTHROAT & STEELHEAD



Data collected on August 14 - 24, 2000 from 10 Redwood Creek tributaries (Bond Crk., Bridge Crk., Clouquet Crk., Cole Crk., Davidson Crk., Forty Four Crk., Hayes Crk., Miller Crk., Strawberry Crk., and Tom McDonald Crk.).

12/21/00

SHD	
Mean	56.78788
Std. Err.	2.709676
Median	59
Mode	41
Std. Dev.	15.5659
Sample Var.	242.2973
Kurtosis	1.195865
Skewness	0.664598
Range	71
Minimum	34
Maximum	105
Sum	1874
Count	33
BOND CREEK	
CUR	
Mean	120.125
Std. Err.	9.19518
Median	124
Mode	#N/A
Std. Dev.	26.0079
Sample Var.	676.4107
Kurtosis	0.097298
Skewness	0.358944
Range	82
Minimum	84
Maximum	166
Sum	961
Count	8

SHD	
Mean	64.51246
Std. Err.	1.451662
Median	56
Mode	49
Std. Dev.	24.33426
Sample Var.	592.1576
Kurtosis	8.468092
Skewness	2.512642
Range	183
Minimum	35
Maximum	218
Sum	18128
Count	281

SHD	
Mean	62.825
Std. Err.	1.934799
Median	62
Mode	52
Std. Dev.	12.23674
Sample Var.	149.7378
Kurtosis	2.916575
Skewness	1.359396
Range	63
Minimum	42
Maximum	105
Sum	2513
Count	40

SHD	
Mean	61.57143
Std. Err.	2.348831
Median	59
Mode	#N/A
Std. Dev.	6.214423
Sample Var.	38.61905
Kurtosis	0.776774
Skewness	1.074784
Range	18
Minimum	55
Maximum	73
Sum	431
Count	7

SHD	
Mean	62.98824
Std. Err.	1.305826
Median	62
Mode	56
Std. Dev.	12.03912
Sample Var.	144.9403
Kurtosis	0.350366
Skewness	0.392649
Range	63
Minimum	36
Maximum	99
Sum	5354
Count	85

DAVIDSON CREEK	
CUT	
Mean	106.6154
Std. Err.	5.184467
Median	104
Mode	95
Std. Dev.	18.69286
Sample Var.	349.4231
Kurtosis	3.857796
Skewness	1.784986
Range	71
Minimum	86
Maximum	157
Sum	1386
Count	13

COLE CREEK	
COHO	
Mean	71
Std. Err.	0.894427
Median	72
Mode	72
Std. Dev.	2.19089
Sample Var.	4.8
Kurtosis	2.135417
Skewness	-1.54047
Range	6
Minimum	67
Maximum	73
Sum	426
Count	6

DAVIDSON CREEK	
COHO	
Mean	67
Std. Err.	4.932883
Median	68
Mode	#N/A
Std. Dev.	8.544004
Sample Var.	73
Kurtosis	#DIV/0!
Skewness	-0.51947
Range	17
Minimum	58
Maximum	75
Sum	201
Count	3

12/21/00

SHD	
Mean	56
Std. Err.	1.510190
Median	55
Mode	45
Std. Dev.	6.582806
Sample Var.	43.33333
Kurtosis	0.946493
Skewness	0.875034
Range	26
Minimum	47
Maximum	73
Sum	1064
Count	19

FORTYFOUR CREEK

CUT	
Mean	95.35714
Std. Err.	10.58592
Median	74.5
Mode	70
Std. Dev.	39.60807
Sample Var.	1568.863
Kurtosis	4.974187
Skewness	2.088218
Range	143
Minimum	67
Maximum	210
Sum	1335
Count	14

SHD	
Mean	73.5
Std. Err.	3.280413
Median	73.5
Mode	#N/A
Std. Dev.	10.37358
Sample Var.	107.6111
Kurtosis	-1.31197
Skewness	0.232537
Range	30
Minimum	60
Maximum	90
Sum	735
Count	10

HAYES CREEK

COHO	
Mean	74.5
Std. Err.	3.391165
Median	71.5
Mode	66
Std. Dev.	9.591663
Sample Var.	92
Kurtosis	-0.65740
Skewness	0.966808
Range	24
Minimum	66
Maximum	90
Sum	596
Count	8

SHD	
Mean	58.73438
Std. Err.	2.057005
Median	56
Mode	56
Std. Dev.	16.45604
Sample Var.	270.8013
Kurtosis	10.20381
Skewness	3.165365
Range	87
Minimum	43
Maximum	130
Sum	3759
Count	64

STRAWBERRY CRK.

CUT	
Mean	135
Std. Err.	6
Median	135
Mode	#N/A
Std. Dev.	8.485281
Sample Var.	72
Kurtosis	#DIV/0!
Skewness	#DIV/0!
Range	12
Minimum	129
Maximum	141
Sum	270
Count	2

SHD	
Mean	63.12698
Std. Err.	1.836576
Median	59
Mode	54
Std. Dev.	14.57737
Sample Var.	212.4997
Kurtosis	8.056351
Skewness	2.257742
Range	88
Minimum	44
Maximum	132
Sum	3977
Count	63

TOM MCDONALD CRK.

COHO	
Mean	65.38462
Std. Err.	0.944203
Median	64
Mode	64
Std. Dev.	3.404371
Sample Var.	11.58974
Kurtosis	0.160387
Skewness	0.67341
Range	12
Minimum	60
Maximum	72
Sum	850
Count	13

Data collected on August 14- 24, 2000 from 10 Redwood Creek tributaries. Data is separated by tributary and species.

* Didn't not do King Salmon on Tom McDonald.