

# Memorandum

To : Files

Date: July 25, 1984

From : Department of Fish and Game

Subject: Brush Creek, Mendocino County, Population Sample, June 8, 1984

## General data

Sample date - June 8, 1984

Section Location - Brush Creek, IFIM transects 1-12 located ~1.13[KM]  
(0.7 mile) below Hwy 1 bridge

Section length - 81.1m (266 ft.)

Section width (ave.) - 6.5m (21.3 ft.)

Section area (approx.) - 526.5m<sup>2</sup> (5,666 ft<sup>2</sup>)

Flow (approx.) - 0.255m<sup>3</sup>/s (9 cfs)

Water temp. - 13.3C (56 F) @0800

Air temp. - 13.9C (57 F) @ 0800

Weather - clear

Sampling crew - Don Ward and Bill Snider

Sampling method - Mark/recapture using SRVII electrofisher; w/block nets

Fishes present - steelhead, sculpin(spps.), armoured three-spined stickleback

Fishes sampled - steelhead

## Results

One marking run and two recapture runs were made. Two SH year classes were apparently present (1983 and 1984). No aging was done, but fish >100mm (4 in.) FL were considered age 1.

## Raw data

### Run #1 (Marking run)

223 SH caught total

58 SH died

165 SH marked then released (148 age 0 and 17 age 1)

### Run #2

149 SH caught total

127 SH caught unmarked (124 age 0 and 3 age 1)

22 SH recaptured/marked (22 age 0)

(No fish marked or released between 2nd and 3rd run).

Run #3

- 80 SH caught total
- 68 SH caught (unmarked) (68 age 0)
- 12 SH recaptured/marked (10 age 0 and 2 age 1)

Estimation of Population per Section

The ratio of unmarked to marked SH was essentially the same for both runs 2 and 3.

$$\begin{array}{ll} \text{Run 2} & 127/22 = 5.78 \\ \text{Run 3} & 68/12 = 5.67 \end{array}$$

Therefore, the two runs were combined as one for the purpose of calculating the total population as follows:

$$N(\text{total}) = M(C + 1)/(R + 1) + \# \text{ dead}$$

	<u>Total :</u>	<u>100mm</u>
M (marked)	165	17
C( total caught in runs 1 and 2)	229	5
R (total recaptured in runs 1 and 2)	32	2
dead	58	0

$$N(\text{total}) = 165(229 + 1)/(32 + 1) + 58$$

$$N(\text{total}) = 1208 \text{ SH}$$

$$N = 100 \text{ mm} = 17(5 + 1)/(2 + 1) + 0$$

$$N = 100 \text{ mm} = 34 \text{ SH}$$

Confidence limits calculations (95%  $\pm$  20%).

$$\text{C.L.} \sim [\sim 2(C-R)/(C + 1)(R+2)]^{1/2}$$

$$\text{C.L. total} = \pm 163 (\pm 13.5\%)$$

$$\text{C.L. -100mm} = \pm 12 (35\%).$$

Extrapolation of SH Population Estimates

$$N(\text{total})/\text{km} = 1208 \text{ SH}/.0811\text{km}$$

$$N(\text{total})/\text{km} = 14,895 \pm 2,012 \text{ SH or}$$

$$N(\text{total})/\text{mile} = 23,978 \pm 3,238 \text{ SH}$$

$$\begin{aligned} N = 100\text{mm}/\text{km} &= 34 \text{ SH}/.0811\text{km} \\ &= 419 \pm 148 \text{ or} \end{aligned}$$

$$N = 100\text{mm}/\text{mile} = 675 \pm 238$$

$$N(\text{total})\text{m}^2 = 2.3 \text{ fish}/\text{m}^2 (9,152 \text{ fish}/\text{acre})$$

$$N = 100\text{mm}/\text{m}^2 = 0.06 \text{ fish}/\text{m}^2 (262 \text{ fish}/\text{acre})$$

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Fisheries Biologist

hrf

c: W. Jones R-3, R-3

6-6-84

Brush Creek (Mendo. Co) SH juvenile pop'n sampling

Size class (mm)											
0- 24											
25- 49											
50- 74											
75- 99											
100-124											
125-149											
150-174											
175-199											
200-224											
225-249											
250-274											
275-299											
300-324											
325-349											
350-374											
375-399											
400-424											
425-449											
450-474											
475-499											
500-524											
525-549											
550-574											
575-599											
600+											

Ave FL total = 54 mm

Ave FL < 100mm = 51 mm

Ave FL > 100mm = 122 mm

(1) (6) (13) (32) (34) (18)

### CURVE FORMULAS

$$T = R \tan \frac{1}{2} I$$

$$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$$

$$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$$

$$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$$

$$R = T \cot. \frac{1}{2} I$$

$$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$$

$$E = R \text{ ex. sec } \frac{1}{2} I$$

$$E = T \tan \frac{1}{2} I$$

$$\text{Chord def.} = \frac{\text{chord}^2}{R}$$

$$\text{No. chords} = \frac{1}{D}$$

$$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

### GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. 10.  $10^2 + 200 = 5.100 + 3 = 100.5$  hyp.

Given Hyp. 100, Alt.  $25.25^2 + 200 = 3.125.100 - 3.125 = 96.875$  = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to  $0.674d^2$ , where  $d$  is the distance in miles. The correction for curvature alone is closely,  $\frac{1}{2}d^2$ . The combined correction is negative.

PROBABLE ERROR. If  $d_1, d_2, d_3$ , etc. are the discrepancies of various results from the mean, and if  $\sum d^2$  = the sum of the squares of these differences and  $n$  = the number of observations, then the probable error of the mean =  $\pm 0.6745 \sqrt{\frac{\sum d^2}{n(n-1)}}$

### MINUTES IN DECIMALS OF A DEGREE

1'	.0167	12'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	13	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	14	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	15	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	16	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	17	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	18	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	19	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	20	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	21	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

### INCHES IN DECIMALS OF A FOOT

1-16	3-32	1/4	3-16	1/2	5-16	3/4	7/8	1	1.0000
.0625	.03125	.0625	.1875	.2500	.3125	.3750	.4375	.5000	
1	2	3	4	5	6	7	8	9	10
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333
									.9167

BRUSH CREEK  
Mendocino Co.

June 6, 1984

pop'n estimate  
SRM / Mark / recapture

Transect 1-12 IFIM  
Section

Don Ward  
Bill Smider

20800

wt = 56 F

at = 57 F

flow ~ 9 cfs

weather - clear

section length = 226 ft.

Bush Creek Mendoc. Co.  
 IFIM transect  
 Electro-fishing survey  
 6-6-84 0800-1300  
 Juvenile SH

MARKING RUN (FL in mm)

54	58	50	58	60	50
48	51	52	55	50	65
75	49	85	55	35	45
68	34	52	34	49	53
59	94	50	75	49	52
59	55	50	55	30	34
65	54	50	85	131	36
37	59	57	75	65	38
55	55	50	86	95	35
50	50	46	67	60	45
36	120	60	62	40	27
45	130	48	55	115	36
36	106	110	75	58	35
56	67	170	80	80	30
57	115	120	50	83	46
47	65	132	72	72	
50	115	115	48	36	
46	57	50	74	69	
48	75	50	52	49	
54	65	52	55	54	

marking (cont.)

36	49	50	54	58	
64	73	60	52	67	
50	50	59	81	58	
50	52	60	60	55	
107	67	56	50	76	
111	55	49	36	68	
49	80	53	53	75	
135	65	59	46	45	
125	60	51	56	63	
125	47	55	55	34	
dead					
84	65	65	55	53	39
57	65	53	50	35	32
68	57	47	64	36	28
78	71	35	33	54	38
52	35	29	50	36	43
68	57	44	48	47	34
48	55	51	35	46	38
45	37	30	64	32	32
53	46	52	59	34	
44	36	46	43	39	

Run #2

unmarked

55	65	50	46	59	51
55	45	50	54	50	43
61	85	60	46	47	40
54	37	55	43	49	39
45	48	58	55	46	47
53	85	36	49	34	50
54	71	56	44	42	59
32	52	45	63	43	70
55	80	47	41	45	40
114	54	33	48	52	48
119	53	35	44	47	44
120	34	39	50	50	55
60	53	34	53	55	44
60	50	53	80	45	50
60	57	28	78	45	44
52	35	31	43	48	44
53	37	45	60	62	44
54	60	35	60	50	55
55	43	44	50	57	43
57	52	49	32	52	71

Run #2 (unmarked) cont.

Summary RIERE

Run #1

37

36

42

37

35

29

52

165 marked

58 dead

223 total

Run #2 127 unmarked

22 marked

149 total

Run #2 (marked)

54

53

44

47

62

50

95

52

65

70

47

45

45

45

85

55

54

65

49

48

57

47

Run #3

unmarked

67	48	50	34
59	73	31	34
53	53	32	37
50	62	30	47
75	52	54	34
51	37	35	45
35	55	50	32
58	55	50	30
53	49	61	
46	76	33	

54	51	50	
75	50	34	
54	63	34	
31	50	54	
95	34	30	
50	52	24	
50	59	37	
75	39	36	
55	55	37	
59	28	38	

Run #3 (cont.)

marked

75	58
130	60
115	
50	
54	
54	
52	
75	
60	
46	

Run #3

68 unmarked  
12 marked  
80 total

Summary (total)

362 fish captured

$M = 165$

$Q = 229$

$R = 32$

#dead = 58

$$N = \frac{165(229+1)}{(32+1)} + 58$$

$$= 1208$$