

Length and Age Composition of English Sole (*Parophrys Vetulus*) in Commercial Landings from North Hecate Strait, British Columbia

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LENGTH AND AGE COMPOSITION OF ENGLISH SOLE
(PAROPHRYS VETULUS) IN COMMERCIAL LANDINGS
FROM NORTH HEcate STRAIT, BRITISH COLUMBIA

1973-1979

by

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ABSTRACT

Bennett, D. M. A., and M. Stocker. 1980. Length and age composition of English sole (Parophrys vetulus) in commercial landings from north Hecate Strait, British Columbia, 1973-1979. Can. Data Rep. Fish. Aquat. Sci. 190.

This report provides tables summarizing age, length and sex information collected from commercial landings of English sole (Parophrys vetulus) from northern Hecate Strait (Area 5D) from 1973-1979. Ages were determined from surface readings of otoliths, otolith sections, and burned sections.

RÉSUMÉ

Bennett, D. M. A., and M. Stocker. 1980. Length and age composition of English sole (Parophrys vetulus) in commercial landings from north Hecate Strait, British Columbia, 1973-1979. Can. Data Rep. Fish. Aquat. Sci. 190.

Le rapport présente des tableaux qui résument les données sur l'âge, la longueur et le sexe, recueillies à partir des débarquements commerciaux de plie grand-père (Parophrys vetulus) provenant du nord du détroit d'Hécate (zone 5D), entre 1973 et 1979. On a déterminé l'âge à partir d'examens superficiels des otolithes, de sections d'otolithes et par la méthode de brûlage.

INTRODUCTION

English sole (Parophrys vetulus) occurs in commercial quantities along Canada's west coast and is generally distributed from Western Alaska to Baja California (Hart 1973). Sampling of commercial catches from Canadian grounds has been carried out since 1944 by personnel of the Fisheries Research Board of Canada and more recently the Department of Fisheries and Oceans. During the period 1944-1979 the fishing grounds in Area 5D (see Fig. 1) have been the primary source of landings, contributing about 67% of the total Canadian English sole landings, averaging 590 metric tons annually.

This report summarizes age, length and sex information of English sole sampled from commercial landings from the Butterworth Rocks-Two Peaks region of Hecate Strait during the period 1973-1979. Earlier publications present similar information for the years 1944-1971 (Ketchen 1956; Forrester et al. 1973).

Only those otolith samples collected between April and July, following post-spawning migration, are included in this summary. No such samples were collected in 1972. Appendix Table 1 summarizes the samples examined.

Previous age determination of English sole was done using surface readings of otoliths. For the present report ages were determined using surface readings, examining sections of otoliths, and examining burned sections. The latter techniques have resulted in discovering older maximum ages for both sexes; 22 for males, 19 for females. Details of these methods are outlined in Williams and Bedford (1974). It is noted that the resolved ages reported are not validated. Agreement between the ages as determined by two readers was very good.

Tables 1-14 provide for each year a summary of length and age composition by sex based on the number of samples read. On the right hand side of each table, the seasonal length frequency is expressed in numbers and percentage of the total in each centimeter length interval. The average length and age appear in the second line of the table heading. Across the bottom of each table are given the number and percentage of the total in each age group, the average length of fish at each age, and its standard deviation. Where ages exceed 20 years, footnotes provide precise ages.

The collection of samples from the commercial fishery was made under the supervision of R. M. Wowchuk and N. Venables.

Doris Chilton provided the ages for the 1973 samples and valuable direction and support throughout the ageing project.

The data were programmed for output on the Xerox 530 under the supervision of J. Thomson.

REFERENCES

Forrester, C. R., D. E. Chilton and J. E. Smith. 1973. Length and age composition of English sole (Parophrys vetulus) in commercial landings from north Hecate Strait, British Columbia, 1953-1971. Fish. Res. Board Can. MS Rep. 1269: 43 p.

Hart, J. L. 1973. Pacific fishes of Canada. Bull. Fish. Res. Board Can. 180: 740 p.

Ketchen, K. S. 1956. Factors influencing the survival of the lemon sole (Parophrys vetulus) in Hecate Strait, British Columbia. J. Fish. Res. Board Can. 13: 647-694.

Williams, T. and B. C. Bedford. 1974. The use of otoliths for age determination, p. 114-123. In T. B. Bagenal [ed] Proc. Symp. Ageing of Fish. The Grensham Press, Old Woking, Surrey. 234 p.

KEY TO ABBREVIATIONS IN THE FOLLOWING TABLES

YC = year class

AG = age in completed years

CM = column headings of centimeter length groups

NO = number

PC = per cent frequency

AL = average length in centimeters

SD = standard deviation (not calculated for age frequencies containing fewer than 15 individuals)

Appendix Table 1. Summary of samples examined.

Year	Otolith code numbers	Dates caught	Locality	Ageing methods			Sex composition		
				SFC. ^a	SEC. ^b	BUR. ^c	M	F	T
1973	Y1808- 1835	Aug 30- Sep 4	Butterworth	X			14	238	252
1973	Z8652- 8683	June 12-13	Butterworth	X			151	157	308
1974	Z9974- A0008	July 14-15	Two Peaks			X	53	245	298
1975	A0616- 0645	April 11-15	Butterworth			X	100	156	256
1975	A0646- 0674	April 14-18	Butterworth	X	X		100	209	309
1975	Y1942- 1971	May 24-25	Butterworth	X	X		122	219	341
1976	Y1972- 1978	April 28-29	Butterworth	X		X	55	178	233
1976	A1320- 1340	May 13-14	Butterworth	X		X	21	137	158
1976	A1439- 1467	June 2-6	Butterworth			X	94	142	236
1977	Y2721- 2754	April 27	Butterworth			X	168	210	378
1977	Y2818- 2848	May 6-9	Butterworth			X	99	117	216
1977	Y2849- 2876	May 11-13, 15	Two Peaks			X	118	83	201
1977	Y2877- 2915	May 9-15	Two Peaks			X	157	138	295
1977	Y3021- 3048	July 22-26	Two Peaks			X	51	219	270

Appendix Table 1 cont'd.

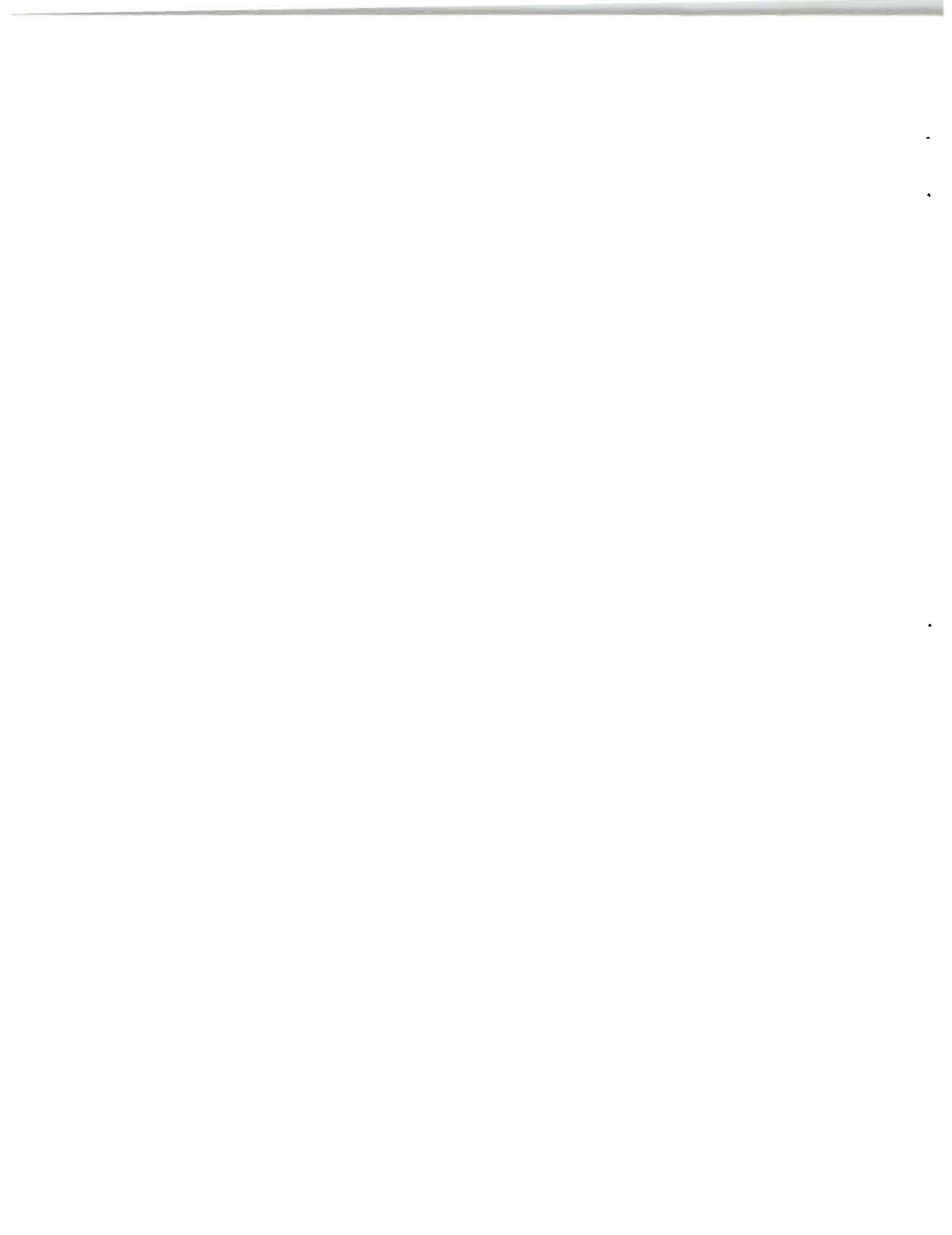
Year	Otolith code numbers	Dates caught	Locality	Ageing methods			Sex composition		
				SFC.	SEC.	BUR.	M	F	T
1978	Y5184- 5219	July 12, 14	Butterworth			X	141	101	242
1979	Y8007- 8027	April 20-22	Butterworth			X	16	24	40
1979	Y8466- 8503	May 2, 4, 6	Two Peaks			X	125	284	409
1979	Y8621- 8654	May (17) ^d	Butterworth- Two Peaks			X	120	107	227
1979	Y8868- 8893	June (11) ^d	Butterworth- Two Peaks			X	113	111	224

^aSurface readings

^bSections of otoliths

^cBurned sections

^dIndicates landing date



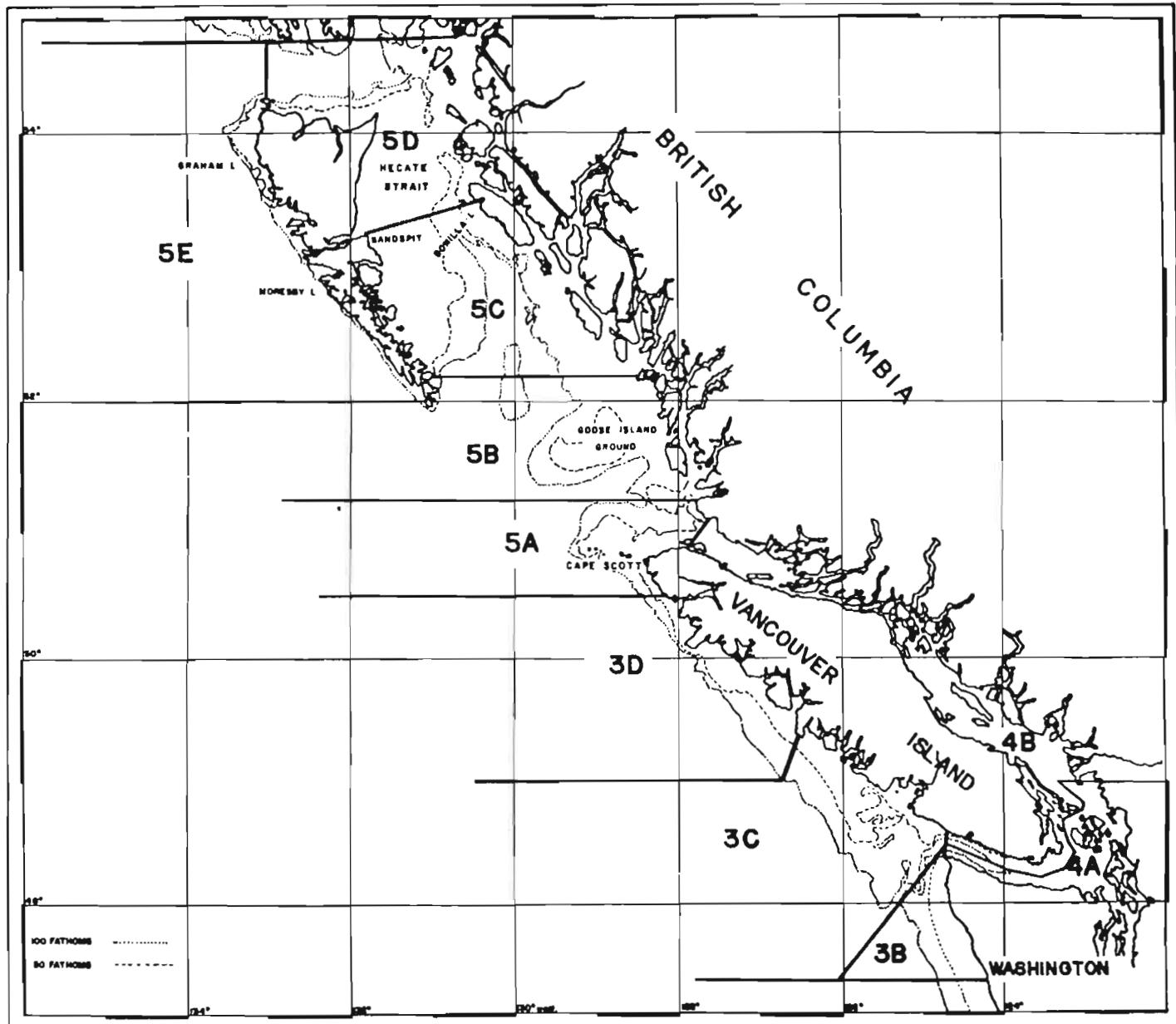


Fig. 1. International (Pacific Marine Fisheries Commission) statistical areas along the British Columbia coast.



TABLE 1. ENGLISH SOLE, AREA 50, BUTTERWORTH-TWO PEAKS, 1973.

FEMALES 1973 SAMPLE AV LENGTH 39.5 CM SAMPLE AV AGE 5.1 YRS

TABLE 2. ENGLISH SULE, AREA SD, BUTTERWORTHTAU PEAKS, 1973.

TABLE 3. ENGLISH SOLE, AREA 50, GUTTERWORTH-TWO PEAKS, 1974.

FEMALES 1974 SAMPLE AV LENGTH 40.0 CM SAMPLE AV AGE 5.4 YRS

TABLE 4. ENGLISH SOLE, AREA 5D, BUTTERWORTH-TWO PEAKS, 1974.

MALES 1974 SAMPLE AV LENGTH 36.7 CM SAMPLE AV AGE 7.2 YRS

YC	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	20+	NO.	PC
AG	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	NO.	PC
CM																					
31																					
32	1	2																		3	5.7
33	3																			3	5.7
34	4		1																	5	9.4
35	6	1	2																	9	17.0
36	3	1	2	1	1															9	17.0
37		1	2	2																6	11.3
38																				3	5.7
39		1	1		1															5	9.4
40					2															5	9.4
41			1																	3	5.7
42																				1	1.9
43																				1	1.9
44																					
45																					
46																					
47																					
48																					
49																					
50																					
51																					
52																					
NO	1	18	4	9	5	2													2	53	
PC	1.9	34.0	7.5	17.0	9.4	3.8													3.8		100.0
AL	32.0	34.3	36.8	36.7	38.0	37.5													41.0		
SD																					

TABLE 5. ENGLISH SOLE, AREA 5D, BUTTERWORTH-THO PEAKS, 1975.

FEMALES 1975 SAMPLE AV LENGTH 37.5 CM SAMPLE AV AGE 5.4 YRS

TABLE 6. ENGLISH SOLE, AREA 5D, BUTTERWORTH-TWO PEAKS, 1975.

MALES 1975 SAMPLE AV LENGTH 34.4 CM SAMPLE AV AGE 6.0 YRS

TABLE 7. ENGLISH SOLE, AREA 50, BUTTERWORTH-TWO PEAKS, 1976.

FEMALES 1976 SAMPLE AV LENGTH 40.5 CM SAMPLE AV AGE 5.7 YRS

TABLE 8. ENGLISH SOLE, AREA 50, BUTTERWORTH-TWO PEAKS, 1976.

MALES 1976 SAMPLE AV LENGTH 36.6 CM SAMPLE AV AGE 7.4 YRS

YC	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	20+	NU.	PC
AG	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
CM																					
32		3	2																	5	2.9
33		4	7	1				1												13	7.6
34			11	14	1															26	15.3
35			3	9	4	3	1													20	11.8
36		1	3	9	5	4	2													24	14.1
37			3	7	2	1	2	1												17	10.0
38			2	5	3	5	4	1												21	12.4
39			1		1	6	6	1												20	11.8
40				1	3	4		1	1											13	7.6
41				1			1		1											8	4.7
42								1												2	1.2
43																					
44																					
45																					
46																			1	0.6	
47																					
48																					
49																					
50																					
51																					
52																					
NU		8	32	47	19	23	17	4	3										170		
PC		4.7	18.8	27.6	11.2	13.5	10.0	2.4	1.8											100.0	
AL		33.0	34.6	35.7	36.9	37.8	37.7	38.5	41.0												
SD		1.81	1.73		1.72																

TABLE 9. ENGLISH SULE, AREA 50, BUTTERWURTH-TRU PEAKS, 1977.

FEMALES 1977 SAMPLE AV LENGTH 38.7 CM SAMPLE AV AGE 5.2 YRS

TABLE 10. ENGLISH SOLE, AREA 50, BUTTERWORTH-TWO PEAKS, 1977.

MALES 1977 SAMPLE AV LENGTH 35.1 CM SAMPLE AV AGE 6.6 YRS

YC	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	NU.	PL
AG	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	
CM																				
29	1	2																	3	0.5
30	0	3																	9	1.5
31	4	10	3	1															18	5.0
32	5	10	14	7															42	7.1
33	7	15	30	11	2				2	1									68	11.5
34	1	16	35	42	17	2	2	1											116	19.6
35	1	9	26	43	19	2	0	4											110	18.5
36	3	14	27	20	4	7	1	3											80	13.5
37		2	20	18	4	9	2	1	1										59	9.9
38			3	5	5	6	6		2	3	1	1							32	5.4
39			1	1	4	3	4	1	1	1									17	2.9
40				1	3	3	3	1		2	2	1	2		1	1	1	15	2.5	
41					1	3	3	1		2	2	1	2		1	1	1	16	2.7	
42						1	1	1		1								4	0.7	
43							1											1	2	0.3
44																		1	1a	0.3
45																				
46																				
47																				
48																				
49																				
50																				
51																				
52																				
53																				
NO	1	26	72	126	155	88	18	39	26	7	4	7	5	6	5	2	1	2	3	593
PC	0.2	4.4	12.1	21.2	26.1	14.8	3.0	6.6	4.4	1.2	0.7	1.2	0.8	1.0	0.8	0.3	0.2	0.3	0.5	100.0
AL	29.0	31.6	33.0	34.0	34.9	35.9	36.7	36.9	38.0	38.1	38.0	39.3	40.0	38.2	40.2	41.5	41.0	42.0	42.7	
SD		1.58	1.51	1.48	1.43	1.61		2.12	2.46											

^a21 year old
^b22 year old

TABLE 11. ENGLISH SOLE, AREA 50, BUTTERWORTH-TWO PEAKS, 1978.

FEMALES 1978 SAMPLE AV LENGTH 39.6 CM SAMPLE AV AGE 5.4 YRS

TABLE 12. ENGLISH SOLE, AREA 50, BUTTERWORTH-TWO PEAKS, 1978.

MALES 1978 SAMPLE AV LENGTH 35.3 CM SAMPLE AV AGE 6.8 YRS

TABLE 13. ENGLISH SOLE, AREA 5D, BUTTERWORTH-TWO PEAKS, 1979.

FEMALES 1979 SAMPLE AV LENGTH 59.0 CM SAMPLE AV AGE 5.1 YRS

TABLE 14. ENGLISH SUE, AREA 50, BUTTERWORTH-TWO PEAKS, 1979.

MALES 1979 SAMPLE AV LENGTH 35.4 CM SAMPLE AV AGE 6.9 YRS