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Status in 1980 of the Cod Stock in Divisions 2J3KL

by

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INTRODUCTION

Nominal catches in the period 1965-69 averaged about 650,000 MT but declined to an average of 200,000 MT in 1975-79. The decline in catches coincided with a decline in catch rates implying a decrease in the biomass of the stock. Catch restrictions were introduced in 1973 on the basis of fishing at the  $F_{max}$  level. The STACRES report of its meeting of May-June 1976 (Redbook 1976) advised ICNAF that TAC's for 1977 should be based on management objectives different from those associated with  $F_{max}$  or  $F_{MSY}$ . In fact, the management strategy since 1977 has been to limit catches to a level consistent with fishing at the  $F_{0.1}$  or lower level.

AGE COMPOSITION OF THE CATCHES, 1962-80

The age compositions for 1962-78 were taken from Wells and Bishop (1980). The 1979 age composition was adjusted slightly to take into account revised catch statistics. The 1980 age composition was based on extensive sampling (Tables 1 and 2) of both the inshore and offshore sectors of the fishery in all three divisions. In 1980 the 1973, 1974 and 1975 year-classes predominated in the fishery (Tables 3, 4 and 5).

COHORT ANALYSIS

Weights at age for 1980 were derived from the conversion of average lengths at age in the commercial sampling. These values were similar to those of 1979 (Tables 6 and 7). The partial recruitment pattern was derived from the average

pattern of distribution of fishing mortalities with age for the period 1972-78  
(Table 8).

The results of a cohort analysis incorporating the usual natural mortality value of 0.2 and a terminal fishing mortality of 0.17 were not very dissimilar from that of Wells and Bishop (1980) (Tables 9 and 10). The regression of mean biomass of the stock (numbers of cod present half-way through the year X average weights at age) against catch rates (Gavaris 1981) was good for the period 1962-78. An even better relationship ( $r^2 = 0.93$ ) is evident if the values for 1974, 1975 and 1976 are excluded in the series 1962-78.

While a wide range of terminal F values provide biomass estimates well correlated with catch rates, an indication of the appropriateness of the terminal F is also given by the biomasses predicted from the regressions for the years 1979 and 1980 (Table 11).

#### YIELD PER RECRUIT

The value of 0.2 had been used as the  $F_{0.1}$  level for some years. The latest calculation available is that of Wells and Bishop (1980).

#### SURVEY RESULTS

The catch at age per standard tow in Canadian research vessel surveys show considerable variation (Tables 12, 13 and 14) between divisions. The catch per tow in USSR research vessel surveys is also available (Bulatova et al. 1981). No attempt has been made here to estimate the strength of the most recent recruiting year-classes from these research data.

#### References

WELLS, R., and C. A. BISHOP. 1980. Some recent changes in the status of the cod stock in Divisions 2J+3KL. NAFO SCR Doc. 80/VI/101, Serial No. N156.

BULATOVA, A. Y., V. M. KISELEVA, K. G. KONSTANTINOV, A. I. POSTOLAKY, and V. A. CHEKHOVA. 1981. Preliminary assessment of some demersal fish stocks in the Newfoundland and Labrador areas. NAFO SCR Doc. 81/VI/18, Serial No. N294.

Table 1. Sampling available from Canadian observers at sea for determination of age composition of catches of cod in Division 2J3KL, 1980.

Country	Division	Gear	Quarter	No. aged	Month	No. measured
Canada	2J	OT	1	445	Jan.	202
			2	190	Feb.	11,863
		OT	1	114	Apr.	848
			2	491	May	2,030
			1	247	Feb.	1,126
	3K	OT	2	16	Mar.	4,397
			1	89	Apr.	3,155
		OT	2	164	May	5,858
			1	18	June	459
			2	163	May	200
			2	97	June	1,584
France	3L	OT	2	227	May	3,128
			1	227	June	211
FRG	2J	OT	2	164	Apr.	7,236
			1	18	May	339
Japan	3L	OT	4	62	Nov.	2,063
			3	135	Dec.	2,811
Norway	2J	OT	2	18	May	442
	3K	OT	2	163	Apr.	3,656
Poland	2J	OT	1	97	Feb.	4,038
Portugal	2J	OT	1	227	Feb.	9,505
		OT	2	263	Apr.	6,294
		GN	3	135	July	1,532
		GN	4	55	Aug.	1,914
		GN	3	421	Sept.	2,958
		GN	4	413	Oct.	409
Portugal	3K	OT	1	88	Feb.	2,097
			2	148	Mar.	200
	3L	OT	1	148	Feb.	4,170
			2	148	Mar.	3,636
Portugal	3L	OT	4	247	Oct.	2,604
			3	247	Nov.	17,351
			4	243	Dec.	7,785
	3L	GN	3	421	June	4,433
		GN	4	413	July	14,884
		GN	3	54	Aug.	8,219
Spain	3K	PT	2	97	Sept.	6,579
	3L	PT	2	85	Oct.	8,844
			3	54	May	10,159
			4	243	June	3,616
			3	54	July	9,027
			4	243	Oct.	744
			3	243	Nov.	3,447
			4	243	Dec.	2,047

Table 2. Sampling available from Canadian observers at port of landing.

Division	Gear	Quarter	No. aged	Month	No. measured
2J	OT	1	455	Feb.	5,203
		2	386	Apr.	1,189
	Trap	3	415	May	2,420
		3		Aug.	4,450
	GN			Aug.	3,782
	3K	1	442	Feb.	1,935
		2	529	Mar.	2,719
		Trap	794	Apr.	7,707
			402	May	418
	GN	3		July	10,720
		4		Sept.	193
3L	LT	3		July	3,194
		4		Sept.	199
	HL	3		July	494
		4		July	4,935
	OT			Sept.	4,347
		1	400	Feb.	736
		2	448	Mar.	3,673
		Trap	76	Apr.	371
			444	May	1,642
		3		June	3,383
3L	GN	4		Aug.	274
		3	669	Oct.	1,169
	LT	2	484	Nov.	861
		3		Dec.	1,380
	HL	4	465	June	5,147
		4		July	1,205
	OT	3		Apr.	628
		4		May	1,626
		3		June	314
		4		July	776
		4		Oct.	280
		4		Sept.	401
3L	GN	3		Oct.	459
		4		June	2,025
	LT	3		July	1,013
		4		Aug.	446
	HL			Sept.	1,778

Table 3. Estimated age compositions of cod taken in Divisions 2J3KL by the offshore fleet.

Age	Otter trawl								Subtotal	Total
	Canada	France	FRG	GDR	Poland	Portugal	Spain			
2						1	10	11	11	
3	42		3			8	27	80	81	
4	1,241	11	34	2	10	132	161	1,591	1,603	
5	11,415	87	737	70	184	1,094	1,220	14,807	14,920	
6	12,801	140	959	143	163	1,063	1,611	16,880	17,009	
7	5,247	37	657	56	95	473	479	7,044	7,098	
8	989	7	82	11	12	72	106	1,279	1,289	
9	224		19	4	3	15	19	284	286	
10	116		11	4	2	9	10	152	153	
11	57		5		1	3	4	70	71	
12	51		3			2	3	59	59	
13	19							19	19	
14	4		2					6	6	
15	3							3	3	
16	3						1	4	4	
>16	6							6	6	
Total	32,218	282	2,512	290	470	2,872	3,651	42,295	42,618	
Av wt	1.71	1.86	1.69	1.81	1.56	1.56	1.92	1.72	1.72	
Catch	55,213	527	4,250	524	733	4,492	7,005	72,744	73,301	

Age	Longline		Gill net Portugal
	Norway	Total	
4	1	1	13
5	51	74	438
6	132	191	601
7	116	168	112
8	27	39	29
9	5	7	1
10	2	3	1
11	1	1	
Total	335	484	1,195
Av wt	2.08	2.08	2.17
Catch	695	1,006	2,592

Table 4. Estimated age compositions of cod taken in Divisions 2J3KL by the Canadian inshore fleet.

Age	Trap	Gill net	Hand line	Line trawl	Subtotal inshore	Total inshore*	
2	76		2		78		78
3	2,123	12	194	107	2,436		2,437
4	8,170	211	1,125	636	10,142		10,169
5	7,867	903	1,995	1,778	12,543		12,608
6	4,243	2,582	2,001	2,161	10,987		11,077
7	2,244	4,774	1,039	1,563	9,620		9,808
8	287	2,019	293	685	3,284		3,309
9	36	597	48	196	877		883
10	14	225	11	84	334		337
11	3	102	5	46	156		157
12	3	93	8	62	166		167
13		28		7	35		35
14		35	3	19	57		58
15		24		10	34		34
16		5		4	9		9
17		8			8		8
18				12	12		12
19		3			3		3
20		3		7	10		10
>20							
Total	25,066	11,624	6,724	7,377	50,791		51,199
Av wt	1.18	2.96	1.70	2.33	1.82		1.83
Catch	29,604	34,427	11,417	17,206	92,654		93,520

\*The 866 tons for which appropriate samples were not available were adjusted on the basis of the total inshore of Division 2J.

Table 5. Estimated age composition of cod taken in Divisions 2J3KL in 1980.

Age	Otter trawl	Gillnet	Longline	Inshore gears	Grand total	Calculated biomass
2	11			78	89	36
3	81			2,437	2,518	1,332
4	1,603	13	1	10,169	11,786	9,028
5	14,920	438	74	12,608	28,040	32,582
6	17,009	601	191	11,077	28,878	49,786
7	7,098	112	168	9,808	17,186	40,989
8	1,289	29	39	3,309	4,666	16,681
9	286	1	7	883	1,177	5,923
10	153	1	3	337	494	2,763
11	71		1	157	229	1,542
12	59			167	226	1,784
13	19			50	69	602
14	6			58	64	643
15	3			19	22	248
>15	10			42	52	690
Total	42,618	1,195	484	51,199	95,496	
Av wt	1.72	2.17	2.08	1.83	1.78	
Catch	73,301	2,592	1,006	93,520	170,419	164,629

Table 6. Average lengths at age of cod removed by the fishery in Divisions 2J3KL in 1980.

Age	Otter trawl	Gill net	Long line	Inshore gears	Grand total	Average weight <sup>1</sup>
2	32.70			37.00	36.47	.410
3	40.67			39.58	39.62	.529
4	45.51	51.19	47.46	44.53	44.67	.766
5	51.41	58.08	52.80	50.52	51.12	1.162
6	57.46	63.26	59.35	58.73	58.08	1.724
7	63.32	63.88	64.44	65.34	64.52	2.385
8	70.47	74.81	69.11	74.81	73.56	3.575
9	78.92	88.98	75.14	83.27	82.17	5.032
10	80.07	89.57	74.16	87.37	85.03	5.593
11	85.80		77.26	92.42	90.30	6.734
12	91.10			96.47	95.07	7.894
13	89.69			101.45	98.21	8.728
14	90.40			104.06	102.78	10.044
15	105.15			106.93	106.69	11.271
>15	116.67			111.49	112.49	13.272

<sup>1</sup>Using log wt = 3.088 log fork length - 5.2106.

Table 7. Catch at age ( $\times 10^{-5}$ ) and average weight at age (kg) of cod in Divisions 2J3KL.

	CATCH AT AGE 2J-3KL COD											29/ 4/81		
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
4	267	271	267	280	663	785	916	381	572	690	798	407	138	150
5	658	592	563	456	942	1009	1990	964	773	921	1166	945	355	259
6	600	1159	590	655	632	972	1450	1534	940	944	762	592	747	347
7	486	579	981	629	598	553	809	1006	788	557	560	353	613	389
8	284	288	498	671	307	388	379	493	269	241	296	273	361	356
9	207	152	202	334	240	172	224	184	100	113	118	142	186	133
10	186	114	118	147	88	161	76	115	36	43	64	76	102	77
11	108	81	84	68	47	60	54	60	19	21	30	38	55	24
12	98	41	61	37	23	34	34	42	11	12	17	22	29	13
13	80	39	48	39	18	21	19	28	5	11	14	12	10	9
	1976	1977	1978	1979	1980									
4	644	528	169	121	118									
5	346	464	396	382	280									
6	251	143	213	302	289									
7	180	62	83	116	172									
8	149	38	32	36	47									
9	113	33	15	14	12									
10	45	20	11	8	5									
11	19	8	4	6	2									
12	7	3	2	2	2									
13	4	3	1	1	1									
	WEIGHT AT AGE 2J3KL COD											29/ 4/81		
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973		
4	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
5	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
6	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
7	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
8	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12
9	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64
10	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18
11	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76
12	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15
13	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06
	1974	1975	1976	1977	1978	1979	1980							
4	0.55	0.55	0.55	0.77	0.70	0.74	0.77							
5	0.88	0.88	0.88	1.02	0.99	1.12	1.16							
6	1.23	1.23	1.23	1.73	1.59	1.68	1.72							
7	1.66	1.66	1.66	2.51	2.53	2.49	2.39							
8	2.12	2.12	2.12	3.29	3.40	3.60	3.58							
9	2.64	2.64	2.64	3.99	4.26	4.46	5.03							
10	3.18	3.18	3.18	4.81	4.75	5.31	5.59							
11	3.76	3.76	3.76	5.61	5.51	5.86	6.73							
12	4.15	4.15	4.15	6.48	7.32	7.18	7.89							
13	6.06	6.06	6.06	8.05	8.25	9.02	8.73							

Table 8. Percentage distribution of fishing mortality at age with respect to the average fishing mortality on ages 7-10. The fishing mortalities were derived from a cohort run at F.15.

Age	1972	1973	1974	1975	1976	1977	1978	1979	Average
4	.40	.53	.17	.14	.29	.28	.08		0.27
5	.72	.86	.46	.39	.49	.73	.37		0.57
6	.87	.69	.84	.72	.75	.79	.70		0.77
7	1.02	.83	.86	.89	.95	.84	1.04		0.92
8	1.06	1.14	1.15	1.10	.92	1.08	.99		1.06
9	.86	1.18	1.14	1.03	1.19	1.08	1.04		1.07
10	.84	1.23	1.34	1.23	1.10	1.40	.86		1.14
11	.83	1.07	1.50	.75	1.04	1.17	.70		1.01
12	.62	1.40	1.21	.98	.45	.88	.69		0.89
13	.94	.83	.91	.86	.82	.71	.63		0.81
Population 7-10	2875	2540	2652	1741	856	446	490		
8-11		1415	1315	1029	563	260	227	274	
F	.51	.46	.75	.93	.99	.48	.38		

Table 9. Population numbers at age and mean population biomasses of cod in Divisions 2J3KL as estimated from a cohort analysis using a Terminal F of 0.17.

POPULATION NUMBERS											29/ 4/81:
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	
4+1	5401	5787	5122	6872	8184	9261	6729	5794	5379	5907	
5+1	6790	4181	4493	3952	5373	6100	6872	4680	4399	3886	
6+1	3716	4963	2887	3169	2823	3547	4082	3826	2960	2902	
7+1	1945	2500	3015	1830	2002	1740	2024	2030	1744	1573	
8+1	1110	1153	1523	1581	929	1098	924	925	752	715	
9+1	756	651	683	796	687	483	548	413	312	372	
10+1	673	432	396	377	350	345	240	246	172	165	
11+1	462	383	250	217	175	207	137	128	97	108	
12+1	329	280	240	129	116	101	115	63	50	62	
13+1	397	181	192	141	72	74	52	63	14	31	
4+1	21580	20511	18802	19065	20712	22956	21722	18169	15878	15721	
5+1	16179	14724	13680	12192	12528	13695	14993	12375	10499	9814	
6+1	9389	10544	9187	8240	7155	7595	8121	7694	6100	5928	
7+1	5673	5580	6300	5071	4332	4048	4040	3869	3140	3026	
	1972	1973	1974	1975	1976	1977	1978	1979	1980		
4+1	4775	2089	1278	1354	2659	4004	4568	4209	2520		
5+1	4212	3187	1342	922	973	1594	2800	3587	3336		
6+1	2348	2393	1755	777	520	483	885	1934	2591		
7+1	1522	1233	1424	761	322	199	266	532	1310		
8+1	784	739	690	611	271	101	107	143	331		
9+1	367	374	358	238	178	87	48	58	84		
10+1	202	194	177	125	75	44	41	26	35		
11+1	96	108	90	53	33	21	18	24	14		
12+1	70	51	54	24	22	10	10	11	14		
13+1	40	42	22	18	8	11	5	6	7		
4+1	14416	10410	7190	4883	5060	6553	8749	10531	10244		
5+1	9641	8322	5912	3529	2402	2550	4181	6322	7724		
6+1	5429	5134	4570	2607	1429	955	1381	2735	4387		
7+1	3081	2741	2816	1830	908	472	495	800	1796		
MEAN POPULATION BIOMASS (KG)											29/ 4/81
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	
4+1	23361	21278	19411	17849	17879	18852	17473	14620	13017	12874	
5+1	20740	18466	16929	14499	13979	14449	14370	11835	10492	10118	
6+1	15611	15391	13592	11545	10110	10028	9793	8531	7325	7431	
7+1	11837	10584	10740	8420	7357	6689	6180	5271	4627	4801	
	1972	1973	1974	1975	1976	1977	1978	1979	1980		
4+1	11959	9758	6793	4271	3385	5639	7507	10680	13225		
5+1	9798	8830	6193	3637	2240	3047	4667	8101	11511		
6+1	6967	6718	5283	3019	1624	1817	2350	4671	8162		
7+1	4837	4422	3820	2384	1213	1188	1246	1979	4368		

Table 10. Fishing mortalities at age of cod in Divisions 2J3KL as estimated from a cohort analysis using a Terminal F of 0.17.

Table 11. Mean biomass estimates ( $\times 10^{-9}$  t) of cod in Divisions 2J3KL as compared to standardized catch rates. The biomass estimates are derived from cohort analyses at the terminal fishing mortalities indicated.

Year	CPUE	$F_T = .1$	$F_T = .13$	$F_T = .15$	$F_T = .17$	$F_T = .20$
1962	2.673	2.34	2.34	2.34	2.34	2.34
1963	2.779	2.13	2.13	2.13	2.13	2.13
1964	2.686	1.94	1.94	1.94	1.94	1.94
1965	2.275	1.78	1.78	1.78	1.78	1.78
1966	2.466	1.79	1.79	1.79	1.79	1.79
1967	2.540	1.89	1.89	1.89	1.89	1.89
1968	2.557	1.75	1.75	1.75	1.75	1.75
1969	2.179	1.46	1.46	1.46	1.46	1.46
1970	1.918	1.30	1.30	1.30	1.30	1.30
1971	1.607	1.29	1.29	1.29	1.29	1.29
1972	1.468	1.20	1.20	1.20	1.20	1.20
1973	1.263	0.98	0.98	0.98	0.98	0.97
1974	1.408	0.69	0.68	0.68	0.68	0.68
1975	1.313	0.45	0.44	0.43	0.43	0.42
1976	1.215	0.39	0.36	0.35	0.34	0.33
1977	0.766	0.75	0.64	0.60	0.56	0.52
1978	0.687	1.12	0.91	0.82	0.75	0.67
1979	1.311	1.75	1.38	1.21	1.09	0.95
1980	1.788	2.13	1.68	1.47	1.32	1.15
1981	4.833					
All years 1972-78						
slope		0.7342	0.7852	0.8060	0.8230	0.8430
Intercept		-0.0058	-0.1229	-0.1706	-0.2095	-0.2557
$r^2$		0.7663	0.8200	0.8381	0.8519	0.8653
Predicted for 1979		0.9567	0.9065	0.8861	0.8695	0.8495
1980		1.3069	1.2810	1.2705	1.2620	1.2516
1981		3.5426	3.6720	3.7248	3.7681	3.8185
Excluding 1974-76						
slope		0.5958	0.6569	0.6817	0.7027	0.7267
Intercept		0.3656	0.2212	0.1625	0.1129	0.0559
$r^2$		0.8516	0.9033	0.9181	0.9270	0.9347
Predicted for 1979		1.1467	1.0824	1.0562	1.0341	1.0086
1980		1.4309	1.3957	1.3814	1.3693	1.3552
1981		3.2451	3.3959	3.4572	3.5090	3.5680
Observed						
expected		1979	1.53	1.27	1.15	1.06
		1980	1.49	1.20	1.06	0.96
						0.85

Table 12. Number of tows made in strata of depths up to 400 m in Divisions 2J3K in the autumn period.

Stratum	Nov. 1977	Aug.-Sept. 1978	Oct.-Nov. 1979	Oct.-Nov. 1980	Stratum	Aug.-Sept. 1978	Oct.-Nov. 1979	Oct.-Nov. 1980
201	2	3	2	3	620	12	10	12
202	2	4	4	4	621	12	11	13
203	2	2	2	4	623	6	3	6
205	4	4	2	4	624	7	4	4
206	11	7	8	7	625	6	5	6
207	5	4	5	5	626	7	5	5
208	4	5	4	4	628	7	5	6
209	7	6	7	6	629	6	2	5
210	6	7	4	5	630	2	4	4
211	2	4	4	5	632	7	4	4
213	8	7	7	8	633	9	10	10
214	6	7	6	5	634	9	8	7
215	4	8	6	4	635	9	8	6
216	2	2	4	4	636	7	7	7
217	3	2	2	2	637	9	7	6
222	4	5	4	4	638	8	9	9
228	8	3	6	5	639	9	4	6
229	4	4	4	4	644	2	2	-
234	2	5	4	4	Total	134	108	116
Total	86	89	85	87				

Table 13. Catch of cod per half-hour tow in Divisions 2J3K in depths to 400 m.

Age	2J				3K		
	Nov. 1977	Aug.-Sept. 1978	Oct.-Nov. 1979	Oct.-Nov. 1980	Aug.-Sept. 1978	Oct.-Nov. 1979	Oct.-Nov. 1980
1	0.0	0.24	0.0	0.20	0.0	0.0	0.25
2	3.57	0.55	0.17	1.17	0.16	0.27	1.07
3	10.37	7.28	1.03	1.05	2.60	1.61	1.12
4	31.40	19.42	14.45	4.92	10.61	11.35	1.79
5	14.37	38.74	22.23	19.06	11.91	19.51	10.47
6	3.18	10.90	22.82	16.73	5.53	11.38	11.29
7	1.48	1.98	3.85	9.88	1.96	2.98	2.18
8	1.35	0.63	1.29	1.43	0.84	1.30	1.03
9	1.08	0.56	0.37	0.39	0.56	0.40	0.36
10	0.59	0.40	0.30	0.27	0.38	0.29	0.24
11	0.22	0.23	0.18	0.16	0.08	0.21	0.02
12	0.10	0.08	0.06	0.20	0.08	0.04	0.14
13	0.04	0.08	0.02	0.06	0.03	0.04	0.05
>13	0.10	0.17	0.05	0.07	0.05	0.07	0.13
Total	67.85	81.26	66.82	55.59	34.79	49.45	30.14

Table 14. Mean number of cod per standard tow from research surveys in Division 3L.

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1	.12	0.0	0.0	.16	0.0	0.0	0.0	0.0	.06	0.09
2	7.81	1.54	3.77	.51	1.56	2.07	0.91	0.07	.08	1.94
3	22.07	5.55	12.93	5.77	3.46	18.26	4.13	3.35	.84	0.90
4	6.99	15.19	7.33	8.20	4.95	9.39	5.94	6.26	9.16	3.48
5	4.58	1.23	3.89	5.82	2.64	3.76	4.61	4.98	13.89	10.65
6	1.62	1.23	.54	2.38	2.11	2.63	2.15	3.22	6.48	8.60
7	1.70	.53	.41	.57	1.78	1.47	0.64	1.45	1.53	2.17
8	.61	.59	.28	.24	0.29	0.70	0.66	0.47	.46	0.79
9	.46	.31	.28	.17	0.16	0.12	0.44	0.40	.12	0.16
10	.49	.24	.15	.09	0.05	0.03	0.15	0.23	.19	0.07
11	.18	.08	.12	.04	0.08	0.03	0.10	0.17	.08	0.12
12	.24	.06	.17	.07	0.02	0.06	0.06	0.12	.04	0.07
13+	1.17	.31	.41	.12	0.20	0.09	0.16	0.17	.18	0.15
Total	48.04	26.86	30.28	24.14	17.38	38.58	19.95	20.89	33.12	29.19
# sets	57	38	29	70	55	64	102	94	141	115

