

Table 17. Estimates of beginning year stock size (thousands of fish), instantaneous fishing mortality (F), mean biomass (mt), spawning stock biomass (mt), and percent mature of Georges Bank cod, estimated from virtual population analysis (VPA), calibrated using the commercial catch at age ADAPT formulation, 1978-2000.

Stock Numbers (Jan 1) in thousands																								
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	27711	23512	20109	41393	17470	9615	27390	8672	42751	16376	23448	15689	9218	17866	6632	8433	6300	4331	7612	10325	3179	7291	4896	1710
2	4270	22686	19219	16383	33865	14004	7774	22352	6979	34860	13384	19188	12845	7540	14580	5366	6901	5156	3545	6231	8450	2603	5968	4003
3	25527	3140	16774	12318	10513	19458	7587	5182	12485	4514	21779	9531	13821	6045	4794	8158	3459	5290	3867	2715	4634	6250	1873	4152
4	7933	13889	1756	8460	6266	5148	8635	3115	2032	6084	2423	10573	5159	6753	2015	1961	2837	1451	3374	2349	1645	2719	3373	891
5	2877	4411	6965	986	4697	2608	1992	4051	1312	943	3062	1068	4897	2521	2560	710	597	671	562	1645	1126	964	1587	1835
6	1127	1604	2515	3614	594	2036	1181	871	1611	640	519	1153	575	1961	745	755	184	132	287	242	629	629	607	1023
7	1414	804	899	1085	1687	232	965	500	340	752	296	204	454	264	621	244	191	63	68	124	80	300	427	432
8	67	846	588	334	511	772	104	375	212	200	371	97	93	150	102	229	56	33	28	42	25	30	138	315
9	147	12	463	403	162	226	419	46	124	108	107	126	40	44	60	53	58	4	13	21	20	8	10	91
10+	50	135	25	174	171	133	268	190	69	62	91	41	82	40	16	25	8	2	0	1	12	11	5	12
1 +	71122	71040	69315	85150	75937	54232	56316	45354	67916	64540	65481	57670	47184	43183	32124	25935	20591	17134	19357	23696	19801	20805	18885	14464
Fishing Mortality																								
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
1	0	0	0	0	0.02	0.01	0	0.02	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0
2	0.11	0.1	0.24	0.24	0.35	0.41	0.21	0.38	0.24	0.27	0.14	0.13	0.55	0.25	0.38	0.24	0.07	0.09	0.07	0.1	0.1	0.13	0.16	
3	0.41	0.38	0.48	0.48	0.51	0.61	0.69	0.74	0.52	0.42	0.52	0.41	0.52	0.9	0.69	0.86	0.67	0.25	0.3	0.3	0.33	0.42	0.54	
4	0.39	0.49	0.38	0.39	0.68	0.75	0.56	0.66	0.57	0.49	0.62	0.57	0.52	0.77	0.84	0.99	1.24	0.75	0.52	0.54	0.33	0.34	0.41	
5	0.38	0.36	0.46	0.31	0.64	0.59	0.63	0.72	0.52	0.4	0.78	0.42	0.72	1.02	1.02	1.15	1.31	0.65	0.64	0.76	0.38	0.26	0.24	
6	0.14	0.38	0.64	0.56	0.74	0.55	0.66	0.74	0.56	0.57	0.73	0.73	0.58	0.95	0.91	1.17	0.86	0.46	0.64	0.91	0.54	0.19	0.14	
7	0.31	0.11	0.79	0.55	0.58	0.6	0.74	0.66	0.33	0.51	0.92	0.59	0.91	0.75	0.8	1.27	1.57	0.6	0.28	1.38	0.78	0.58	0.1	
8	1.49	0.4	0.18	0.52	0.62	0.41	0.63	0.91	0.47	0.43	0.88	0.68	0.56	0.72	0.46	1.18	2.36	0.71	0.12	0.54	0.94	0.89	0.22	
9	0.36	0.44	0.51	0.44	0.66	0.67	0.6	0.71	0.54	0.49	0.73	0.58	0.63	0.87	0.95	1.11	1.3	0.71	0.54	0.66	0.4	0.32	0.22	
10+	0.36	0.44	0.51	0.44	0.66	0.67	0.6	0.71	0.54	0.49	0.73	0.58	0.63	0.87	0.95	1.11	1.3	0.71	0.54	0.66	0.4	0.32	0.22	
mn4-8,u	0.54	0.35	0.49	0.47	0.65	0.58	0.64	0.74	0.49	0.48	0.79	0.60	0.66	0.84	0.81	1.15	1.47	0.63	0.44	0.83	0.59	0.45	0.22	
Fwb	0.31	0.29	0.39	0.32	0.47	0.52	0.41	0.53	0.29	0.33	0.42	0.35	0.53	0.56	0.57	0.66	0.55	0.30	0.31	0.27	0.28	0.24		

Table 17 continued. Estimates of beginning year stock size (thousands of fish), instantaneous fishing mortality ( $F$ ), mean biomass (mt), spawning stock biomass (mt), and percent mature of Georges Bank cod, estimated from virtual population analysis (VPA), calibrated using the commercial catch at age ADAPT formulation, 1978-2000.

### Mean biomass (mt)

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	17756	18930	15201	33078	11990	8411	26099	7070	35926	10766	16700	11504	6940	18010	6861	6663	5173	3556	6085	8926	1668	5484	4679
2	4816	29255	22650	19782	36452	15601	10449	24024	8344	41185	17250	26451	14074	9866	17054	6662	8841	6591	4690	8505	10818	3471	8559
3	47057	5118	29978	21113	20017	31666	12313	7020	21790	8386	36581	16162	24297	9347	7809	11349	5011	8925	7415	4957	8268	10370	3221
4	20817	42243	4894	21839	16000	10999	21920	8106	5192	18430	5809	27816	12975	14785	4809	3823	5495	3590	8152	5875	4457	7258	8991
5	9449	16495	28841	4033	17037	8352	6888	13463	5247	4126	10556	4299	15692	6948	6955	1934	1481	2485	1866	4336	4041	3777	6211
6	5533	8742	11357	18264	2510	9170	5214	3621	8109	3448	2246	5021	2530	6863	2764	2620	840	715	1287	879	2638	3349	3050
7	8154	6341	4785	6532	10957	1273	5563	2718	2353	4828	1564	1165	2323	1262	2948	961	719	467	455	501	416	1533	2728
8	275	6555	4453	2347	3458	5943	717	2321	1538	1486	2266	691	696	1031	735	1145	190	249	204	259	131	176	958
9	1326	107	2801	4217	1355	1693	3264	341	1107	894	774	1020	345	260	428	285	290	30	120	163	193	77	74
10+	553	1376	303	2611	2091	1408	3101	1838	751	735	985	533	880	406	201	203	77	21	4	14	147	130	48
Total	115735	135163	125263	133816	121866	94515	95528	70522	90356	94285	94730	94659	80753	68777	50565	35644	28116	26628	30277	34414	32777	35625	38517

### SSB at the start of the spawning season - males and females (mt)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Age	1	912	1104	850	1962	1200	902	3122	773	8515	2226	3480	2477	635	1963	763	660	87	59	97	993	141	530	575
2	1411	7540	6911	5784	16138	6347	4303	11650	5031	25331	8897	13718	6615	4228	9022	3442	2904	2212	1545	3986	5446	1337	3814	
3	33839	3730	22412	15924	15649	26066	10500	6878	18777	7103	32838	14540	22023	9033	7442	11476	5186	8150	6400	4297	7431	9422	2973	
4	20179	38255	4300	21375	15792	12655	21656	8075	4842	17023	6133	27186	12815	16506	5246	4564	6403	3570	7973	6095	4287	7007	8571	
5	8796	16541	30441	3962	17468	9636	7118	14908	5434	3936	12373	4195	18059	8431	8379	2477	1857	2612	2118	5225	4179	3692	6028	
6	4892	8127	12487	20325	2961	10514	5653	4252	8583	3704	2763	5934	2953	8688	3351	3291	934	705	1506	1093	2743	3250	3089	
7	8094	5563	5914	7240	12174	1464	6221	3163	2355	5363	2023	1326	2842	1542	3495	1300	1018	495	496	695	475	1742	2799	
8	366	6672	5047	2693	4108	6842	815	2980	1702	1701	2931	811	769	1214	780	1512	307	271	256	319	175	222	1017	
9	1339	111	3841	4111	1557	2059	3957	420	1245	1030	965	1193	408	372	555	414	425	37	142	178	192	77	86	
10+	620	1580	355	3000	2562	1729	3731	2282	890	857	1229	637	1067	526	266	279	111	26	5	17	167	144	51	
Total	80447	89224	92560	86373	89609	78214	67075	55382	57374	68273	73633	72016	68186	52504	39299	29413	19233	18136	20538	22898	25236	27422	29003	

### **Percent Mature (females)**