Draft

Gulf of Maine Redfish stock assessment data - 1978.

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The following tables and figures are presented to update the results presented in ICNAF Research Documents 75/59 and 76/VI/43. A comprehensive analysis of these data and a complete assessment of the Gulf of Maine redfish stock through 1978 will be available in the near future.

Table 1 Total landings of redfish by country from ICNAF Subarea 5 (metric tons, live).

Year	Canada	USSR	Poland	Other Non-US	Total Non-US	USA	Subarea 5 Total
1934						519	519
1935						7549	7549
1936						23162	23162
1937						14823	14823
1938						20638	20640
1939						25401	25406
1940						26762	26762
1941						59783	59796
1942						55892	55892
1943						48348	48348
1944						50439	50439
1945						37912	37912
1946						42423	42423
1947						40160	40160
1948						43631	43631
1949						30743	30743
1950						34307	34307
1951						30077	30077
1952						21377	21377
1953						16791	16791
1954						12988	12988
1955						13914	13914
1956						14388	14388
1957						18490	18490
1958	4				4	16043	16047
1959						15521	15521
1960	2				2	11373	11375
1961	50	11			61	14040	14101
1962	3	1590			1593	12541	14134
1963	89	1086			1175	8871	10046
1964	56	445			501	7812	8313
1965	68	968	25	10	1071	6986	8057
1966	420	939	6		1365	7204	8569
1967	194		215	13	422	10442	10864
1968	197			2	199	6578	6777
1969	260	15	56	83	414	12041	12455
1970	338		30	839	1207	15534	16741
1971	269	3394	84	20	3767	16267	20034
1972	124	5639	1	174	5938	13157	19095
1973	35	5240	28	103	5406	11954	17360
1974	59	1705	2	28	1794	8677	10471
1975	59	1368	1	69	1497	9075	10572
1976	186	379			565	10131	10696
1977	204				204	13005	13209
1978					—	13984	13984

Table 2 Total catch of redfish from ICNAF divisions 5Y and 5Z (metric tons, live).

Year	5Y U.S.	5Y Other	5Y Total	5Z U.S.	5Z Other	5Z Total	Subarea 5 Total
1954	11561	-	11561	1427	-	1427	12988
1955	11132	-	11132	2782	-	2782	13914
1956	10678	-	10678	3710	-	3710	14388
1957	14471	-	14471	4019	-	4019	18490
1958	13900	4	13904	2143	-	2143	16047
1959	12438	-	12438	3083	-	3083	15521
1960	9321	2	9323	2052	-	2052	11375
1961	12457	-	12457	1583	61	1644	14101
1962	10196	-	10196	2345	1593	3938	14134
1963	6785	44	6829	2086	1131	3217	10046
1964	6137	2	6139	1675	499	2174	8313
1965	5045	51	5096	1941	1020	2961	8057
1966	4719	292	5011	2485	1073	3558	8569
1967	6746	75	6821	3696	347	4043	10864
1968	4062	22	4084	2516	177	2693	6777
1969	9640	28	9668	2401	386	2787	12455
1970	13551	159	13710	1983	1048	3031	16741
1971	12541	121	12662	3726	3466	7192	20034
1972	7150	94	7244	6007	5844	11851	19095
1973	7001	11	7012	4953	5395	10348	17360
1974	5457	43	5500	3220	1751	4971	10471
1975	5961	-	5971	3114	1487	4601	10572
1976	7989	2	7991	2142	563	2705	10696
1977	9848	-	9848	3157	204	3361	13209
1978	11352	-	11352	2632	—	2632	13984

Table 3 US and total Redfish catch and C/E (metric tons, live) for ICNAF Subarea 5.

Year	US Catch	US C/E	STD US C/E	Calculated STD US Effort	Total Catch	Calculated Total STD Effort
1942	55892	6.9	6.9	8100	55892	8100
1943	48348	6.7	6.7	7216	48348	7216
1944	50439	5.4	5.4	9341	50439	9341
1945	37912	4.5	4.5	8425	37912	8425
1946	42423	4.7	4.7	9026	42423	9026
1947	40160	4.9	4.9	8196	40160	8196
1948	43631	5.4	5.4	8080	43631	8080
1949	30743	3.3	3.3	9316	30743	9316
1950	34307	4.1	4.1	8368	34307	8368
1951	30077	4.1	4.1	7336	30077	7336
1952	21377	3.5	3.4*	6287	21377	6287
1953	16791	3.8	3.6	4664	16791	4664
1954	12988	3.4	3.1	4190	12988	4190
1955	13914	4.5	4.0	3478	13914	3478
1956	14388	4.4	3.8	3786	14388	3786
1957	18490	4.3	3.6	5136	18490	5136
1958	16043	4.4	3.6	4456	16047	4458
1959	15521	4.3	3.5	4435	15521	4435
1960	11373	3.8	3.0	3791	11375	3792
1961	14040	4.6	3.5	4011	14101	4029
1962	12541	5.4	4.0	3135	14134	3533
1963	8871	4.1	3.0	2957	10046	3349
1964	7812	4.3	2.9**	2604	8313	2867
1965	6986	7.0	4.5	1552	8057	1790
1966	7204	11.7	6.5	1092	8569	1318
1967	10442	12.4	5.8	1740	10864	1873
1968	6578	14.7	6.4	997	6777	1059
1969	12041	11.4	5.2	2272	12455	2395
1970	15534	9.0	4.1	3613	16741	4083
1971	16267	7.0	3.3	4784	20034	6071
1972	13157	5.7	3.0	4386	19095	6365
1973	11954	5.3	2.7	4427	17360	6930
1974	8677	5.0	2.3	3615	10471	4553
1975	9075	4.0	2.0	4538	10572	5286
1976	10131	4.6	2.0	5066	10696	5348
1977	13005	4.9	2.1	5911	13209	6290
1978	13984	4.8	2.05	6821	13984	6821

* 1952-1963 catch/effort data were divided by e^{kt} where k=.0274 to reflect a 2.74% increase in vessel efficiency per year between these years. Thus, in 1952, t=1 and in 1964 t=13.

** 1964-1977 catch/effort were standardized against tonnage class 31, 32, and 33 vessels before the e^{kt} adjustment to account for changes in vessel size composition of the U.S. redfish fleet.

Table X. Stratified mean catch per tow indices for Subarea 5 redfish from fall survey cruises of ALBATROSS IV.

wt./tow in kg.

	Inshore[1] Strata		Offshore[2] Strata		Total[1] Subarea 5	
Year	No./tow	wt./tow	No./tow	wt./tow	No./tow	wt./tow
1963	86.3	7.6	87.5	27.0	87.3	24.1
1964	81.3	13.5	122.3	61.8	116.3	54.6
1965	189.5	22.3	33.9	11.5	57.0	13.1
1966	172.8	17.0	77.8	31.2	91.9	29.1
1967	62.9	5.3	107.1	27.6	100.5	24.3
1968	41.1	4.7	161.3	46.6	143.4	40.4
1969	105.9	16.0	65.2	24.8	71.2	23.5
1970	18.2	2.8	107.2	38.2	94.0	32.9
1971	20.7	4.7	52.8	26.7	48.0	23.4
1972	36.4	6.6	58.9	27.8	55.6	24.6
1973	26.2	2.1	41.4	19.7	39.2	17.0
1974	44.2	4.7	49.0	27.6	48.3	24.2
1975	45.7	6.0	79.9	45.9	74.8	39.9
1976	11.6	2.5	31.9	17.5	28.9	15.3
1977	54.6	12.3	37.9	18.1	40.4	17.3
1978	20.4	5.5	49.5	23.4	45.2	20.7

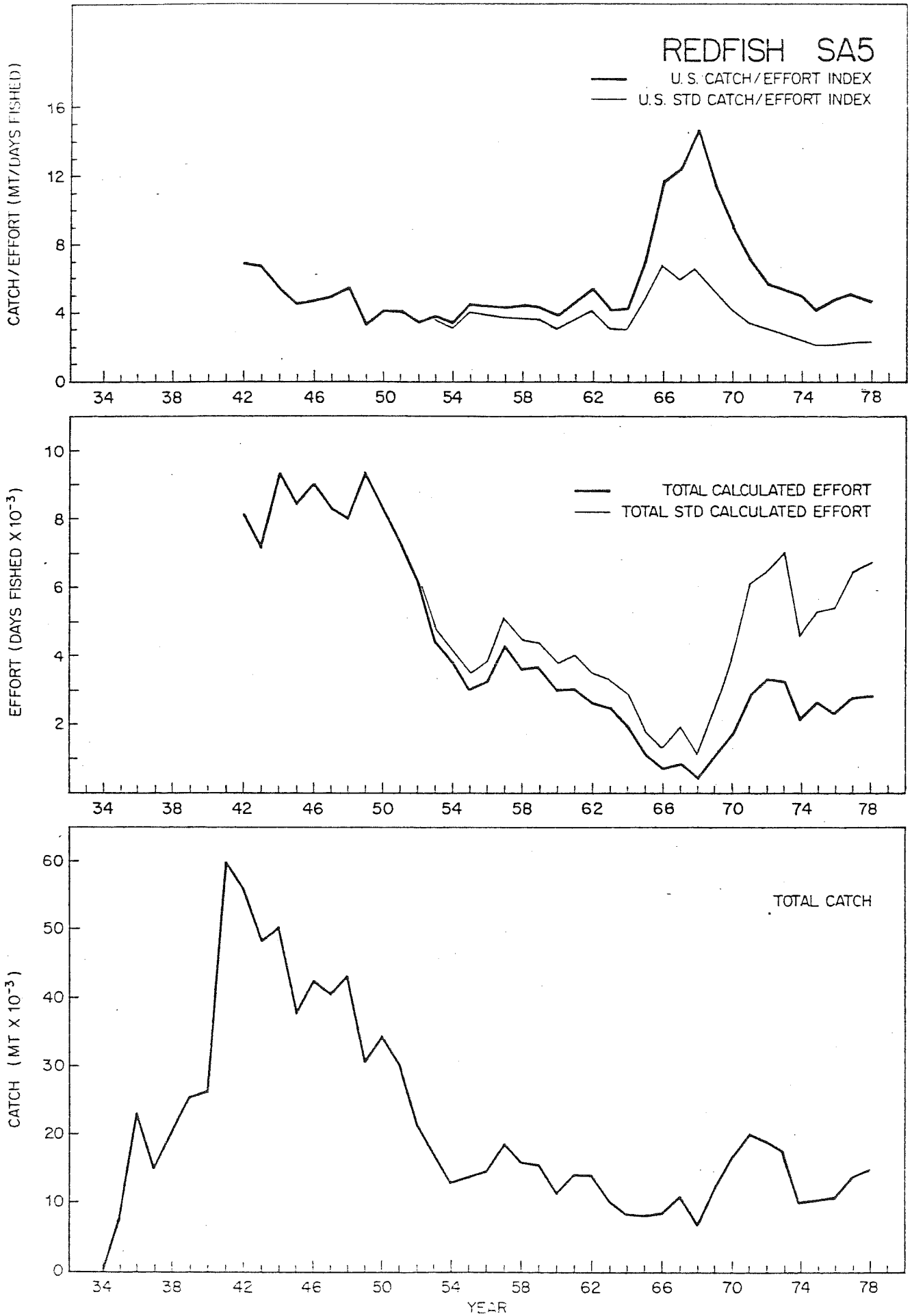
[1]Strata 26, 27, 39, 40

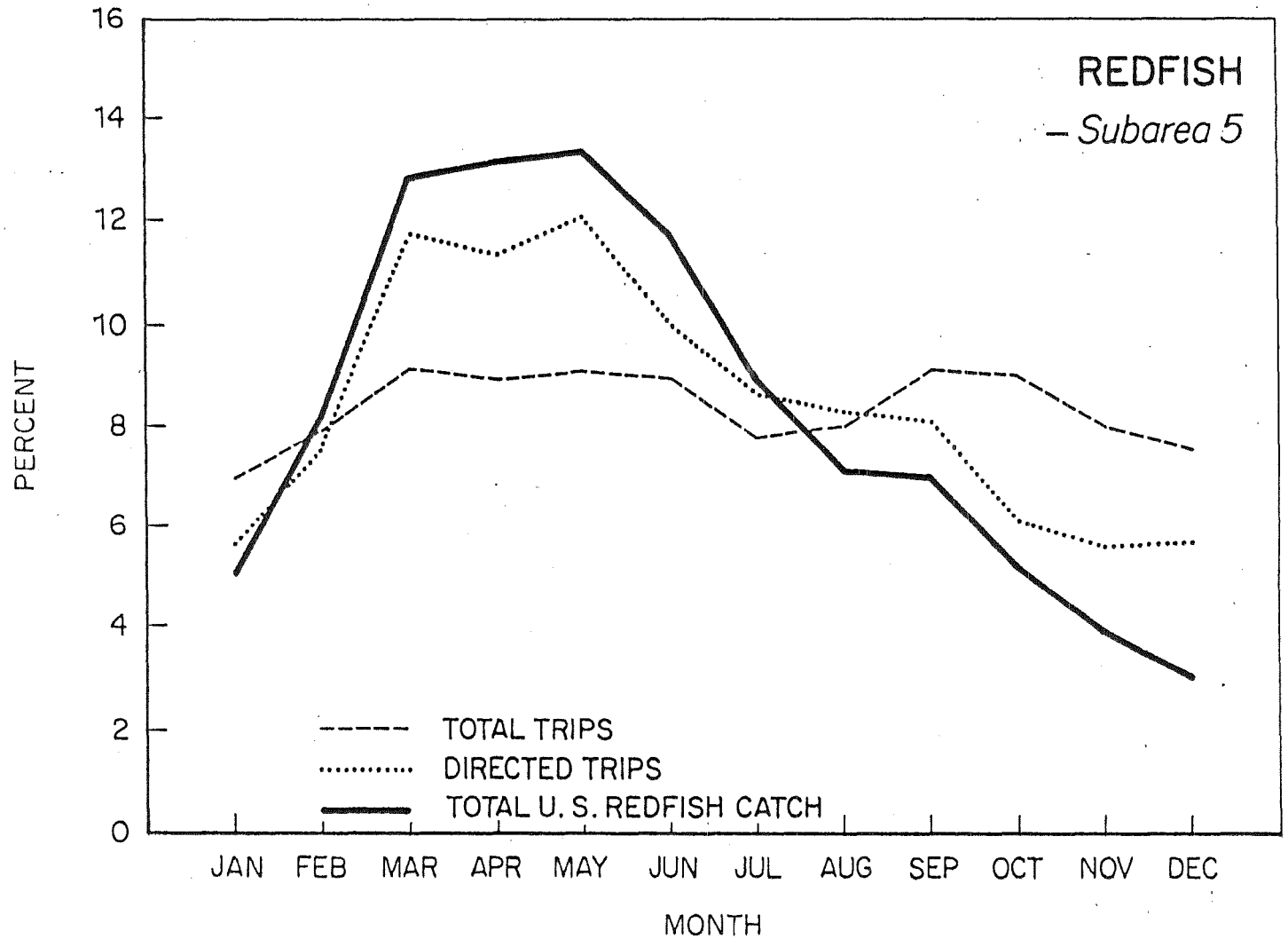
[2]Strata 24, 28-30, 36-38

[3]Strata 24, 26-30, 36-40

Table 12. Estimates of Y_{max} (metric tons), f_{opt} (standard days fished), and U_{opt} from the General Production Model with 12 year average effort

	Gompertz M = 1.0	Logistic M = 2.0
Maximum Sustainable Yield (Y_{max})	14,562	14,077
Optimum Effort (F_{opt})	2,265	3,162
Optimum CPUE (U_{opt})	6.43	4.45
Residual Sum of Squares	0.579	0.686
Correlation Coefficient	0.88	0.86


REDFISH SA5
U. S. CATCH/EFFORT INDEX
U.S. STD CATCH/EFFORT INDEX
CATCH/EFFORT (MT/DAYS FISHED)
TOTAL CALCULATED EFFORT
TOTAL STD CALCULATED EFFORT
EFFORT (DAYS FISHED X 10^-3)
TOTAL CATCH
CATCH (MT X 10^-3)
YEAR


REDFISH
– Subarea 5
PERCENT
16
14
12
10
8
6
4
2
0
TOTAL TRIPS
DIRECTED TRIPS
TOTAL U. S. REDFISH CATCH
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTH

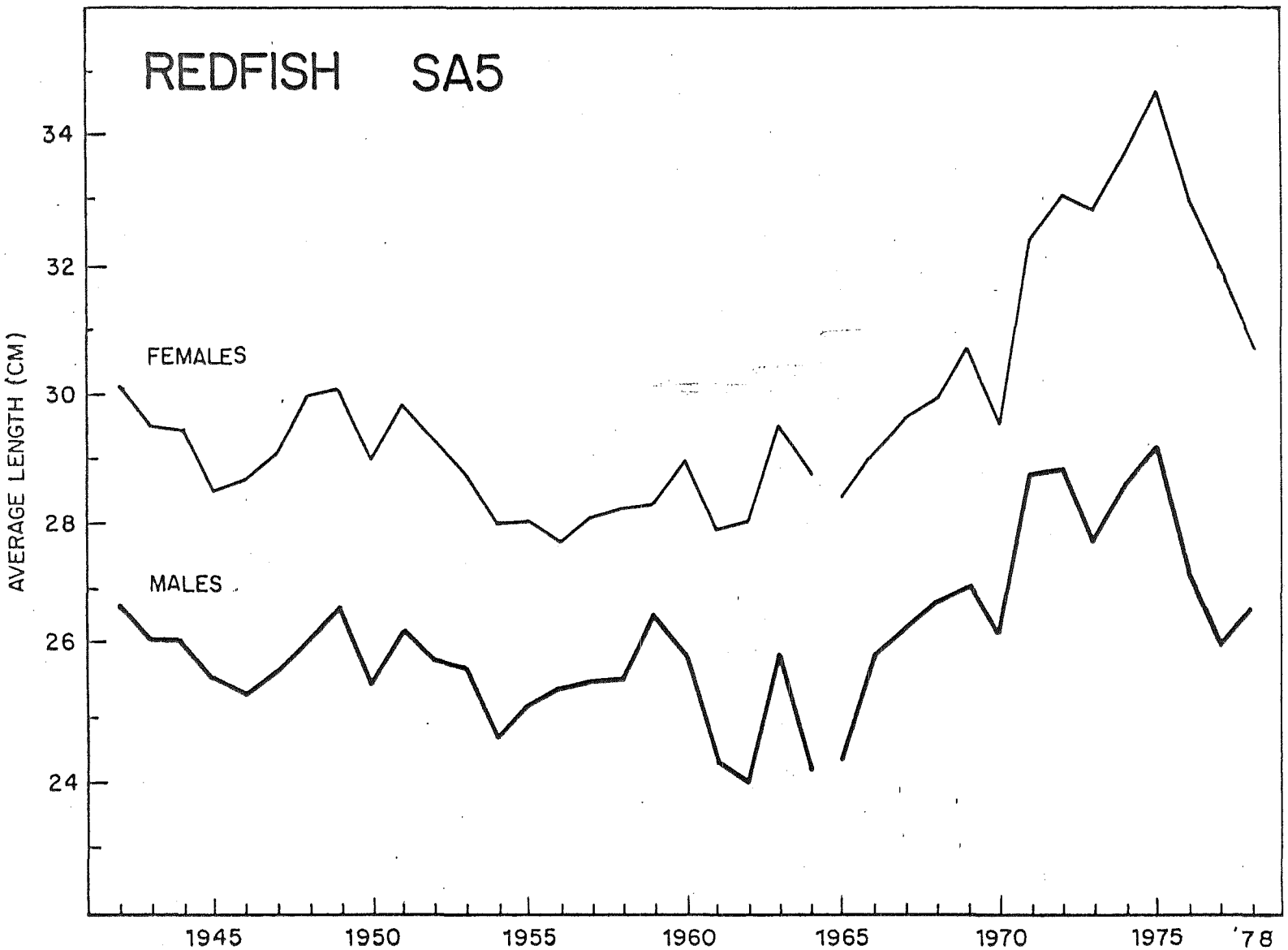
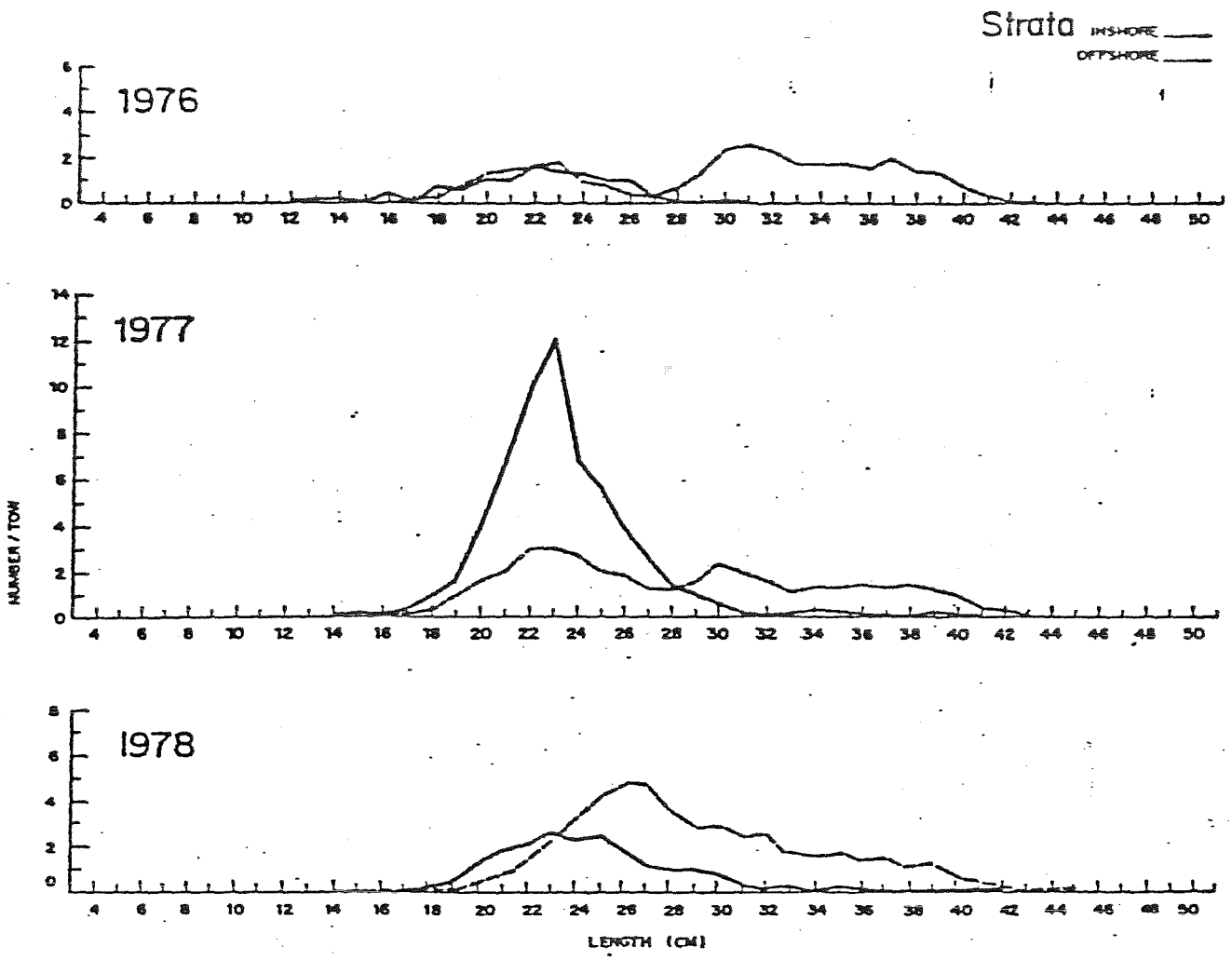
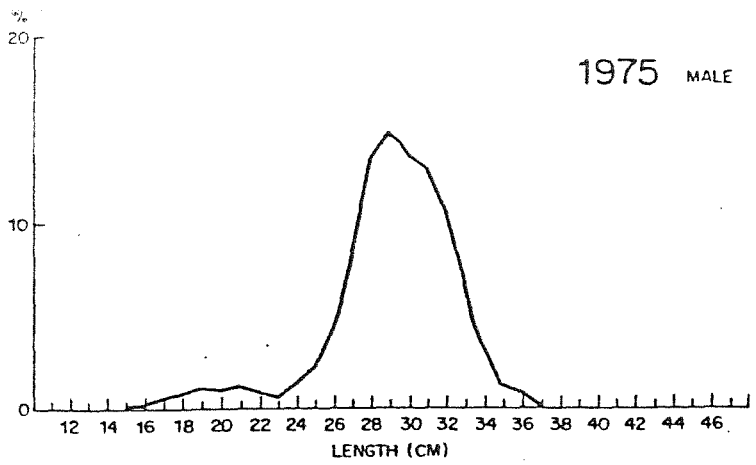
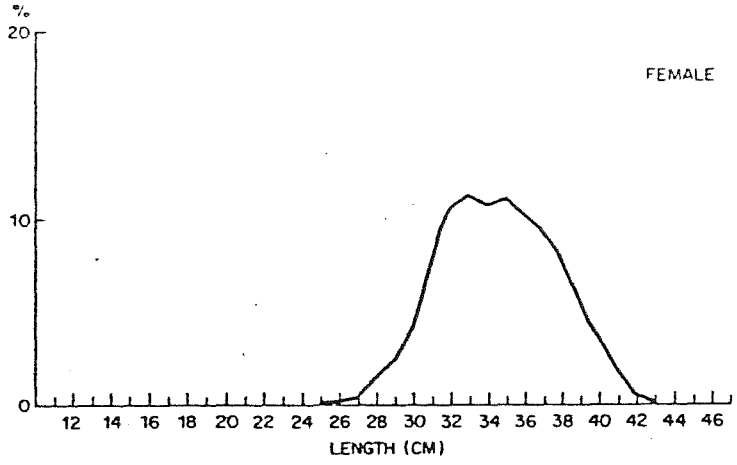
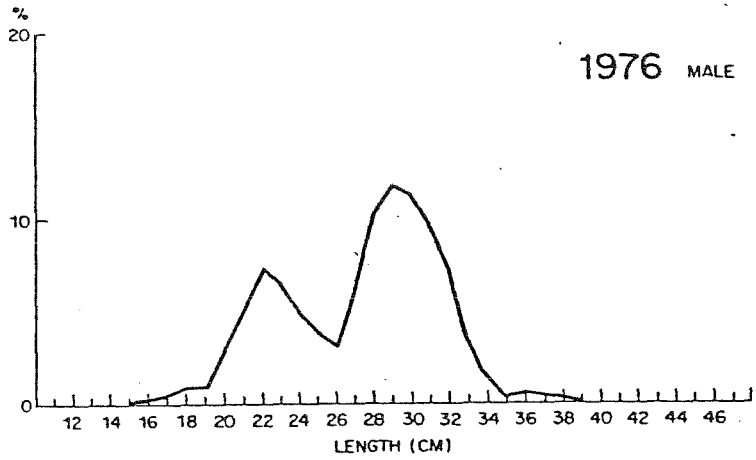


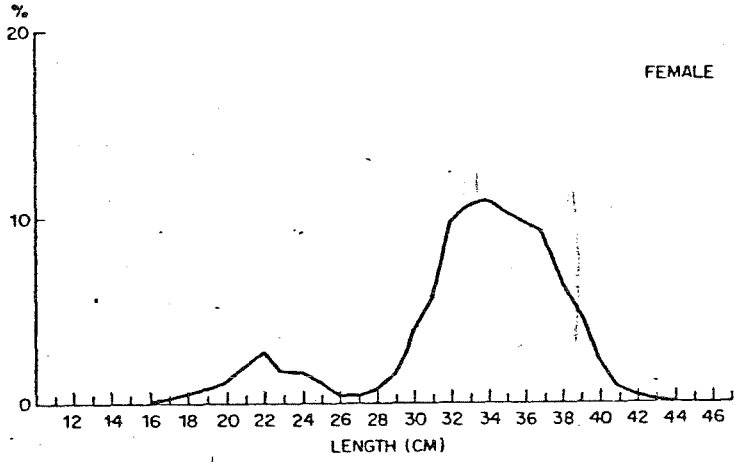
Figure 3. Average length of male and female redfish landed in the U.S. commercial fishery in Subarea 5. Data from 1942 to 1964 was

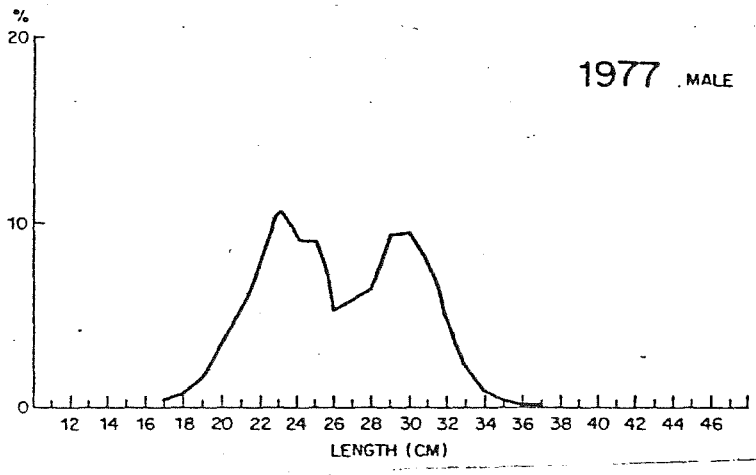

Strata INSHORE
OFFSHORE
1976
1977
1978
NUMBER / TOW
LENGTH (CM)

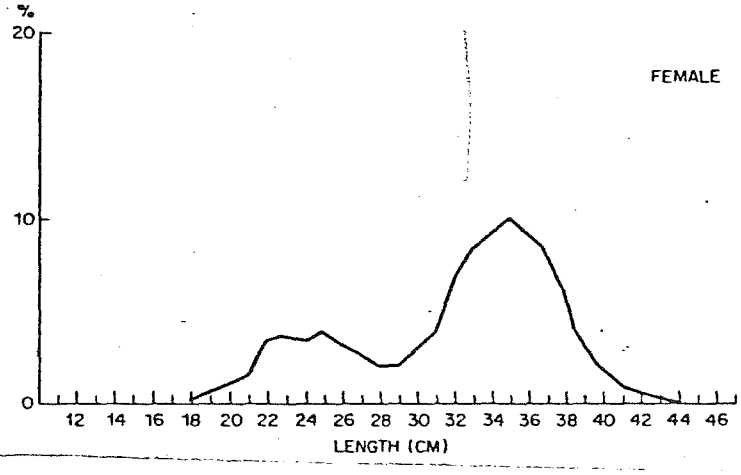

%
20
10
0
1975 MALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)

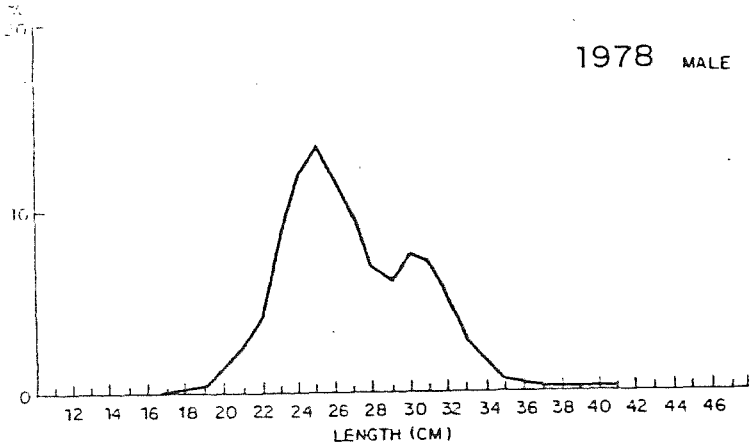

%
20
10
0
FEMALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)

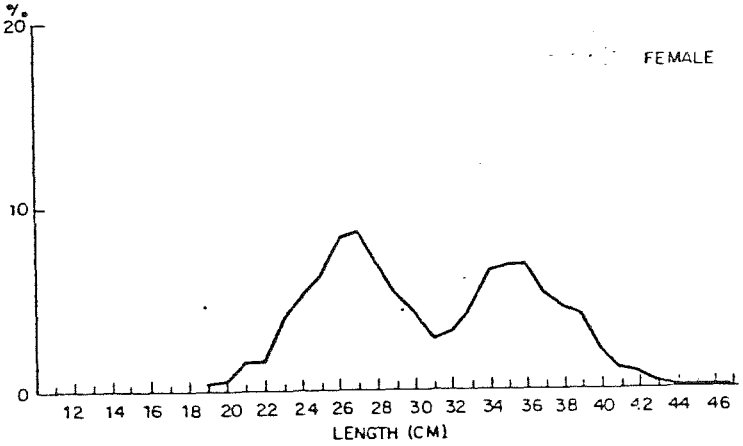

%
20
10
0
1976 MALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)

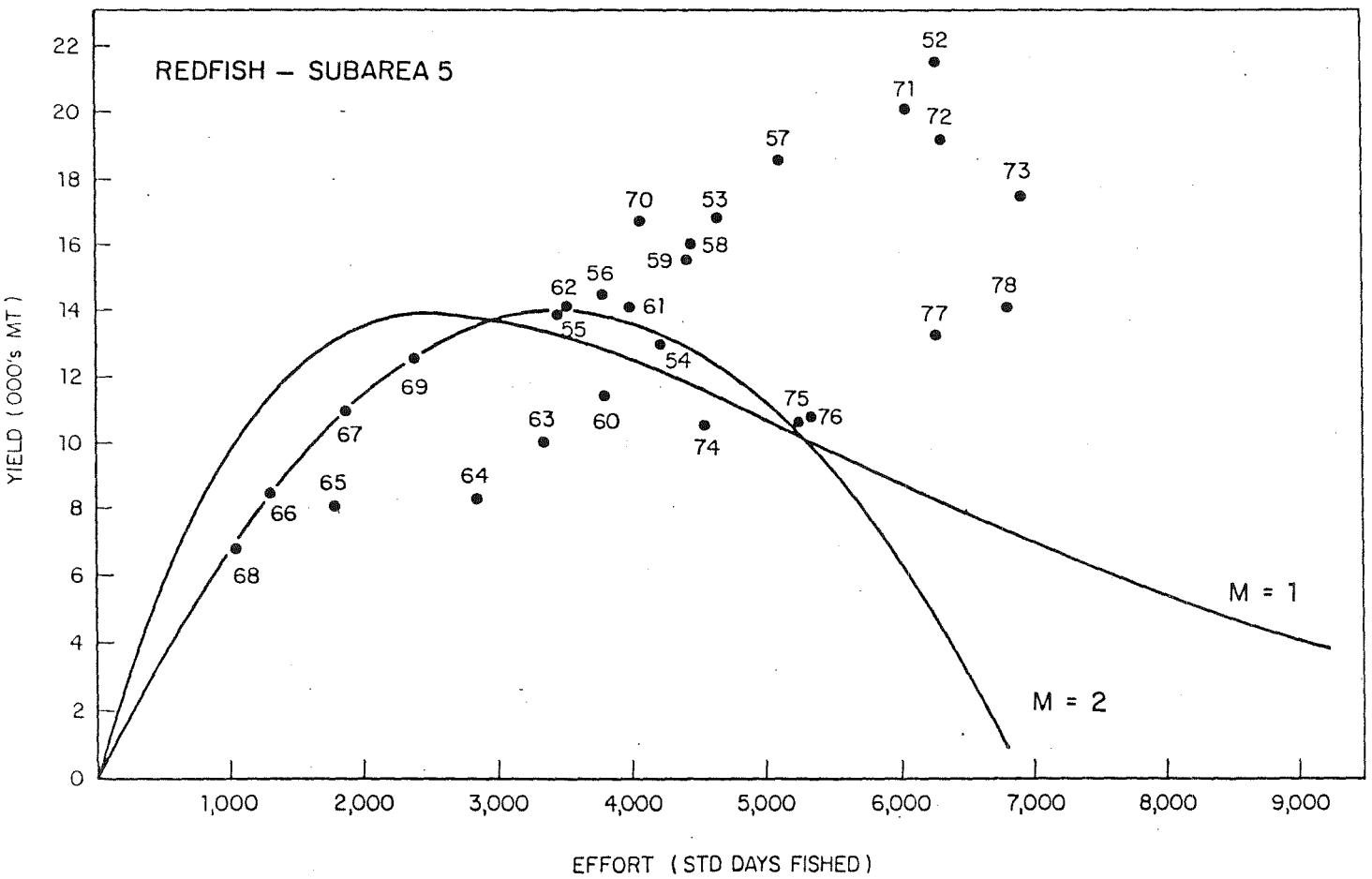

%
20
10
0
FEMALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)


%
20
10
0
1977 MALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)


%
20
10
0
FEMALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)


10
0
1978 MALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)


%
20
10
0
FEMALE
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
LENGTH (CM)


REDFISH – SUBAREA 5
YIELD (000's MT)
EFFORT (STD DAYS FISHED)
0
2
4
6
8
10
12
14
16
18
20
22
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
M = 1
M = 2
52
71
72
57
73
70
53
58
59
56
62
61
78
77
55
54
69
75
76
63
60
74
67
64
65
66
68