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Assessment of American plaice in ICNAF Divisions 3LNO

by

T.K. Pitt  
Department of Fisheries and Environment  
Fisheries and Marine Service  
Research and Resource Services  
St. John's, Newfoundland, Canada

This stock has been regulated since 1973 with TACs and catches as follows:

	1973	1974	1975	1976	1977
TAC ('000 tons)	60.5	60.0	60.0	47.0	47.0
Catch ('000 tons)	53.0	46.0	43.0	50.9*	

\* Provisional figure.

Catches from this stock declined from a peak of 94,000 tons in 1967 to 68,000 tons in 1971 and then down to 43,000 tons in 1975. The catch increased in 1976 to approximately 51,000 tons (Fig. 1A).

Catch per unit effort (total) declined generally since 1967 (Fig. 1B) but in 1976 there was an increase in the catch rate to about 360 kg/hr from the 1975 level of 310 kg. "Main Species" catch rates remained relatively stable since 1974 at 410-430 kg/hr.

For the first time sufficient data were available from Div. 30 to do a cohort analysis (1973-76). Previous to this year, a yield/recruit assessment and the allocation of approximately 10,000 tons based on average catches was used to complete the assessment of this stock. In the 1976 assessment presented here, cohort analysis were run for Div. 3LN and 30 separately and the projected TAC added.

Terminal F's for 1976 used to initiate the cohort analysis were taken from the regression of F on effort for Div. 3LN for 1962 to 1974 inclusive (Fig. 2). The tables from the cohort analysis are presented as Tables 1-8.

A summary of the projected catches to 1978 at  $F_{0.1}$  (Fig. 3) is presented below (thousands of tons):

Div.	1976		1977			1978		
	3LN (F)*	30 (F)*	3LN (F)*	30 (F)*	(F)*	3LN (F)*	30 (F)*	(F)*
Male	15.0 (.60)	1.8 (.50)	14.8 (.60)	2.6 (.5)		13.6 (.48)	2.2 (.5)	
Female	31.5 (.55)	4.0 (.40)	25.5 (.48)	3.1 (.4)		26.2 (.42)	3.0 (.4)	
Total 3LNO		52.3		46.0			45.0	
TAC		47.0		47.0				
Catch		51.9						

\* At fully recruited age.

Table 1.

## PLAICE MALE 1962-1976 3LN

NATURAL MORTALITY# 0.25

PARTIAL RECRUITMENT MULTIPLIER

0.0600 0.1500 0.2500 0.4000 0.6500 1.0000 1.2500 1.4000 1.2000 1.2000 1.3000

ASSUMED FISHING MORTALITY FOR LAST AGES

0.2000 0.2400 0.2500 0.4000 0.4500 0.5000 0.6700 0.8500 0.7300 0.8000 0.8200 0.9600 0.9700 0.6000 0.6000

AGE	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
6	90395.	78468.	64402.	94443.	100542.	88598.	79394.	55393.	49474.	46750.	60958.	84680.	110881.	69280.	60525.
7	71893.	70092.	60683.	64565.	71709.	76043.	67872.	61499.	42713.	37930.	35786.	46499.	65376.	83247.	52624.
8	42805.	55699.	53765.	45287.	46919.	51426.	55093.	50240.	43559.	31829.	26005.	27108.	33599.	47208.	61725.
9	28454.	32902.	42654.	40626.	31184.	37254.	37254.	37673.	32494.	28789.	20513.	16338.	18526.	22425.	33262.
10	19892.	21516.	24927.	29952.	27843.	20842.	20788.	23188.	19739.	18664.	15458.	9902.	8529.	9780.	14202.
11	18884.	13236.	19547.	15078.	18144.	18590.	10589.	10755.	11857.	10862.	9433.	5869.	4289.	4504.	5141.
12	12341.	13236.	19547.	15078.	18144.	18590.	10589.	10755.	11857.	10862.	9433.	5869.	4289.	4504.	5141.
13	6795.	7973.	7965.	5432.	5394.	5086.	5828.	3321.	1503.	1689.	1855.	1734.	290.	1627.	2010.
14	6464.	4155.	4338.	4502.	2771.	2303.	280.	2059.	1126.	568.	654.	458.	56.	62.	454.
15	2644.	3934.	1571.	2095.	2178.	705.	879.	720.	347.	359.	236.	82.	16.	91.	22.
16	2416.	1282.	2229.	312.	1462.	670.	176.	297.	166.	50.	101.	70.	15.	18.	12.

## KNOWN CATCHES

AGE	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
6	348.	485.	1322.	2089.	2550.	1279.	377.	484.	680.	706.	1105.	649.	3521.	1509.	1895.
7	331.	933.	2236.	3813.	5009.	4679.	2967.	4574.	1627.	4005.	864.	2850.	4200.	3522.	4015.
8	492.	821.	1412.	4629.	5537.	3169.	5930.	7576.	6083.	4732.	4436.	5196.	6328.	3970.	7631.
9	730.	790.	3702.	4302.	3903.	4379.	6601.	10879.	6847.	7890.	6970.	4754.	3502.	3697.	6311.
10	1013.	1334.	4912.	4282.	3506.	6394.	6158.	7028.	5112.	6312.	6991.	3879.	2423.	2805.	4091.
11	1667.	1834.	2708.	3319.	3076.	5382.	3549.	4514.	4874.	3432.	5230.	3249.	1941.	1697.	2078.
12	1856.	2655.	2450.	2487.	2015.	4325.	4822.	2811.	1962.	2251.	1118.	2061.	1756.	922.	953.
13	1288.	2234.	1928.	1653.	2150.	1905.	2810.	1655.	883.	750.	1118.	1484.	186.	297.	232.
14	1246.	1887.	1366.	1505.	1647.	1036.	439.	1424.	587.	234.	444.	386.	234.	30.	42.
15	881.	946.	1033.	1192.	1163.	423.	92.	447.	250.	202.	129.	55.	12.	2.	10.
16	492.	306.	551.	113.	580.	287.	92.	180.	92.	29.	60.	45.	10.	1.	6.

## ESTIMATE FISHING MORTALITY

AGE	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
6	0.0044	0.0070	0.0179	0.0254	0.0293	0.0165	0.0054	0.0099	0.0157	0.0173	0.0208	0.0087	0.0366	0.0250	0.0
7	0.0052	0.0152	0.0426	0.0593	0.0825	0.0723	0.0508	0.0880	0.0441	0.1274	0.0277	0.0720	0.0756	0.0491	0.0
8	0.0131	0.0168	0.0302	0.0278	0.1436	0.0724	0.1301	0.1858	0.1710	0.1845	0.2148	0.2449	0.1573	0.1001	0.0
9	0.0295	0.0276	0.1035	0.1278	0.1529	0.1705	0.2241	0.3963	0.2728	0.3719	0.4831	0.4001	0.2746	0.2068	0.0
10	0.0594	0.0728	0.2527	0.1767	0.1540	0.4271	0.4090	0.4207	0.3474	0.4641	0.7184	0.5868	0.3985	0.3930	0.0
11	0.1054	0.1536	0.2194	0.2869	0.2998	0.3576	0.4777	0.6455	0.6270	0.4416	0.9896	1.1558	0.7192	0.5558	0.0
12	0.1868	0.2579	0.3351	0.3414	0.2098	0.3137	0.8248	0.9749	0.7055	0.7275	0.8820	1.9918	0.9046	1.0275	0.0
13	0.2418	0.3820	0.3206	0.4229	0.6009	0.5524	0.7904	0.8317	0.7237	0.6299	1.1484	3.1925	1.2957	1.3548	0.0
14	0.2465	0.7228	0.4545	0.4762	1.1191	0.7128	0.9024	1.5307	0.8934	0.6296	1.8253	3.0902	1.2957	1.3548	0.0
15	0.4740	0.3181	1.3675	0.1096	0.9293	1.1394	0.8340	1.2151	1.6947	1.0157	0.9694	1.4247	1.8175	0.7976	0.0
16	0.2000	0.2400	0.2500	0.4000	0.4500	0.5000	0.6700	0.8500	0.7300	0.8000	0.8200	0.9600	0.9700	0.6000	0.6000

## POPULATION WTS AND NOS

WT	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
155138.	155555.	156978.	156978.	155274.	156018.	149492.	139104.	121566.	101173.	89861.	83193.	82232.	94337.	97984.	101197.
302983.	303856.	307763.	312034.	318363.	308426.	289881.	250262.	207671.	183023.	176538.	195491.	241116.	238607.	230067.	

POPULATION WTS AND NOS AGE 8 TO 16	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
101031.	105905.	108707.	102425.	98718.	94513.	89932.	82321.	70385.	61617.	51136.	38822.	35928.	46672.	63403.	
140695.	155295.	162678.	153026.	146112.	143785.	142616.	133370.	115484.	98343.	79794.	64312.	64859.	86080.	116919.	

Table 2. AM PLAICE FEMALE 3LN 1962

NATURAL MORTALITY= 0.20		PARTIAL RECRUITMENT MULTIPLIER															
		0.0500	0.0800	0.1200	0.1800	0.2500	0.3500	0.5000	0.6000	1.0000	1.1000	1.1500	1.3000	1.3000	1.3000	1.3000	
ASSUMED FISHING MORTALITY FOR LAST AGES		0.2300 0.2600 0.2800 0.3400 0.3900 0.4600 0.4700 0.5500 0.6000 0.6000 0.6700 0.8100 0.8400 1.0000 0.5000															
ESTIMATED POPULATION		1962 1963 1964 1965 1966 1967 1968 1969 1970 1970 1971 1972 1973 1974 1975 1976															
AGE YEAR		1962	1963	1964	1965	1966	1967	1968	1969	1970	1970	1971	1972	1973	1974	1975	1976
7	118125	110312	103077	104121	93783	89603	87262	86237	73909	88640	117709	168719	259587	203473	289673	150667	
8	86445	95931	89585	82197	82392	73768	70527	70501	68099	59890	70320	70320	137253	137253	203473	234445	
9	59480	70262	78075	71878	63375	64721	58334	54743	53130	53056	45983	55323	75364	108987	177600	177600	
10	52667	48117	56936	62060	56598	48187	50853	44143	39603	39503	38578	34302	42528	58932	85517	85517	
11	32355	42380	38714	42753	48066	43975	36630	37788	32084	32084	26098	28718	26528	30912	44874	44874	
12	20092	25627	33747	28272	33011	36678	32374	28945	25969	21511	17171	17171	19475	22750	22750	22750	
13	18029	15684	19315	24655	20350	24388	24257	20153	16371	16275	12498	10810	10810	13156	10810	10810	
14	14036	13709	11575	15309	17137	14025	15587	16006	12364	9467	9878	4000	5068	6358	8229	8229	
15	8400	19787	9879	8152	10119	11511	8412	8892	10158	6833	4731	5145	2460	2599	3269	3269	
16	5554	5562	6690	6938	5244	6455	6458	4905	4936	4936	2278	2278	1340	1242	1142	1142	
17	5399	3781	3641	4736	3904	3144	3194	3310	2715	2156	2156	685	1340	1560	1560	1560	
18	2494	3540	2532	2432	2728	2168	1331	1460	1726	1104	402	473	197	266	103	103	
19	2306	1266	2337	1563	1488	1300	761	500	622	658	402	254	86	102	46	46	
20	1737	1465	679	1429	1721	833	721	295	129	129	224	213	97	7	52	11	

KNOWN CATCHES		1962 1963 1964 1965 1966 1967 1968 1969 1970 1970 1971 1972 1973 1974 1975 1976															
AGE YEAR		1962	1963	1964	1965	1966	1967	1968	1969	1970	1970	1971	1972	1973	1974	1975	1976
7	864	807	2426	3156	3332	3131	1152	2824	687	2489	1159	976	3402	3171	3171	3171	
8	567	526	2058	2487	3023	2378	3115	4984	2983	3371	2138	2962	3742	4295	4295	4295	
9	842	752	4268	3033	4083	3582	3938	5766	4417	5371	3698	5342	3172	3172	3172	3172	
10	807	1050	3785	2202	2956	3119	4279	4484	5113	6903	3920	3842	4318	3640	3640	3640	
11	852	1270	3287	3091	2919	5068	7075	6288	5511	6053	4336	3810	3960	2827	2827	2827	
12	848	1399	1100	3370	2914	4893	7075	6288	4351	5654	4336	3590	3082	2958	2958	2958	
13	1166	1704	1464	2669	2785	3393	4841	4571	3636	3814	4678	3652	2754	2813	2813	2813	
14	1884	1704	1091	1581	2022	3378	4241	3257	3601	3127	3278	2174	1714	2145	1174	1942	
15	1454	1059	819	1270	1270	2311	2191	2590	2084	2059	1743	3174	853	1089	1174	1942	
16	973	623	607	1270	1136	1374	2185	1438	1236	878	1539	1427	594	594	594	442	
17	857	650	536	1270	1032	1121	1277	1088	834	555	1597	402	187	193	193	193	
18	467	395	536	618	426	379	652	633	315	555	256	333	65	190	190	45	
19	409	383	189	466	262	343	363	310	64	120	256	223	20	80	80	20	
20							302	138			120	128	62	4	35	5	

ESTIMATE FISHING MORTALITY		1962 1963 1964 1965 1966 1967 1968 1969 1970 1970 1971 1972 1973 1974 1975 1976															
AGE YEAR		1962	1963	1964	1965	1966	1967	1968	1969	1970	1970	1971	1972	1973	1974	1975	1976
7	0.0081	0.0081	0.0264	0.0341	0.0401	0.0394	0.0147	0.0368	0.0103	0.0315	0.0109	0.0064	0.0146	0.0122	0.0122	0.0122	
8	0.0073	0.0060	0.0202	0.0501	0.0414	0.0347	0.0533	0.0615	0.0496	0.0642	0.0342	0.0349	0.0306	0.0306	0.0306	0.0306	
9	0.0120	0.0103	0.0296	0.0390	0.0740	0.0406	0.0788	0.1238	0.0964	0.1186	0.0931	0.0687	0.0476	0.0476	0.0476	0.0476	
10	0.0171	0.0174	0.0865	0.0555	0.0524	0.0742	0.0975	0.1191	0.1540	0.2146	0.1191	0.1346	0.1190	0.1190	0.1190	0.1190	
11	0.0095	0.0280	0.1143	0.0586	0.0704	0.1042	0.1071	0.1751	0.1996	0.2753	0.1286	0.1644	0.1964	0.1964	0.1964	0.1964	
12	0.0742	0.0561	0.1139	0.1288	0.1028	0.1850	0.2759	0.2886	0.3477	0.2998	0.3247	0.2628	0.1922	0.2204	0.2204	0.2204	
13	0.0478	0.1038	0.0630	0.1638	0.1723	0.2501	0.2442	0.2886	0.3477	0.2998	0.5339	0.5020	0.3307	0.2694	0.2694	0.2694	
14	0.1506	0.1478	0.1506	0.2140	0.1980	0.3111	0.3588	0.2547	0.3931	0.4936	0.4519	0.46915	0.4480	0.4480	0.4480	0.4480	
15	0.2123	0.1804	0.1330	0.2412	0.2495	0.3179	0.3395	0.3885	0.4973	0.7048	0.5560	1.1451	0.4832	0.6227	0.6227	0.6227	
16	0.1846	0.2236	0.1454	0.3750	0.3115	0.5036	0.4689	0.3916	0.6285	0.5976	1.1957	1.2327	0.6740	0.7460	0.7460	0.7460	
17	0.2521	0.2010	0.2037	0.3515	0.3860	0.6396	0.5831	0.4514	0.6996	0.5960	1.3729	1.0465	0.4227	0.4592	0.4592	0.4592	
18	0.4777	0.2151	0.2821	0.5413	0.4871	0.8471	0.7795	0.6525	0.7638	0.8109	1.1368	1.5085	0.4507	1.5610	1.5610	1.5610	
19	0.2534	0.4227	0.2923	0.5743	0.3805	0.3889	0.7490	1.1566	0.8197	0.9773	1.2174	3.4635	0.2987	1.9432	1.9432	1.9432	
20	0.2930	0.2600	0.2800	0.3400	0.3900	0.4600	0.4700	0.5500	0.6000	0.6000	0.8100	0.9000	0.8400	1.0000	1.0000	0.5000	

Table 2. (Continued)

POPULATION WTS AND NOS		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
WT		298774.	311735.	324538.	331921.	323523.	315875.	294632.	273181.	248907.	228435.	217897.	233616.	287508.	365609.	399316.
NO		427131.	447530.	457183.	456496.	438916.	420755.	397453.	375837.	341813.	332174.	349699.	424290.	579250.	739706.	729822.
POPULATION WTS AND NOS AGE 10 TO 20																
WT		191516.	197232.	211010.	224517.	233895.	220624.	204917.	185730.	167342.	145653.	124866.	108058.	103798.	123146.	160490.
NO		163061.	171025.	166445.	158300.	159366.	192662.	181329.	164395.	146675.	130589.	115687.	104617.	107047.	130593.	177260.

Table 3. AM PLAICE MALE 30 1973-76

NATURAL MORTALITY=		0.25			
PARTIAL RECRUITMENT MULTIPLIER		0.0400 0.2200 0.4000 0.7500 1.0000 1.2500 1.2500 1.2500 1.0000			
ASSUMED FISHING MORTALITY FOR LAST AGES		1.5000 0.3800 1.3000 0.3000			
ESTIMATED POPULATION		1973	1974	1975	1976
AGE	YEAR				
6		11003.	16647.	9083.	18093.
7		9315.	8525.	12566.	7051.
8		8683.	6708.	5532.	9611.
9		6794.	4962.	4235.	3931.
10		3572.	2317.	3275.	2921.
11		1330.	791.	1463.	2159.
12		575.	171.	449.	854.
13		243.	24.	97.	183.
14		28.	4.	18.	26.
KNOWN CATCHES		1973	1974	1975	1976
AGE	YEAR				
6		50.	452.	26.	191.
7		620.	1255.	199.	399.
8		2040.	1120.	428.	964.
9		3370.	668.	428.	704.
10		2256.	387.	444.	674.
11		980.	189.	324.	602.
12		480.	41.	189.	238.
13		210.	1.	56.	51.
14		20.	1.	12.	6.
ESTIMATE FISHING MORTALITY		1973	1974	1975	1976
AGE	YEAR				
6		0.0052	0.0312	0.0032	0.0
7		0.0784	0.1825	0.0181	0.0
8		0.3095	0.2097	0.0918	0.0
9		0.8257	0.1655	0.1216	0.0
10		1.2579	0.2098	0.1668	0.0
11		1.8022	0.3159	0.2889	0.0
12		2.9081	0.3174	0.6481	0.0
13		3.9750	0.0474	1.0649	0.0
14		1.5000	0.3800	1.3000	0.5000
POPULATION WTS AND NOS		1973	1974	1975	1976
WT		13805.	11595.	11973.	13967.
NO		41544.	40149.	36719.	44827.
POPULATION WTS AND NOS AGE 8 TO 14		1973	1974	1975	1976
WT		9187.	6146.	6816.	8656.
NO		21225.	14977.	15070.	19684.

Table 4. AM PLAICE FEMALE 3D 1973-75

NATURAL MORTALITY= 0.20		PARTIAL RECRUITMENT MULTIPLIER											
		0.0100	0.1900	0.2800	0.3700	0.5500	0.6500	0.7500	1.0000	1.0700	1.1000	1.5000	1.0000
ASSUMED FISHING MORTALITY FOR LAST AGES		ESTIMATED POPULATION											
AGE YEAR		1973	1974	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
6		10273.	34620.	16356.	73237.								
7		8462.	8400.	28025.	13326.								
8		7654.	6771.	5497.	22835.								
9		7422.	5445.	4710.	4248.								
10		7892.	4792.	3864.	3423.								
11		5775.	3550.	2911.	2725.								
12		3829.	2810.	2175.	1982.								
13		3132.	1873.	1475.	1443.								
14		1327.	1336.	845.	854.								
15		492.	577.	667.	431.								
16		381.	227.	254.	326.								
17		80.	187.	129.	102.								
18		96.	26.	75.	53.								
KNOWN CATCHES		1973	1974	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
6		12.	354.	82.	265.								
7		175.	1525.	121.	885.								
8		908.	925.	279.	2197.								
9		1420.	657.	428.	571.								
10		3217.	1119.	484.	515.								
11		2117.	808.	423.	588.								
12		1395.	913.	374.	488.								
13		1357.	761.	390.	434.								
14		563.	472.	285.	257.								
15		194.	242.	243.	137.								
16		138.	63.	117.	106.								
17		43.	87.	58.	42.								
18		46.	12.	32.	16.								
ESTIMATE FISHING MORTALITY		1973	1974	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
6		0.0013	0.0114	0.0056	0.0								
7		0.0229	0.2240	0.0048	0.0								
8		0.1405	0.1631	0.0577	0.0								
9		0.2375	0.1431	0.1190	0.0								
10		0.5988	0.2965	0.1490	0.0								
11		0.5198	0.2897	0.1842	0.0								
12		0.5152	0.4448	0.2107	0.0								
13		0.6517	0.5961	0.3457	0.0								
14		0.6327	0.4949	0.4728	0.0								
15		0.5723	0.6224	0.5153	0.0								
16		0.5105	0.3658	0.7135	0.0								
17		0.9086	0.7193	0.6864	0.0								
18		0.7400	0.6900	0.6300	0.4000								
POPULATION WTS AND NOS		1973	1974	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
WT		31181.	28146.	26394.	37497.								
NO		56812.	70616.	66952.	124986.								
POPULATION WTS AND NOS AGE 10 TO 18		1973	1974	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
WT		21408.	15094.	12319.	11284.								
NO		23001.	15380.	12394.	11341.								

TABLE 5.

1 AMERICAN PLAICE MALE 3LN  
NATURAL MORTALITY= 0.2500

AGE	POP. NO. (x10-3)	CATCH NO. (x10-3)	YEAR= 1975 FISHING MORT.	MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
6	85000.	1509.	0.021	0.321	27285.0	484.4	64822.4
7	83247.	3522.	0.049	0.349	29053.2	1229.2	61732.6
8	47208.	3970.	0.100	0.441	20818.7	1750.8	33266.9
9	22425.	3697.	0.206	0.567	12715.0	2096.2	14213.3
10	9780.	2805.	0.388	0.724	7080.7	2030.8	5167.3
11	4504.	1697.	0.547	0.855	3850.9	1450.9	2029.9
12	1627.	922.	0.989	0.988	1607.5	910.9	471.3
13	454.	297.	1.276	1.078	489.4	320.2	98.7
14	62.	30.	0.773	1.324	82.1	59.7	22.3
15	18.	2.	0.134	1.394	25.1	2.8	12.3
16	2.	1.	0.812	1.536	3.1	1.5	0.7
TOTAL	254327.	18452.			103010.4	10317.4	181837.3

NATURAL MORTALITY= 0.2500

AGE	POP. NO. (x10-3)	CATCH NO. (x10-3)	YEAR= 1976 FISHING MORT.	MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
6	64000.	1895.	0.035	0.321	20544.0	608.3	48128.9
7	64822.	4015.	0.073	0.349	22623.0	1401.2	46929.7
8	61733.	7631.	0.150	0.441	27224.1	3365.3	41380.7
9	33267.	6311.	0.240	0.567	18862.3	3578.3	20380.2
10	14213.	4091.	0.390	0.724	10290.4	2961.9	7494.6
11	5167.	2078.	0.596	0.855	4418.0	1776.7	2217.4
12	2030.	953.	0.740	0.988	2005.5	941.6	754.3
13	471.	232.	0.793	1.078	508.1	250.1	166.1
14	99.	42.	0.644	1.324	130.7	55.6	40.4
15	22.	10.	0.693	1.394	31.1	13.9	8.7
16	12.	6.	0.786	1.536	18.8	9.2	4.4
TOTAL	245837.	27264.			106655.9	14962.1	167505.1

1 AMERICAN PLAICE MALE 3LN  
NATURAL MORTALITY= 0.2500

AGE	POP. NO. (x10-3)	CATCH NO. (x10-3)	YEAR= 1977 FISHING MORT.	MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
6	64000.	1675.	0.030	0.321	20544.0	537.6	48370.2
7	48129.	3082.	0.075	0.349	16797.0	1075.5	34774.5
8	46930.	4892.	0.125	0.441	20696.0	2157.3	32254.3
9	41381.	6665.	0.200	0.567	23462.8	3778.8	26385.5
10	20380.	5037.	0.325	0.724	14755.3	3647.0	11468.1
11	7495.	2636.	0.500	0.855	6407.9	2254.0	3540.2
12	2217.	924.	0.625	0.988	2190.8	912.5	924.4
13	754.	341.	0.700	1.078	813.1	367.4	291.7
14	166.	67.	0.600	1.324	219.9	88.9	71.0
15	40.	16.	0.600	1.394	56.3	22.7	17.3
16	9.	4.	0.600	1.536	13.3	5.4	3.7
TOTAL	231501.	25338.			105956.2	14847.2	158100.4

NATURAL MORTALITY= 0.2500

AGE	POP. NO. (x10-3)	CATCH NO. (x10-3)	YEAR= 1978 FISHING MORT.	MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
6	64000.	1344.	0.024	0.321	20544.0	431.3	48661.3
7	48370.	2495.	0.060	0.349	16881.2	870.9	35476.9
8	34774.	2934.	0.100	0.441	15335.5	1293.9	24505.1
9	32254.	4234.	0.160	0.567	18288.2	2400.5	21405.6
10	26385.	5374.	0.260	0.724	19103.1	3890.7	15844.4
11	11468.	3373.	0.400	0.855	9805.2	2884.0	5986.9
12	3540.	1245.	0.500	0.988	3497.7	1230.3	1672.3
13	924.	355.	0.560	1.078	996.5	382.4	411.2
14	292.	99.	0.480	1.324	386.2	131.6	140.6
15	71.	24.	0.480	1.394	99.0	33.7	34.2
16	17.	6.	0.480	1.536	26.5	9.0	8.3
TOTAL	222097.	21483.			104962.9	13558.3	154146.5

TABLE 6.

1 AMERICAN PLAICE FEMALE 3LN							
NATURAL MORTALITY* 0.2000							
AGE	POP. NO. (X10-3)	CATCH NO. (X10-3)	YEAR* FISHING MORT.	1975 MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
7	135000.	3171.	0.027	0.326	44010.0	1033.7	107584.3
8	102000.	4295.	0.048	0.432	44064.0	1855.4	79596.7
9	108987.	4105.	0.043	0.528	57545.1	2167.4	85475.4
10	58832.	3640.	0.071	0.694	40829.4	2526.2	44866.3
11	30912.	2827.	0.107	0.878	27140.7	2482.1	22740.4
12	16513.	2958.	0.220	1.073	17718.4	3173.9	10849.8
13	13156.	2813.	0.268	1.341	17642.2	3772.2	8239.0
14	6358.	2145.	0.462	1.546	9829.5	3316.2	3279.6
15	2599.	1089.	0.612	1.830	4756.2	1992.9	1153.9
16	1242.	591.	0.732	2.177	2703.8	1286.6	489.1
17	560.	393.	1.415	2.419	1354.6	950.7	111.4
18	266.	190.	1.470	2.714	721.9	515.7	50.1
19	102.	80.	1.839	2.868	292.5	229.4	13.3
20	52.	35.	1.300	2.997	155.8	104.9	11.6
TOTAL	476579.	28332.			268763.9	25407.3	364460.6
NATURAL MORTALITY* 0.2000							
AGE	POP. NO. (X10-3)	CATCH NO. (X10-3)	YEAR* FISHING MORT.	1976 MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
7	125000.	3373.	0.031	0.326	40750.0	1099.6	99217.4
8	107584.	8332.	0.090	0.432	46476.4	3599.4	80501.4
9	79597.	8856.	0.131	0.528	42027.0	4676.0	57166.8
10	85475.	6681.	0.091	0.694	59319.9	4636.6	63894.2
11	44866.	4789.	0.126	0.878	39392.6	4204.7	32384.7
12	22740.	3320.	0.176	1.073	24400.5	3562.4	15613.7
13	10850.	2183.	0.250	1.341	14549.6	2927.4	6918.2
14	8239.	1942.	0.300	1.546	12737.5	3002.3	4997.2
15	3280.	1174.	0.498	1.830	6001.7	2148.4	1631.9
16	1154.	442.	0.543	2.177	2512.0	962.2	548.9
17	489.	193.	0.565	2.419	1183.0	466.9	227.6
18	111.	45.	0.583	2.714	302.4	122.1	50.9
19	50.	20.	0.574	2.868	143.7	57.4	23.1
20	13.	5.	0.531	2.997	39.8	15.0	6.4
TOTAL	489449.	41355.			289835.7	31480.4	363182.1
1 AMERICAN PLAICE FEMALE 3LN							
NATURAL MORTALITY* 0.2000							
AGE	POP. NO. (X10-3)	CATCH NO. (X10-3)	YEAR* FISHING MORT.	1977 MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
7	125000.	2244.	0.020	0.326	40750.0	731.6	100314.8
8	99217.	2834.	0.032	0.432	42861.9	1224.1	78674.1
9	80501.	3422.	0.048	0.528	42504.8	1806.9	62820.1
10	57167.	3604.	0.072	0.694	39673.8	2501.0	43552.8
11	63894.	5520.	0.100	0.878	56099.1	4846.6	47334.0
12	32385.	3844.	0.140	1.073	34748.8	4124.1	23050.5
13	15614.	2574.	0.200	1.341	20937.9	3451.4	10466.2
14	6918.	1343.	0.240	1.546	10695.5	2076.7	4455.6
15	4997.	1503.	0.400	1.830	9144.9	2750.7	2742.5
16	1632.	530.	0.440	2.177	3552.6	1154.5	860.5
17	549.	185.	0.460	2.419	1327.8	447.1	283.7
18	228.	84.	0.520	2.714	617.6	228.9	110.8
19	51.	19.	0.520	2.868	146.0	54.1	24.8
20	23.	9.	0.520	2.997	69.2	25.7	11.2
TOTAL	488176.	27714.			303129.6	25423.4	374701.0
NATURAL MORTALITY* 0.2000							
AGE	POP. NO. (X10-3)	CATCH NO. (X10-3)	YEAR* FISHING MORT.	1978 MEAN WT. KG.	POP. WT. (METRIC TONS)	CATCH WT. (METRIC TONS)	RESIDUAL (POP. NOS.)
7	125000.	2022.	0.018	0.326	40750.0	659.1	100515.6
8	100315.	2512.	0.028	0.432	43336.0	1085.0	79863.0
9	78674.	2935.	0.042	0.528	41539.9	1549.6	61763.6
10	62820.	3480.	0.063	0.694	43597.1	2415.1	48292.4
11	43553.	3330.	0.088	0.878	38239.3	2923.8	32654.2
12	47334.	4975.	0.123	1.073	50789.4	5338.6	34268.6
13	23050.	3364.	0.175	1.341	30910.7	4510.8	15842.4
14	10466.	1803.	0.210	1.546	16180.7	2787.6	6945.9
15	4456.	1199.	0.390	1.830	8153.7	2195.1	2570.6
16	2743.	799.	0.385	2.177	5970.5	1740.3	1527.9
17	860.	260.	0.402	2.419	2081.5	628.7	471.3
18	284.	95.	0.455	2.714	769.9	257.0	147.4
19	111.	37.	0.455	2.868	317.7	106.1	57.5
20	25.	8.	0.455	2.997	74.3	24.8	12.9
TOTAL	499690.	26819.			322710.4	26221.5	384932.8



Table 7.

PLAICE MALE 30							
NATURAL MORTALITY# 0.2500 YEAR 1975							
AGE	POP. NO. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. %METRIC TONS<	CATCH WT. %METRIC TONS<	RESIDUAL POP. NOS.
6	8000.	26.	0.004	0.186	1488.0	4.8	6205.5
7	12566.	199.	0.019	0.276	3468.2	54.9	9602.2
8	5532.	428.	0.092	0.301	1665.1	128.8	3929.6
9	4235.	428.	0.121	0.426	1804.1	182.3	2922.3
10	3275.	444.	0.166	0.549	1798.0	243.8	2160.5
11	1463.	324.	0.287	0.718	1050.4	232.6	855.1
12	449.	189.	0.635	0.843	378.5	159.3	185.3
13	97.	56.	1.020	1.013	98.3	56.7	27.2
14	18.	12.	1.324	1.155	20.8	13.9	3.7
TOTAL	35635.	2106.			11771.4	1077.2	25891.6

NATURAL MORTALITY# 0.2500 YEAR 1976							
AGE	POP. NO. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. %METRIC TONS<	CATCH WT. %METRIC TONS<	RESIDUAL POP. NOS.
6	8000.	199.	0.029	0.186	1488.0	37.0	6052.3
7	6206.	399.	0.076	0.276	1712.7	110.1	4479.2
8	9602.	964.	0.121	0.301	2890.3	290.2	6626.0
9	3930.	704.	0.226	0.426	1674.0	299.9	2441.4
10	2922.	674.	0.300	0.549	1604.4	370.0	1686.0
11	2160.	602.	0.375	0.718	1551.2	432.2	1156.4
12	855.	238.	0.375	0.843	720.9	200.6	457.7
13	185.	51.	0.370	1.013	187.7	51.7	99.7
14	27.	6.	0.285	1.155	31.5	6.9	16.0
TOTAL	33888.	3837.			11860.6	1798.7	23014.6

NATURAL MORTALITY# 0.2500 YEAR 1977							
AGE	POP. NO. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. %METRIC TONS<	CATCH WT. %METRIC TONS<	RESIDUAL POP. NOS.
6	8000.	140.	0.020	0.186	1488.0	26.1	6107.0
7	6052.	584.	0.111	0.276	1670.4	155.6	4218.3
8	4479.	721.	0.200	0.301	1348.2	217.1	2856.1
9	6626.	1848.	0.375	0.426	2822.7	787.1	3546.6
10	2441.	859.	0.500	0.549	1340.3	471.5	1153.2
11	1686.	593.	0.500	0.718	1210.6	425.8	796.4
12	1156.	407.	0.500	0.843	974.9	342.9	546.3
13	458.	161.	0.500	1.013	463.7	163.1	216.2
14	100.	35.	0.500	1.155	115.1	40.5	47.1
TOTAL	30999.	5328.			11433.9	2629.7	19487.2

NATURAL MORTALITY# 0.2500 YEAR 1978							
AGE	POP. NO. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. %METRIC TONS<	CATCH WT. %METRIC TONS<	RESIDUAL POP. NOS.
6	8000.	140.	0.020	0.186	1488.0	26.1	6107.0
7	6107.	589.	0.111	0.276	1685.5	157.0	4256.5
8	4218.	679.	0.200	0.301	1269.7	204.5	2689.7
9	2856.	796.	0.375	0.426	1216.7	339.3	1528.7
10	3547.	1248.	0.500	0.549	1947.1	684.9	1675.3
11	1153.	406.	0.500	0.718	828.0	291.3	544.7
12	796.	280.	0.500	0.843	671.4	236.2	376.2
13	546.	192.	0.500	1.013	553.4	194.6	258.0
14	216.	76.	0.500	1.155	249.7	87.8	102.1
TOTAL	27440.	4387.			9909.5	2221.7	17538.4

Table 8.

PLAICE FEM 30

NATURAL MORTALITY# 0.2000		YEAR 1975					
AGE	POP. NU. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. XMETRIC TONS<	CATCH WT. XMETRIC TONS<	RESIDUAL POP. NOS.
7	8400.	121.	0.017	0.259	2175.6	31.3	6761.4
8	5497.	279.	0.058	0.334	1836.0	93.2	4247.0
9	4710.	478.	0.119	0.425	2001.7	203.1	3423.6
10	3864.	484.	0.149	0.585	2250.4	283.1	2725.6
11	2911.	443.	0.184	0.792	2305.5	350.9	1982.8
12	2176.	374.	0.210	1.023	2226.0	382.6	1444.1
13	1475.	390.	0.343	1.290	1902.7	503.1	857.0
14	842.	288.	0.468	1.569	1325.8	451.9	433.3
15	667.	243.	0.509	1.899	1266.6	461.5	328.3
16	254.	117.	0.699	2.167	550.4	253.5	103.4
17	129.	58.	0.675	2.343	302.2	135.9	53.8
18	75.	32.	0.628	2.433	182.5	77.9	32.8
TOTAL	31003.	3307.			18335.7	3228.0	22392.9

NATURAL MORTALITY# 0.2000		YEAR 1976					
AGE	POP. NU. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. XMETRIC TONS<	CATCH WT. XMETRIC TONS<	RESIDUAL POP. NOS.
7	8500.	885.	0.122	0.259	2201.5	229.2	6159.9
8	6761.	2197.	0.440	0.334	2258.3	733.8	3565.3
9	4247.	531.	0.149	0.425	1805.0	225.7	2995.8
10	3424.	615.	0.220	0.585	2002.8	359.8	2249.5
11	2726.	568.	0.260	0.792	2158.7	449.9	1720.7
12	1983.	468.	0.300	1.023	2028.4	478.8	1202.6
13	1444.	434.	0.400	1.290	1862.9	559.9	792.5
14	857.	257.	0.399	1.569	1344.6	403.2	470.8
15	433.	137.	0.426	1.899	822.8	260.2	231.7
16	328.	106.	0.437	2.167	711.3	229.7	173.6
17	103.	42.	0.587	2.343	242.2	98.4	47.1
18	54.	16.	0.395	2.433	130.8	38.9	29.7
TOTAL	30860.	6256.			17569.3	4067.4	19639.0

NATURAL MORTALITY# 0.2000		YEAR 1977					
AGE	POP. NU. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. XMETRIC TONS<	CATCH WT. XMETRIC TONS<	RESIDUAL POP. NOS.
7	8500.	593.	0.080	0.259	2201.5	153.6	6424.2
8	6160.	583.	0.110	0.334	2057.4	194.6	4518.0
9	3565.	451.	0.150	0.425	1515.2	191.8	2612.4
10	2996.	538.	0.220	0.585	1752.5	314.8	1968.4
11	2249.	469.	0.260	0.792	1781.6	371.3	1420.0
12	1721.	406.	0.300	1.023	1760.2	415.6	1043.6
13	1203.	362.	0.400	1.290	1551.4	466.6	660.0
14	793.	238.	0.400	1.569	1243.5	374.0	435.0
15	471.	150.	0.430	1.899	894.0	285.2	250.7
16	232.	75.	0.440	2.167	502.0	163.2	122.2
17	174.	72.	0.600	2.343	406.8	168.0	78.0
18	47.	14.	0.400	2.433	114.5	34.4	25.8
TOTAL	28109.	3952.			15780.7	3133.1	19458.3

NATURAL MORTALITY# 0.2000		YEAR 1978					
AGE	POP. NU. XX10-3<	CATCH NO. XX10-3<	FISHING MORT.	MEAN WT. KG.	POP. WT. XMETRIC TONS<	CATCH WT. XMETRIC TONS<	RESIDUAL POP. NOS.
7	8500.	593.	0.080	0.259	2201.5	153.6	6424.2
8	6424.	608.	0.110	0.334	2145.7	202.9	4711.8
9	4518.	572.	0.150	0.425	1920.1	243.0	3183.8
10	2512.	451.	0.220	0.585	1469.8	264.0	1650.8
11	1968.	410.	0.260	0.792	1558.9	324.9	1242.6
12	1420.	339.	0.300	1.023	1452.7	343.0	861.3
13	1044.	314.	0.400	1.290	1346.3	405.0	572.8
14	660.	199.	0.400	1.569	1035.6	311.5	362.2
15	435.	139.	0.430	1.899	826.0	263.5	231.7
16	251.	81.	0.440	2.167	543.4	176.6	132.2
17	122.	50.	0.600	2.343	286.2	118.2	54.9
18	78.	23.	0.400	2.433	189.8	57.1	42.8
TOTAL	27932.	3776.			14975.9	2863.3	19470.9

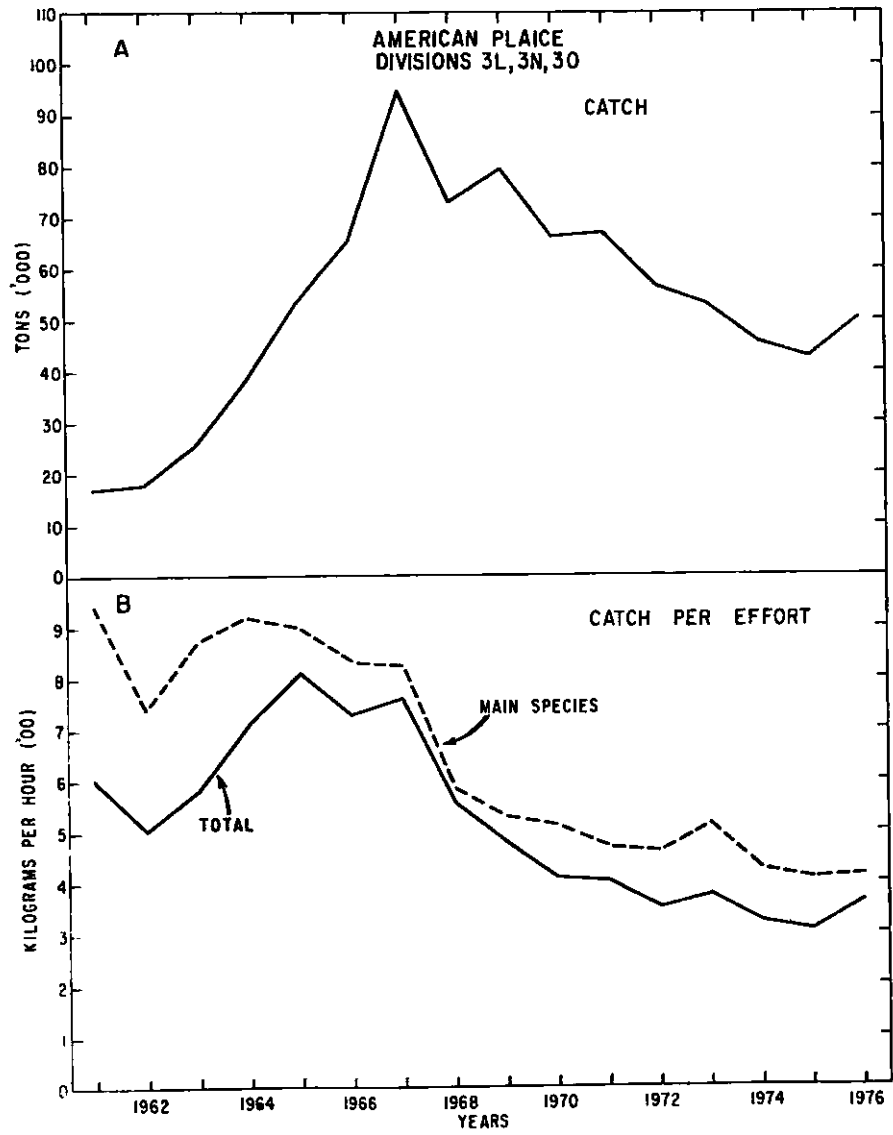


Fig. 1A. Nominal catches of American plaice from ICNAF Div. 3LNO.  
B. Catch/hour for American plaice from ICNAF Div. 3LNO.

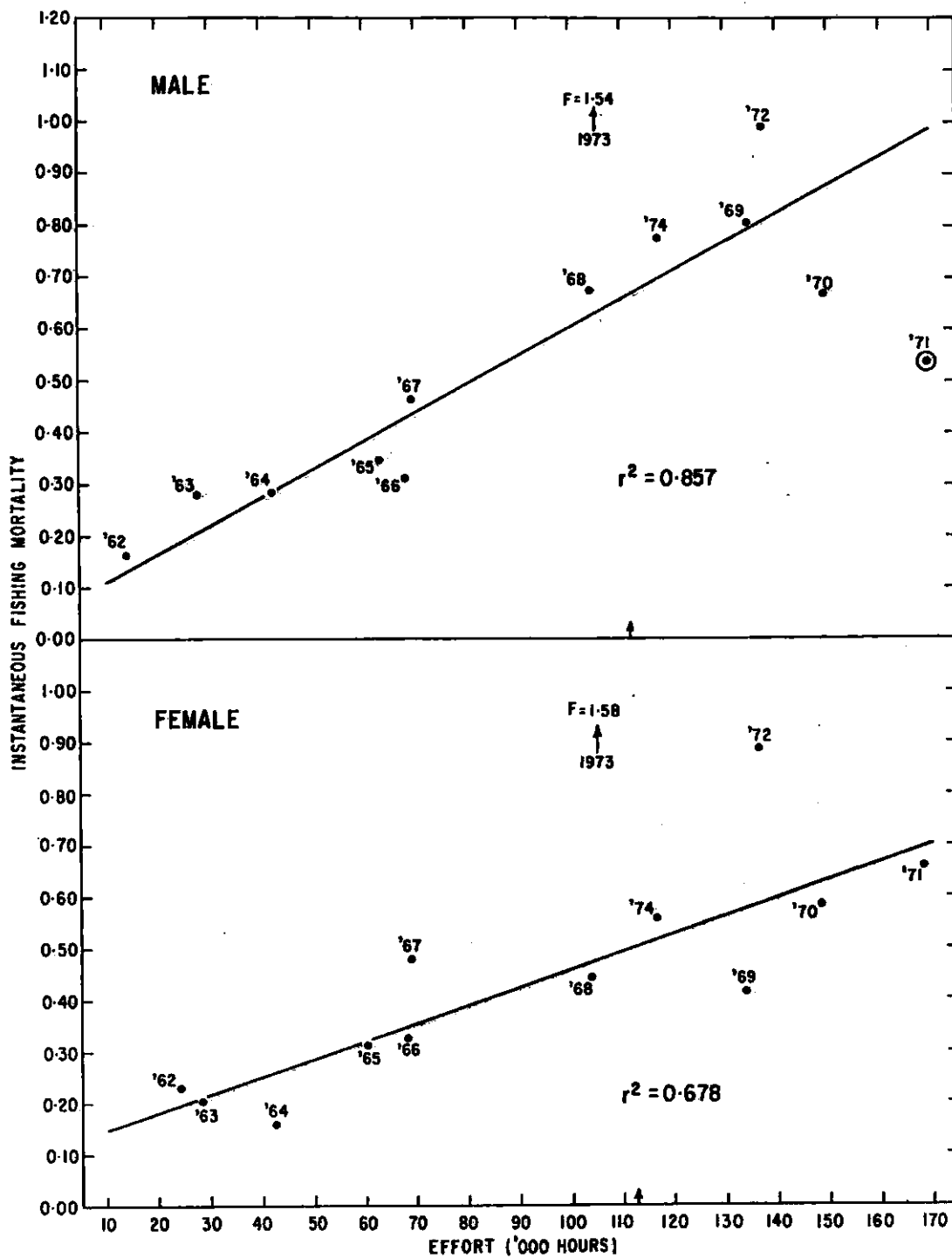


Fig. 2. Yield per recruit of male and female American plaice in ICNAF Div. 3LN.

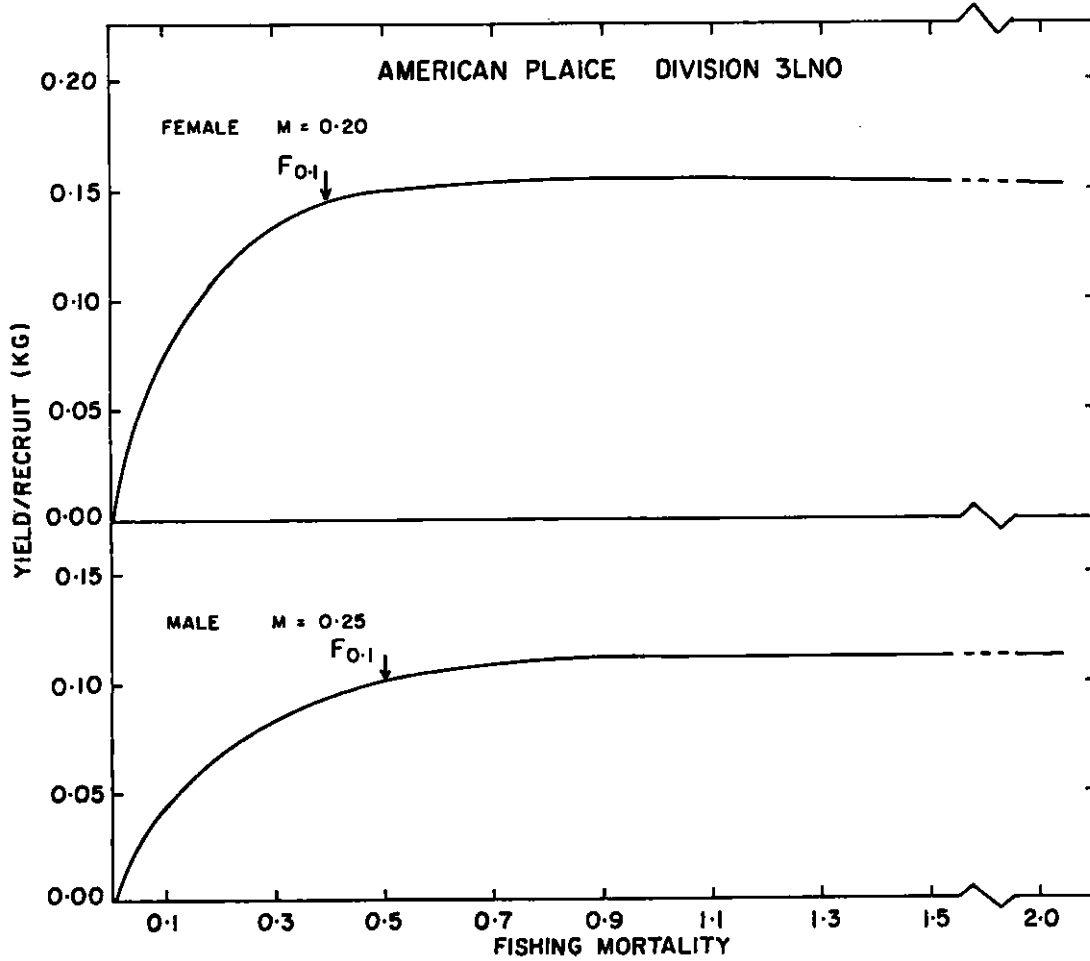


Fig. 3. Regression of fishing mortality on effort for male and female plaice from ICNAF Div. 3LN.

