

Serial No. 2836  
(D.c.9)ICNAF Res.Doc. 72/110ANNUAL MEETING - JUNE 1972Biomass estimates for selected commercial species  
from stratified-random surveys in ICNAF Divisions 3L and 3N,  
1971 and 3Ps, 1972

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A proposed stratification scheme was presented to the 1971 Annual ICNAF Meeting (Res. Doc. 71/128) for ICNAF Divisions 3L, 3N and 3O and a scheme is presented to the present meeting (Res. Doc. 72/ ) for ICNAF Division 3Ps. Two cruises were conducted using these stratification schemes; one in Divisions 3L and 3N during June 1971 and one in Division 3Ps during March 1972. The station plots of these cruises in relation to the strata are presented in Fig. 1 and 2; the biomass calculations in numbers and weights with their respective variance for each stratum and the overall weighted figures for the total survey area according to the method of Grosslein (1971 Res. Doc. 71/59) are shown in Tables 1-3.

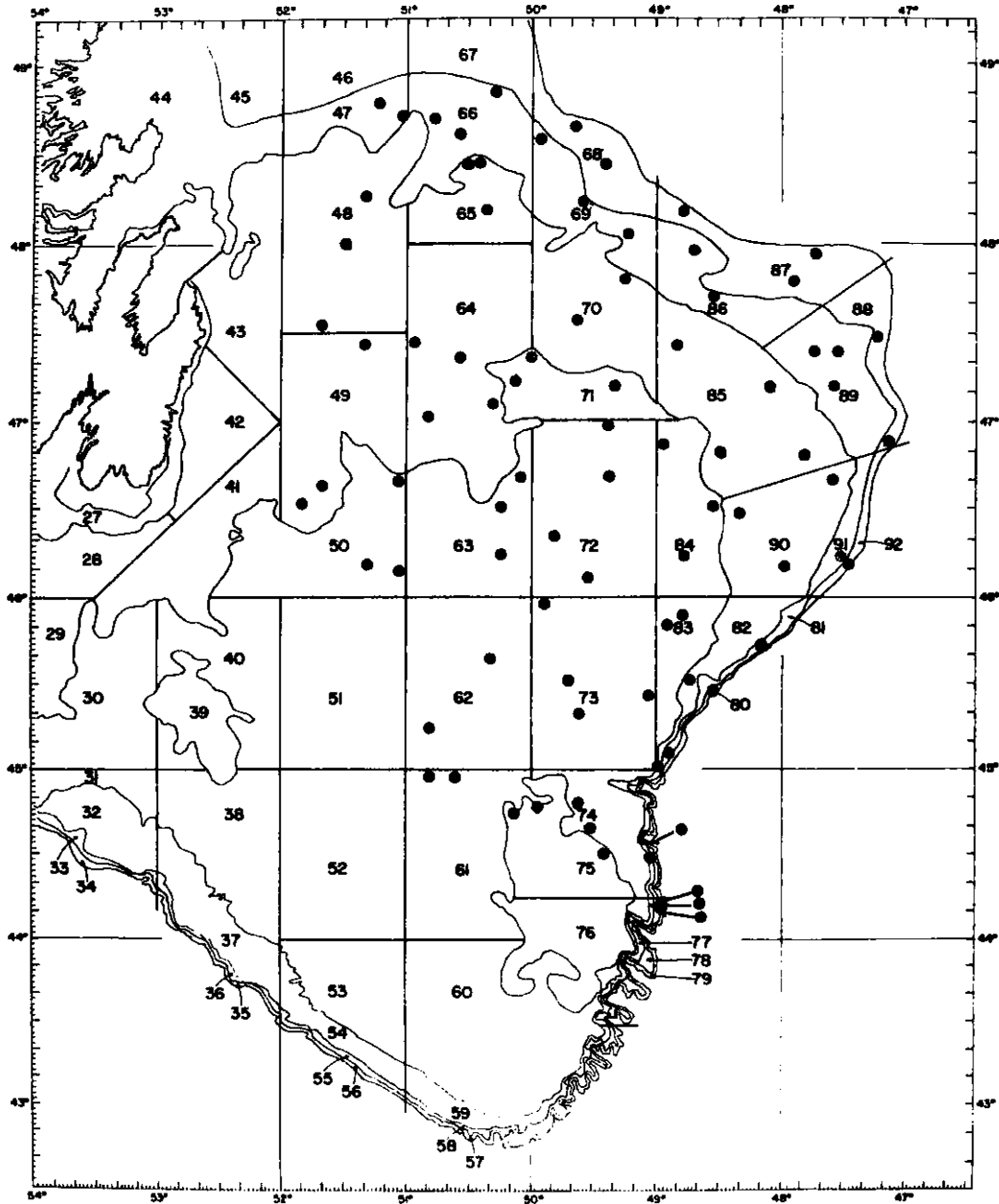


Fig. 1. Station plot for A. T. Cameron, Cruise No. 187, June 1971. Stratified-random survey. ICNAF Divisions 3L and 3N.

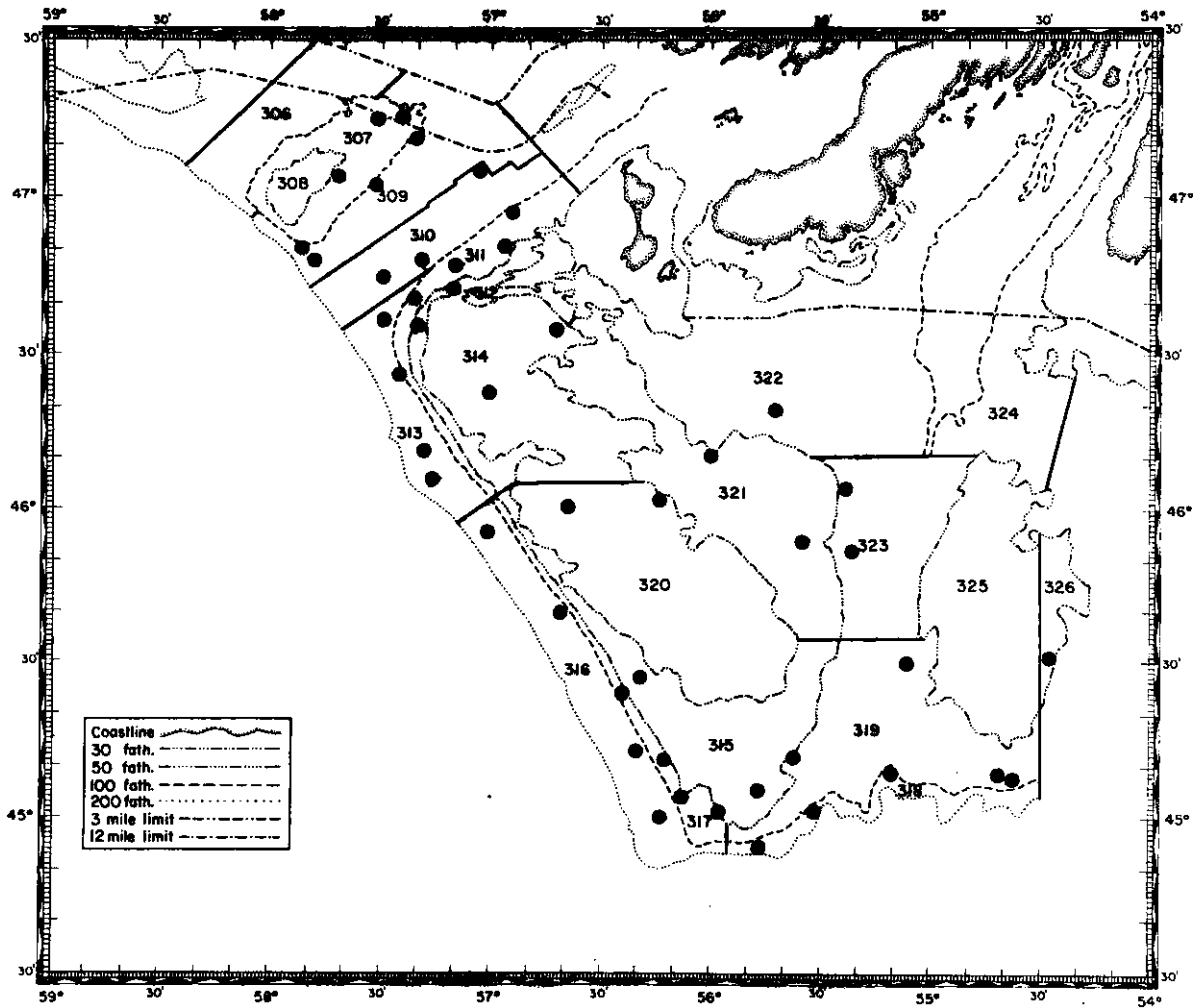


Fig. 2. Station plot for A. T. Cameron, Cruise No. 197, March 1972. Stratified-random survey. ICNAF Division 3Ps.

Table 1. Biomass estimates for ICNAF Division 3L, stratified-random survey, June 1971. All weights are in kg.

Cod							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
347	2	109.86	1482.10	94.90	5153.10	5021497	4337595
348	3	44.07	1034.38	177.29	39008.14	9017714	36274384
349	3	11.02	23.95	92.84	3865.77	1717618	14472149
350	3	17.18	108.07	36.34	58.90	2613809	5530330
363	3	3.56	4.10	10.59	163.07	472029	1402696
364	4	12.88	53.80	77.24	12766.71	2586955	15511971
365	3	29.81	410.54	29.43	6.49	1981994	1956141
366	3	331.20	209869.50	173.76	50153.66	30814080	16166062
368	2	3.40	23.16	13.24	350.68	186009	723841
369	3	120.56	1846.04	73.86	1359.35	7558062	4630494
370	2	18.47	612.50	14.23	392.79	2232033	1720016
371	3	13.61	318.54	15.45	232.04	882755	1001927
372	4	55.17	4266.94	26.21	837.79	10223746	4856278
384	3	1.30	5.04	2.94	25.98	100086	227194
385	4	9.97	12.21	7.94	2.08	1604216	1278990
386	2	193.96	33188.97	120.28	15198.73	11545959	7159946
387	3	6.81	102.08	26.92	1074.84	440852	1744136
388	2	6.81	68.06	15.01	188.59	248012	546902
389	3	102.41	4276.49	52.82	1054.06	8136055	4196404
390	3	23.01	964.44	6.43	31.91	3245700	906959
Total area		Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit	
No.	100629056	190256544	11001568	46.61	88.13	5.10	
Wt.	124644256	203226048	46062464	57.73	94.13	21.34	

American plaice							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
347	2	89.93	4.25	28.03	51.53	4110517	1281102
348	3	795.93	428761.00	208.48	38236.99	162849296	42656272
349	3	455.32	186735.31	273.37	88037.88	70978048	42613696
350	3	103.70	2830.30	75.77	316.07	15781497	11530853
363	3	66.44	129.81	54.73	140.46	8796900	7247271
364	4	433.61	82642.75	151.40	6032.94	87077904	30403456
365	3	637.78	181889.50	186.71	20948.78	42397424	12411714
366	3	134.17	25595.49	33.40	1448.78	12482421	3107278
368	2	0.0	0.0	0.0	0.0	0	0
369	3	97.55	5677.29	30.90	1052.83	6115531	1937058
370	2	168.19	425.38	42.81	327.69	20323248	5173386
371	3	134.17	11700.88	93.13	5338.77	8701438	6040189
372	4	37.43	137.69	26.37	90.45	6935933	4886947
384	3	184.40	38437.53	85.48	5132.13	14237177	6599988
385	4	372.85	125871.06	135.62	12162.63	60021136	21831632
386	2	50.56	3495.41	20.30	450.43	3009475	1208650
387	3	4.54	19.22	1.18	1.04	293901	76246
388	2	3.40	11.82	1.32	1.56	124006	48256
389	3	59.63	4287.81	16.92	254.89	4737451	1344251
390	3	170.79	13745.69	229.67	31144.60	24091312	32397264
Total area		Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit	
No.	553062400	811359744	294764800	256.18	375.82	136.53	
Wt.	232795408	330423552	135167072	107.83	153.05	62.61	

Table 1. Continued.

Yellowtail							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
347	2	0.0	0.0	0.0	0.0	0	0
348	3	0.0	0.0	0.0	0.0	0	0
349	3	8.75	69.00	4.71	19.74	1363990	733929
350	3	73.89	5280.92	31.34	803.26	11244320	4769070
363	3	243.70	37243.71	116.53	7815.57	32269584	15429677
364	4	24.31	477.02	13.35	141.10	4881049	2681354
365	3	0.0	0.0	0.0	0.0	0	0
366	3	0.0	0.0	0.0	0.0	0	0
368	2	0.0	0.0	0.0	0.0	0	0
369	3	0.0	0.0	0.0	0.0	0	0
370	2	1.46	4.25	1.32	3.51	176213	160002
371	3	135.79	24052.27	86.07	9774.14	8806527	5582163
372	4	263.96	38880.25	131.64	5444.98	48911824	24393856
384	3	123.47	12371.94	83.72	5256.42	9533153	6463678
385	4	0.0	0.0	0.0	0.0	0	0
386	2	0.0	0.0	0.0	0.0	0	0
387	3	0.0	0.0	0.0	0.0	0	0
388	2	0.0	0.0	0.0	0.0	0	0
389	3	0.0	0.0	0.0	0.0	0	0
390	3	0.32	0.32	0.29	0.26	45714	41508
Total area	Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit		
No.	117232336	177671536	56793136	54.30	82.30	26.31	
Wt.	60255200	86017024	34493376	27.91	39.84	15.98	

Greysole							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
347	2	10.69	92.63	11.26	93.61	488818	514459
348	3	1.94	11.34	2.06	12.73	397840	421446
349	3	0.0	0.0	0.0	0.0	0	0
350	3	0.0	0.0	0.0	0.0	0	0
363	3	0.32	0.32	0.88	2.34	42912	116891
364	4	1.70	2.13	2.43	5.91	341673	487519
365	3	0.0	0.0	0.0	0.0	0	0
366	3	3.56	21.11	5.15	25.78	331659	479096
368	2	0.97	1.89	0.66	0.88	53145	36192
369	3	10.69	69.00	10.59	52.21	670473	664134
370	2	0.0	0.0	0.0	0.0	0	0
371	3	0.0	0.0	0.0	0.0	0	0
372	4	0.0	0.0	0.0	0.0	0	0
384	3	0.32	0.32	0.59	1.04	25021	45439
385	4	0.24	0.24	0.33	0.44	39127	53291
386	2	11.18	250.01	17.66	623.44	665557	1051000
387	3	3.24	5.99	3.31	1.90	209930	214443
388	2	0.97	1.89	0.66	0.88	35430	24128
389	3	0.0	0.0	0.0	0.0	0	0
390	3	0.32	0.32	0.29	0.26	45714	41508
Total area	Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit		
No.	3347296	6157454	537138	1.55	2.85	0.25	
Wt.	4149543	9613475	-1314389	1.92	4.45	-0.61	

Table 2. Biomass estimates for ICNAF Division 3N, stratified-random survey, June 1971. All weights are in kg.

Cod							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
361	2	41.32	957.03	17.43	163.75	6894084	2908976
362	2	13.13	106.34	11.48	76.37	2432080	2126537
373	4	99.90	36629.89	44.03	3957.84	18510816	8158547
374	2	22.36	47.26	8.06	0.61	1389814	500665
375	3	42.45	1011.70	37.52	969.25	3700639	3270403
378	2	59.31	189.04	53.63	2.43	586101	529999
380	2	1.94	7.56	1.54	4.77	11710	9304
381	4	87.50	652.22	48.55	260.93	864739	479834
382	3	8.75	49.15	8.50	97.87	145925	141824
383	2	1.46	4.25	4.86	47.15	69359	230920
	Total area	Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit	
No.	34605200	90383200	-21172800	44.55	116.35	-27.26	
Wt.	18356944	35958800	755088	23.63	46.29	0.97	

American plaice							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
361	2	13.61	0.0	16.77	1.56	2270993	2798509
362	2	141.46	3255.78	86.51	562.65	26212416	16030836
373	4	76.56	7710.07	90.48	13579.21	14187125	16766913
374	2	45.21	0.47	62.90	703.80	2809841	3909305
375	3	23.33	389.43	16.77	84.94	2033938	1462062
378	2	21.39	120.99	22.51	450.43	211381	222469
380	2	0.0	0.0	0.0	0.0	0	0
381	4	21.88	69.63	21.52	532.44	216185	212654
382	3	38.56	875.58	22.81	275.16	643150	380323
383	2	63.68	4.25	67.09	284.05	3028691	3190899
	Total area	Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit	
No.	51613680	85572480	17654880	66.44	110.16	22.73	
Wt.	44973920	78715200	11232640	57.90	101.33	14.46	

Table 2. Continued.

Yellowtail

Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
361	2	118.13	454.17	44.58	0.39	19708976	7438152
362	2	371.39	4917.00	136.39	65.88	68818864	25273088
373	4	147.05	10321.99	71.62	2089.08	27248304	13270424
374	2	132.22	13338.97	65.99	2782.19	8218026	4101341
375	3	108.56	2080.76	58.41	552.58	9463462	5091570
378	2	0.0	0.0	0.0	0.0	0	0
380	2	0.0	0.0	0.0	0.0	0	0
381	4	0.0	0.0	0.0	0.0	0	0
382	3	0.0	0.0	0.0	0.0	0	0
383	2	29.17	1277.93	18.10	424.33	1387186	860703
	Total area	Upper limit	Lower limit	Av. per unit		Upper limit	Lower limit
No.	134844800	174722800	94966800	173.59		224.93	122.25
Wt.	56035232	69220512	42849936	72.14		89.11	55.16

Greysole

Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
361	2	0.0	0.0	0.0	0.0	0	0
362	2	1.46	4.25	1.77	6.23	270231	327160
373	4	0.0	0.0	0.0	0.0	0	0
374	2	0.0	0.0	0.0	0.0	0	0
375	3	0.32	0.32	0.29	0.26	28249	25650
378	2	0.49	0.47	1.10	2.44	4804	10905
380	2	4.86	30.25	3.86	20.48	29275	23259
381	4	0.73	0.87	0.33	0.18	7206	3272
382	3	0.0	0.0	0.0	0.0	0	0
383	2	0.49	0.47	0.66	0.88	23120	31489
	Total area	Upper limit	Lower limit	Av. per unit		Upper limit	Lower limit
No.	362885	3842470	-3116699	0.47		4.95	-4.01
Wt.	421735	4621350	-3777880	0.54		5.95	-4.86

Table 3. Biomass estimates for ICNAF Division 3Ps, stratified-random survey, March 1972. All weights are in kg.

Cod							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
307	3	53.15	157.22	92.99	679.81	1867097	3266599
309	4	29.65	746.40	129.88	34434.02	1691909	7410533
310	3	20.09	610.92	27.22	1015.49	833063	1128531
311	4	92.36	18616.35	154.32	72050.75	2602850	4348944
312	2	16.04	170.61	9.71	126.25	388908	235419
313	4	9.48	33.00	12.80	95.85	307388	415084
314	3	1.67	8.33	1.89	10.74	339848	385727
315	2	2.92	17.01	22.51	1013.48	214609	1656348
316	4	4.13	33.63	5.24	53.65	238948	303113
317	4	16.77	394.08	6.62	83.90	287458	113484
318	3	3.36	2.13	10.04	39.98	64899	193825
319	4	22.60	296.40	58.93	6559.14	1977359	5154659
321	2	2.43	0.47	20.30	224.44	256907	2146100
323	3	7.78	36.86	13.32	174.97	481011	823471
Total area	Upper limit	Lower limit		Av. per unit	Upper limit	Lower limit	
No.	11552249	17237840	5866650	13.67	20.39	6.94	
Wt.	27581760	43102368	12061146	32.63	50.99	14.27	

American plaice

Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
307	3	0.00	0.00	0.00	0.00	0	0
309	4	0.00	0.00	0.00	0.00	0	0
310	3	0.00	0.00	0.00	0.00	0	0
311	4	5.35	16.07	7.89	73.46	150691	222345
312	2	130.28	20446.97	242.76	78903.75	3158399	5885463
313	4	1.46	1.58	0.55	0.21	47290	17892
314	3	15.93	547.02	18.92	1010.40	3247435	3857270
315	2	54.93	1043.99	69.74	6996.53	4041794	5131433
316	4	10.69	66.80	3.70	9.20	618454	213774
317	4	182.53	90529.81	63.12	11246.04	3128712	1081876
318	3	34.03	3184.43	9.64	259.91	656812	186015
319	4	28.44	1790.48	13.63	419.73	2487646	1192135
321	2	64.65	578.94	71.51	1964.21	6833730	7558004
323	3	670.19	332386.81	216.57	33573.07	41447152	13393918
Total area	Upper limit	Lower limit		Av. per unit	Upper limit	Lower limit	
No.	65818112	152530656	-20894432	77.87	180.45	-24.72	
Wt.	38740096	64514560	12965632	45.83	76.32	15.34	



Table 3. Continued.

Yellowtail

Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
307	3	0.0	0.0	0.0	0.0	0	0
309	4	0.0	0.0	0.0	0.0	0	0
310	3	0.65	1.26	0.44	0.58	26873	18300
311	4	0.0	0.0	0.0	0.0	0	0
312	2	12.15	295.38	16.77	562.65	294627	406632
313	4	0.0	0.0	0.0	0.0	0	0
314	3	2.59	20.16	2.21	14.61	528652	450015
315	2	0.49	0.47	0.44	0.39	35768	32477
316	4	0.0	0.0	0.0	0.0	0	0
317	4	0.0	0.0	0.0	0.0	0	0
318	3	0.0	0.0	0.0	0.0	0	0
319	4	0.0	0.0	0.0	0.0	0	0
321	2	14.58	425.35	6.62	87.67	1541443	699815
323	3	0.0	0.0	0.0	0.0	0	0
Total area		Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit	
No.	2427363	19307920	-14453197	2.87	22.84	-17.10	
Wt.	1607240	5064208	- 1849728	1.90	5.99	- 2.19	

Greysole

Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
307	3	0.0	0.0	0.0	0.0	0	0
309	4	2.43	13.55	1.27	2.80	138681	72405
310	3	21.39	377.14	9.27	65.66	886809	384311
311	4	1.46	8.51	0.83	2.74	41098	23323
312	2	0.0	0.0	0.0	0.0	0	0
313	4	17.50	52.30	6.40	7.89	567485	207542
314	3	13.33	533.33	3.97	47.34	2718782	810027
315	2	0.0	0.0	0.0	0.0	0	0
316	4	50.56	1211.77	21.02	218.96	2923602	1215641
317	4	10.21	416.84	4.86	94.29	174975	83221
318	3	33.70	2939.94	12.06	347.83	650557	232874
319	4	6.08	84.68	5.08	50.07	531548	444034
321	2	0.0	0.0	0.0	0.0	0	0
323	3	0.97	2.84	0.88	2.34	60126	54595
Total area		Upper limit	Lower limit	Av. per unit	Upper limit	Lower limit	
No.	8693659	18343536	-956223	10.28	21.70	-1.13	
Wt.	3527971	6248646	807296	4.17	7.39	0.96	

Table 3. Continued.

Haddock							
Stratum	No. sets	Av. No. per set	Variance	Av. wt. per set	Variance	Stratum total	
						Nos.	Wt.
307	3	11.34	385.96	10.30	318.21	398466	361807
309	4	3.16	14.73	5.74	48.58	180286	327398
310	3	12.96	431.33	21.70	1205.69	537460	899775
311	4	4.62	85.31	4.63	85.92	130143	130608
312	2	1.46	4.25	0.33	0.22	35355	8026
313	4	16.53	348.47	25.60	939.18	535958	830168
314	3	0.00	0.00	0.00	0.00	0	0
315	2	0.00	0.00	0.00	0.00	0	0
316	4	2.43	5.36	2.70	11.25	140558	156342
317	4	38.89	5374.50	10.15	388.87	666570	174008
318	3	6.93	143.95	21.52	1389.03	133708	415340
319	4	0.49	0.95	0.22	0.19	42524	19306
321	2	0.00	0.00	0.00	0.00	0	0
323	3	0.65	1.26	0.07	0.02	40084	4550
Total area		Upper limit	Lower limit	Av. per unit		Upper limit	Lower limit
No.	2841108	4788504	893712	3.36		5.66	1.06
Wt.	3327323	6124551	530095	3.94		7.25	0.63