

# **The Fecundity of Haddock (*Melanogrammus aeglefinus*) on the Scotian Shelf and Georges Bank (NAFO Subareas 4 and 5), 1969-1973**

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## ABSTRACT

R.G. Halliday, R.G., and Livingstone Jr., R. 2017. The fecundity of haddock (*Melanogrammus aeglefinus*) on the Scotian Shelf and Georges Bank (NAFO Subareas 4 and 5), 1969-1973. Can. Tech. Rep. Fish. Aquat. Sci. 3201: iii + 43 p.

Estimates of the fecundity of haddock populations in NAFO Divisions 4W, 4X and 5Z in 1969-73 are listed in appendix tables. They are the product of a collaborative project between Canadian and USA government scientists to describe spatial and temporal variations in the fecundity of haddock populations on the Scotian Shelf and Georges Bank. The processes involved in obtaining these estimates, and the factors that may limit the usefulness of some of the data, are described.

## RÉSUMÉ

R.G. Halliday, R.G., and Livingstone Jr., R. 2017. The fecundity of haddock (*Melanogrammus aeglefinus*) on the Scotian Shelf and Georges Bank (NAFO Subareas 4 and 5), 1969-1973. Can. Tech. Rep. Fish. Aquat. Sci. 3201: iii + 43 p

Les estimations de la fécondité des populations d'aiglefin dans les divisions 4W, 4X et 5Z de l'OPANO en 1969-73 sont énumérées dans les tableaux de l'annexe. Ils sont le produit d'un projet de collaboration entre les scientifiques Canadiens et Américains pour décrire les variations spatiales et temporelles de la fécondité des populations d'aiglefin sur le Scotian Shelf et le Banc Georges. Les processus impliqués dans l'obtention de ces estimations et les facteurs qui peuvent limiter l'utilité de certaines des données sont décrits.

## INTRODUCTION

A collaborative research program to document the fecundity of haddock populations on the Scotian Shelf and Georges Bank was established by staff of the Fisheries Research Board of Canada (FRB, now Department of Fisheries and Oceans - DFO) Biological Station, St. Andrews, New Brunswick, and the U.S. National Marine Fisheries Service (NMFS) Northeast Fisheries Center, Woods Hole, Massachusetts, in the late 1960s. The focus of the study was on the three major populations that spawned on the offshore banks, Emerald-Western banks on the eastern Scotian Shelf, Browns-LaHave banks on the western Scotian Shelf and on northeastern Georges Bank. These populations supported substantial international fisheries, and conservation measures were under consideration in the International Commission for Northwest Atlantic Fisheries (ICNAF<sup>1</sup>) at that time. No studies of fecundity had been conducted for these populations and it was thought that the present project would contribute knowledge that would improve the basis for scientific advice on regulation of fishing. The small coastal populations of haddock that existed in these Divisions (e.g. Kohler, 1959, Grosslein, 1962, Halliday and McCracken, 1970, Fowler, 2011) were ignored in this study.

A plan was devised for collection of late-ripening haddock ovaries from the ICNAF Statistical Divisions (Div.) 4W (eastern Scotian Shelf), 4X (western Scotian Shelf) and 5Z (Georges Bank) during the five years 1969-73, and sample collection was executed very largely as intended. However, the process of egg counting, undertaken initially by the Canadian participants, presented a number of technical issues that delayed fecundity estimations. Thus, the

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<sup>1</sup> The agency responsible for regulation of the fishery prior to extensions of jurisdiction by coastal states in 1977.

USA participants undertook the fecundity estimation for samples from 5Z, the area of primary interest to them, for 1972-73.

Manuscripts presenting the results from these 1972-73 collections from 5Z were drafted by NMFS personnel in the period 1979 – early 1980s to meet their program requirements. The first of these was made publicly available through the Woods Hole Laboratory’s “Laboratory Reference” series (Livingstone and Pennington, 1979), but the version posted on the NMFS web site is incomplete and of no value. Three subsequent draft reports regarding the program were produced by NMFS in the early 1980s but they were not made publicly available. One of these drafts included a graph of Div.5Z data illustrating Canadian estimates for 1970-71 as well as the USA 1972-73 data. This graph was subsequently included in a primary publication by Lough et al. (2008). Also, Garrod (1973), in an analysis of the dynamics of a variety of North Atlantic fish stocks, utilized unspecified data on fecundity of Div.5Z haddock that was provided to him by the Woods Hole Laboratory. However, no descriptions of sample collection, fecundity estimation, data evaluation, and results for the program as a whole, are available. The present report provides such a description, and a listing of final results is to be found in accompanying Annexes 1-4.

## **MATERIALS AND METHODS**

### **SAMPLE COLLECTION**

Samples were collected annually from both research vessel catches and commercial fishery landings during the 5-year period 1969–73 from each of the Divisions 4W, 4X and 5Z. Samples from 4W and 4X were, in large part, collected by Canada and those from 5Z by USA personnel, reflecting the distributions of national commercial fishing and research survey activities. Although the sampling plan called for a stratification of sampling only by Statistical

Division and year, finer scale data on area and depth of fishing, and the date of sampling, were collected in all cases. The fishing area designations used were those already utilized by Canada and the USA for collection of domestic fishery statistics, and these were referred to as "unit areas" by Canada and "subareas" by the USA (Halliday and Pinhorn, 1990).

Sampling was conducted during the winter-spring pre-spawning and spawning seasons, i.e. samples came from fish that were caught in January to April (except 2 caught on May 3), with February and March being the primary months.

The ovary samples collected came from fish that were classified as late ripening, i.e. those with ovaries that contained enlarged eggs that were obviously developing yolk, but showed no external evidence of containing ripe, translucent, eggs. In addition to this material, preserved ovaries from ripening haddock caught on Georges Bank in 1955 and 1956, and subsequently stored at the Woods Hole Laboratory, were utilized.

## DATA RECORDING

During field sampling, fish length (fork length) was recorded, and otoliths were usually collected for subsequent age determination, from each of the fish from which ovaries were retained. Data on fish weight also were usually recorded, but the weight measured varied, depending on sampling conditions, between round (total) and gutted weights, and gutted weights varied between having gills in and gills out, making the weight data of little use. Gonad weight was recorded also by USA personnel at the time of sample collection. Sample numbers were assigned chronologically, regardless of area sampled, and these are retained here for continuity in sample documentation. However, the data summaries presented are organized by Statistical Division and year of capture.

## FECUNDITY ESTIMATION: CANADA

The initial plan was that fecundity estimation would be conducted by the Canadian side and thus ovary collections made by NMFS in 1969-71 were transported to the St. Andrews Biological Station for processing. However, technical issues delayed egg counting severely (see below), causing NMFS personnel to retain and process samples collected by them in 5Z in 1972 and 1973 at the Woods Hole Laboratory, using different methods from those being used at the St. Andrews Biological Station.

The ovary samples to be processed by FRB personnel were preserved in Gilson's fluid (Simpson, 1951) (each sample being stored in a separate jar). Ovaries were sliced open to allow penetration of the preservative and jars were shaken periodically in an electrically powered shaker to separate eggs, extraneous material being decanted. Once separated, egg samples collected in 1969 and 1970, and in part those from 1971, were dried in anticipation of automatic counting using a Decca Mastercount machine, which had been reported by Boyar and Clifford (1967) as providing rapid and accurate counts of herring eggs. However, in the present case, the counts it produced proved to be unreliable, as subsequently found to be the case also in tests of this machine on Pacific halibut eggs by Schmitt and Skud (1978). Thus, the eggs were rehydrated for the application of alternative counting methods.

The first alternative investigated was to use a Stempel pipette (e.g. Van Guelpen et al., 1982) to extract subsamples of eggs from a beaker of water in which all eggs were presumed to be suspended randomly due to constant stirring. Subsamples were counted manually, and fecundity was estimated based on the ratio of water volume in the beaker to that sampled by the pipette. Some 1969 samples, and most 1971 samples, were counted using this method. However, it proved difficult to randomize egg distributions, and thus to obtain unbiased samples, and this method was abandoned also.

Finally, a whirling vessel, as devised by Wiborg (1951) and modified by Pitt (1965), was adopted. This device had been used in studies of the fecundity of haddock (Hodder, 1963) and American plaice (Pitt, 1963) in the Newfoundland area. Sampling procedure was to fill the whirling vessel with water, add the eggs, rotate the vessel, and then stop it, allowing the eggs to settle into the 10 equal sized chambers in its bottom. In the present study, rotation was performed several times until the eggs appeared to be divided equally among the chambers. Two chambers were then selected randomly and the eggs they contained were drawn off through a spigot at the bottom of each chamber. Each of these 1/10th samples was then subsampled using the same technique (giving four 1/100th samples) and each of these was again subsampled (giving eight 1/1000th samples). The eggs in each of these eight subsamples were then lined up in a tray and counted by eye under low magnification. The arithmetic mean of the eight counts, multiplied by one thousand, gave the estimate of total fecundity for that specimen. Initial duplicate counts for test samples gave results that agreed closely ( $n=8$ ,  $R=0.99$ ), and thus this method was adopted for all Canadian samples.

#### FECUNDITY ESTIMATION: USA

Samples collected by NMFS staff in 1972-73, and retained by them for egg counting, were preserved in Davidson's solution, a histological preservative (Henderson, 1963), because of concerns that exposure to Gilson's fluid, an ingredient of which is mercuric chloride, posed a safety hazard.

At the time of egg counting, ovaries were removed from their container, surface preservative was dried off, and the ovaries were weighed. A sample (plug) was then removed from the mid-section of one ovary using a borer (a metal tube with its end sharpened). Borers of either 7 or 11mm diameter were used (the smaller being chosen when eggs were small for the

sake of counting efficiency), and the sample was immediately weighed (to the nearest 0.001g).

Eggs in the plug were then separated using a mechanical mixer (the Sorvall Omni-mixer, a commercial product), and washed repeatedly to remove extraneous material.

The separated eggs were then counted using an electronic counter devised in-house by Crossen (1962). This device enumerated eggs as they were streamed in water through a plastic tube in single file past a photoelectric cell. For each fish, a subset of 300-800 eggs from the subsample was hand-counted and then used to calibrate photocell sensitivity and to establish which tube size was the better to use. The entire plug sample was then counted, and the total was corrected by the ratio of the hand-count/electronic-count for the test subsample (average correction = 2.1% (SE 0.2%)). Fecundity was estimated as the ratio of total weight of ovaries divided by plug weight, multiplied by the corrected number of eggs in the plug.

#### INTER-CALIBRATION OF METHODS

Livingstone and Pennington (1979) record the single comparison between the USA plug and the final Canadian (whirling vessel) counting methods. This consisted of an exchange of 17 ovarian plug samples (to Canada) and of 11 whole ovaries (to USA). The correlation coefficient ( $R^2= 0.99$ ) was highly significant.

#### DATA AMALGAMATION AND EDITING

Canadian and USA electronic data files were standardized and amalgamated in 1987 by Halliday in collaboration with Wallace Morse (NMFS). It is these data that are provided in the present report. As a result of the editing that accompanied this amalgamation, the data reported here for SA5 haddock in 1972-73 differ in some regards from those used in the unpublished MS reports mentioned above.

#### RESULTS

## SAMPLING PERFORMANCE

Samples were collected in all three areas 4W, 4X and 5Z in each of the five years 1969 to 1973. From these samples, fecundity was estimated for 1367 specimens (Table 1), thus averaging 91 per sampling area per year. However, the number of estimates varied substantially among these area/year strata, only 21 being obtained from 5Z in 1973, whereas 172 were obtained from 4W in 1970 (Table 1).

Unit Area information shows clearly that samples were of fish caught on the offshore banks, as intended, at least in very large part. In 4W (Table 1A), samples from commercial vessels in unit area D, south of Cape Breton, in 1973 raise a question regarding their attribution to coastal or offshore spawning populations, as this unit area is predominately in coastal slope waters, distant from the main offshore spawning area. In 4X (Table 1B), most samples are from the off-shore unit areas N and P but samples from area O were of substantial importance in 1969-70. Area O extends from the shore to the northern slopes of the offshore banks. Positional Information was available for the area O sample in 1970 and that shows that it was collected from the offshore part. No positional information is available for the 1969 samples but it is almost certain that they were caught offshore also as there was essentially no inshore fishing conducted at that time of year. Samples from 5Z (Table 1C) came largely from the areas J and M – the northeast of Georges Bank and secondarily from the central areas of the bank, areas H and N. However, small numbers of samples came also from unit area G, adjacent to Cape Cod, and could contain fish from the Gulf of Maine coastal populations. In 1969 and 1970, 9 and 15 fish respectively were sampled from area G (12% and 17% of the totals from SA5 in these years) but in 1971-73, only 1-2 fish per year were sampled from this area.

## FECUNDITY ESTIMATES

The results of the project, in the form of listings of the final estimates of fecundity for each fish, are provided in annexes 1-4 to the present report.

## DISCUSSION

The initial sampling plan to obtain estimates of fecundity of the offshore haddock populations in the eastern and western Scotian Shelf and on Georges Bank for the five years, 1969-73, was fully implemented. There were technical problems with egg counting procedures, however, which greatly delayed the completion of fecundity estimation by DFO personnel and required NMFS staff to undertake the estimations for the 5Z population for 1972 and 1973. The previous reports concerning this substantial project, i.e. the USA Laboratory Reference No.79-09 and subsequent unpublished revised drafts, used only those data for the Georges Bank population in 1972-73, i.e. the estimates made by US personnel, with one exception. This exception included the 1970-71 estimates by Canadian personnel for 5Z, and it was found that these were lower than those for 1972-73. It was a text figure from this report that was included in Lough et al. (2008). It was proposed in both the unpublished and published reports that these lower fecundity estimates for 1970-71 were due to deficiencies in Canadian methodology. Specifically, they identified egg deterioration due to storage of the Canadian samples in Gilson's Fluid for periods of more than 2-3 months as the cause for the lower estimates, a problem that had been reported by Hodder (1963). This was likely an ill-founded conclusion. It was true that most samples processed in Canada were stored in Gilson's Fluid for rather longer than 2-3 months, eggs being separated, cleaned and dried during the summer months following collection, when temporary student help was available. However, the results of Hodder were known at that time, and egg deterioration was not identified as a problem. (Personal discussions with Hodder

qualified his results – his initial samples, which were archived in Gilson's for 6 months to a year, may not have contained enough alcohol and this, rather than storage time, may have been the explanation for the deterioration.)

A stronger basis for reservations about Canadian estimates is that, for 1969-71 samples, the eggs, once separated, were dried in preparation for counting with the Decca Mastercount machine. These samples were then re-hydrated in preparation for subsampling, using the Wiborg whirling vessel, prior to hand counting. It is conceivable that there was some degree of damage to eggs, resulting in some loss, during drying and rehydrating procedures. In addition, in the case of the 1969 samples, about 70% were counted by the Decca Mastercount machine, which may have caused some egg degeneration in these samples. However, these reservations do not apply to the 1972-73 samples, which were not dried.

## **ACKNOWLEDGMENTS**

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Div. 4W				
Year	Sample number	Unit Area	No. of obs.	Source
1969	5	H (455)	35	Can. RV
1970	10	L (458)	59	Can. Com.
	11	K (457)	28	Can. RV
	11	H (455)	75	Can. RV
	11	J (456)	7	Can. RV
	11	L (458)	3	Can. RV
		Total	172	
1971	16	L (458)	43	Can. RV
	17	L (458)	25	Can. RV
	18	L (458)	18	Can. RV
	19	J (456)	8	Can. RV
	20	J (456)	67	Can. Com.
		Total	161	
1972	23	J (456)	7	Can. RV
		L (458)	40	Can. RV
		Total	47	
1973	27	L (458)	28	Can. Com.
	28	D (451)	35	Can. Com.
		Total	63	

Table 1(a). Inventory of samples from NAFO Division 4W used in Canada-USA haddock fecundity study, 1969-73.

Div. 4X				
Year	Sample number	Unit Area	No. of obs.	Source
1969	1	O (463)	6	Can. Com.
	2	O (463)	15	Can. Com.
	3	O (463)	40	Can. Com.
	4	N (462)	53	Can. Com.
	7	N (462)	2	USA RV
	7	O (463)	1	USA RV
		Total	117	
1970	8	O (463)	30	Can. Com.
	9	N (462)	52	Can. Com.
	12	N (462)	23	Can. RV
	12	P (464)	51	Can. RV
		Total	156	
1971	21	N (462)	20	Can. RV
		P (464)	45	Can. RV
		Total	65	
1972	24	N (462)	58	Can. RV
	26	N (462)	19	USA RV/Com.
		P (464)	2	USA RV
		Total	79	
1973	29	Mixed	34	Can. Com.
	30	N (462)	35	USA Com.
		P (464)	20	USA Com.
		Total	89	

Table 1(b). Inventory of samples from NAFO Division 4X used in Canada-USA haddock fecundity study, 1969-73.

## ANNEX 1

## Inventory of data and results of haddock fecundity estimates for Div. 4W.

S. no.	Date D./M./Y.	Area code	Depth fm.	Source no.	Orig. S. no.	Fish no.	Len. cm.	Weights			Age	Egg Counts								
								Round	GGI	GGO		1	2	3	4	5	6	7	8	Ave
5	240369	455	71	2	16	49	60				7	1975	1935	1682	1750	1440	1446	2012	1776	1752
5	240369	455	71	2	16	54	50				6	517	417	421	451	429	403	416	421	434
5	240369	455	71	2	16	59	41				3	164	168	249	217	204	151	182	151	186
5	240369	455	71	2	16	60	46				4	244	260	260	232	228	214	312	253	250
5	240369	455	71	2	16	73	53				6	387	357	393	405	429	403	396	430	400
5	240369	455	71	2	16	84	67				8	970	1115	1015	1169	942	982	915	1015	1015
5	240369	455	71	2	16	85	51				6	474	458	400	473	494	457	403	449	451
5	240369	455	71	2	16	86	55				6	704	795	740	686	946	706	712	743	754
5	240369	455	71	2	16	87	42				4	277	267	248	266	258	235	281	271	263
5	240369	455	71	2	16	89	48				4	315	313	316	296	267	290	315	288	300
5	240369	455	71	2	16	102	62				6	255	275	268	282	287	238	284	274	270
5	240369	455	71	2	16	105	53				6	479	424	512	428	429	419	332	371	424
5	240369	455	71	2	16	106	68				7	1014	896	992	934	866	970	1003	812	936
5	240369	455	71	2	16	107	56				6	547	509	586	519	492	523	551	624	544
5	240369	455	71	2	16	108	67				8	1292	1114	1053	989	992	979	835	981	1029
5	240369	455	71	2	16	109	51				5	666	562	631	591	566	550	597	534	587
5	240369	455	71	2	16	110	45				4	436	462	402	357	339	348	334	392	384
5	240369	455	71	2	16	111	55				6	149	228	269	272	129	225	172	233	210
5	240369	455	71	2	16	121	47				5	230	211	205	206	237	190	218	218	214
5	240369	455	71	2	16	123	39				3	76	58	67	103	62	74	52	47	67
5	240369	455	71	2	16	136	50				6	462	463	472	392	637	536	547	528	505
5	240369	455	71	2	16	137	58				7	896	973	895	831	835	859	902	844	879
5	240369	455	71	2	16	138	51				5	406	483	418	441	456	426	445	403	435
5	240369	455	71	2	16	139	51				5	234	279	199	212	233	249	298	320	253
5	240369	455	71	2	16	140	49				6	488	469	520	458	339	351	392	406	428
5	240369	455	71	2	16	141	66				7	1058	1169	1056	902	914	1074	800	725	962
5	240369	455	71	2	16	142	55				6	792	636	646	631	653	614	765	669	676
5	240369	455	71	2	16	143	43				4	194	217	177	177	167	213	186	183	189

5	240369	455	71	2	16	144	37		4	150	147	131	126	124	109	156	138	135
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10	220370	458		1	3	3	53	1191	6	638	618	652	678	696	716	684	721	675
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11	140370	457	73	2	4	50	50	1400	1200	7	509	452	454	510	462	428	458	513	473
11	140370	457	73	2	4	51	67	3500	2800	8	1746	1784	1805	1844	1705	1827	1651	1648	1751
11	140370	457	73	2	4	53	62	2500	2000	8	1354	1482	1318	1253	1129	1225	1201	1167	1266
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11	140370	457	73	2	4	55	54	1700	1300		7	614	718	679	624	735	685	626	774	682
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11	140370	455	73	2	5	95	50	1400	1200		5	416	428	407	412	335	395	504	396	412
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11	140370	455	73	2	5	100	50	1300	1100		4	488	493	528	510	459	510	506	497	499
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11	140370	455	73	2	5	108	40	700	600		4	200	169	198	174	185	192	177	175	184
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11	140370	455	70	2	7	131	54	1800	1500		7	796	668	756	820	712	578	630	539	687
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11	140370	455	70	2	7	147	52	1225	1100		6	385	455	369	326	377	358	483	432	398
11	140370	455	70	2	7	148	57	1950	1825		7	628	631	575	585	500	722	585	722	619
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11	140370	455	81	2	8	180	55	1500	1100		6	686	732	789	705	737	660	829	833	746
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11	140370	455	81	2	8	199	48	1000	900		4	372	406	388	388	375	409	364	310	377
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11	150370	455	69	2	13	260	66	3700	3100		8	1314	1162	1367	1310	1594	1402	1478	1464	1386
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11	150370	455	69	2	13	264	52	1700	1300		6	573	507	490	496	504	491	469	474	501
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11	150370	455	69	2	13	304	48	1400	1100		5	614	648	552	571	507	558	497	535	560
11	150370	458	75	2	14	306	71	3700	3100		10	789	824	531	717	918	796	798	888	783
11	150370	458	75	2	14	307	60	2800	2200		7	904	933	1215	1152	1036	744	822	880	961

11	150370	458	75	2	14	312	54	2200	1600		6	493	554	398	504	615	613	554	503	529
16	30371	458	68	1	2	3	48		900		5	433	462	515	559	456	436	487	504	482
16	30371	458	68	1	2	14	56		1925		8	623	627	632	607	638	629	641	625	628
16	30371	458	68	1	2	15	61		2250		8	648	647	653	655	606	608	611	697	641
16	30371	458	68	1	2	18	40		600		4	186	177	225	179	181	152	170	215	186
16	30371	458	68	1	2	23	48		1025		4	469	518	514	496	522	538	556	561	522
16	30371	458	68	1	2	24	63		2250		8	675	720	642	579	647	619	553	778	652
16	30371	458	68	1	2	26	63		2100		9	944	852	908	843	920	935	981	994	922
16	30371	458	68	1	2	27	68		2950		8	1345	1337	1350	1536	1256	1256	1519	1643	1405
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16	30371	458	68	1	2	44	40		525		4	203	225	227	252	202	237	197	204	218
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16	30371	458	68	1	2	47	52		1375		6	774	816	727	709	856	722	834	738	772
16	30371	458	68	1	2	50	70		2900		9	1630	1598	1569	1587	1488	1560	1727	1549	1589
16	30371	458	68	1	2	53	49		1150		5	268	251	293	278	262	262	211	227	257
16	30371	458	68	1	2	60	41		650		4	291	233	258	264	246	254	227	249	253
16	30371	458	68	1	2	61	42		725		4	359	362	346	324	285	301	303	314	324
16	30371	458	68	1	2	63	43		750		5	250	223	207	189	194	207	229	234	217
16	30371	458	68	1	2	64	47		1000		4	348	336	314	333	367	366	359	385	351
16	30371	458	68	1	2	65	60		1975		7	692	753	890	769	887	837	752	768	794
16	30371	458	68	1	2	72	59		1950		8	1078	972	1020	1009	1182	1234	1171	1233	1112
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16	30371	458	68	1	2	80	56		1675		8	553	470	484	496	510	503	556	564	517
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16	30371	458	68	1	2	82	44		775		4	257	259	257	280	293	246	325	283	275
16	30371	458	68	1	2	86	49		1100		5	247	219	210	187	262	191	247	213	222
16	30371	458	68	1	2	89	46		1000		5	647	661	617	596	603	475	609	602	601
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16	30371	458	68	1	2	105	41	700		4	214	185	212	208	195	197	215	196	203
16	30371	458	68	1	2	107	59	1950		7	879	873	715	742	719	711	743	727	764
16	30371	458	68	1	2	108	47	950		5	296	259	259	304	272	258	284	299	279
16	30371	458	68	1	2	113	47	950		5	396	370	401	335	353	342	355	398	369
16	30371	458	68	1	2	116	54	1600		7	662	721	615	707	732	609	700	611	670
16	30371	458	68	1	2	117	59	1825		8	1114	1119	1018	975	944	1012	1023	953	1020
16	30371	458	68	1	2	119	71	4750		12	2167	2168	1941	2039	2312	2348	2147	2272	2174
16	30371	458	68	1	2	125	52	1475		5	617	618	616	520	713	742	631	664	640
16	30371	458	68	1	2	127	67	2950		8	1265	1341	1434	1444	1337	1272	1321	1407	1353
17	50371	458	91	1	3	1166	63		1900	7	1079	1121	869	878	925	953	867	891	948
17	50371	458	91	1	3	1170	62		1975	7	600	628	623	549	555	607	614	672	606
17	50371	458	91	1	3	1177	47		775	7	569	512	531	510	487	469	471	476	503
17	50371	458	91	1	3	1178	62		2050	5	595	521	669	694	688	682	659	780	661
17	50371	458	91	1	3	1180	44		725	6	249	251	297	243	233	267	234	229	250
17	50371	458	91	1	3	1186	44		950	4	352	413	354	348	377	416	413	408	385
17	50371	458	91	1	3	1187	59		1850	6	790	694	662	675	669	721	672	688	696
17	50371	458	91	1	3	1188	52		1275	5	627	582	537	612	568	565	600	690	598
17	50371	458	91	1	3	1191	53		1275	7	638	630	601	653	592	521	587	529	594
17	50371	458	91	1	3	1192	66		2375	8	1185	1191	1019	1220	1021	1015	1036	1005	1087
17	50371	458	91	1	3	1193	59		1925	8	776	711	785	737	704	681	754	858	751
17	50371	458	91	1	3	1194	64		2350	8	825	774	817	731	743	675	746	739	756
17	50371	458	91	1	3	1198	53		1250	6	330	319	382	349	278	296	327	323	326
17	50371	458	91	1	3	1201	53		1250	5	450	446	403	441	409	427	416	434	428
17	50371	458	91	1	3	1202	54		1375	5	608	691	678	704	705	694	690	706	685
17	50371	458	91	1	3	1203	69		2700	9	1295	1284	1267	1241	1256	1193	1239	1282	1257
17	50371	458	91	1	3	1204	76			8	1324	1283	1421	1445	1496	1455	1419	1455	1412
17	50371	458	91	1	3	1205	63		2200	7	1470	1444	1605	1677	1513	1669	1645	1515	1567
17	50371	458	91	1	3	1206	50		1050	5	201	212	237	249	223	208	225	202	220
17	50371	458	91	1	3	1211	43		650	4	233	230	257	223	239	261	258	269	246
17	50371	458	91	1	3	1212	53		1200	5	128	132	129	126	127	134	108	146	129
17	50371	458	91	1	3	1222	46		950	5	304	318	271	311	294	302	150	280	279
17	50371	458	91	1	3	1227	48		800	5	475	369	459	393	464	426	473	455	439
17	50371	458	91	1	3	1236	55		1300	5	502	565	494	552	545	509	501	510	522
17	50371	458	91	1	3	1239	52		1275	5	474	461	494	507	512	475	446	470	480

18	50371	458	91	1	4	1242	55	1525	6	508	580	586	604	732	745	574	556	611	
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18	50371	458	91	1	4	1249	65	2225	8	592	692	710	649	723	738	733	745	698	
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18	50371	458	91	1	4	1270	57	1525	6	652	666	691	633	582	602	623	634	635	
18	50371	458	91	1	4	1273	57	1400	6	393	405	420	404	416	394	365	360	395	
18	50371	458	91	1	4	1277	55	1250	6	640	621	633	698	716	672	623	584	648	
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18	50371	458	91	1	4	1282	50	1200	6	564	522	553	569	530	526	563	521	544	
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18	50371	458	91	1	4	1292	55			431	504	463	532	426	387	518	473	467	
19	140371	456	50	1	5	128	54	1425	7	773	721	701	776	775	605	842	780	747	
19	140371	456	50	1	5	134	56	1600	7	751	725	789	602	752	659	811	793	735	
19	140371	456	50	1	5	139	54	1375	7	312	387	303	306	388	403	357	370	353	
19	140371	456	50	1	5	144	70	3000	14	1256	1191	1248	1263	1108	1134	1230	1470	1238	
19	140371	456	50	1	5	145	57	1675	8	772	834	788	711	839	809	866	801	803	
19	140371	456	50	1	5	150	48	1075	5	488	464	473	575	441	466	418	405	466	
19	140371	456	50	1	5	156	71	3250	8	1765	1700	1798	1784	1792	1789	1816	1716	1770	
19	140371	456	50	1	5	164	68	2675	8	1074	1176	922	955	1010	1121	1076	1004	1042	
20	200371	456	52	2	8	49	80	6400	5300										
20	200371	456	52	2	8	50	63	3000	2500	8	1273	1299	1498	1323	1317	1230	1283	1234	1307
20	200371	456	52	2	8	51	48	1200	950	5	407	459	322	358	386	426	430	429	402
20	200371	456	52	2	8	53	55	1500	1400	6	667	716	638	753	892	911	759	705	755
20	200371	456	52	2	8	56	48	1100	1000	5	199	238	255	257	209	211	226	201	225
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20	200371	456	52	2	8	60	58	2000	1800		8	842	839	816	848	817	692	727	719	788
20	200371	456	52	2	8	61	57	1900	1600		6	596	624	692	717	587	695	555	597	633
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20	200371	456	40	2	9	94	47	1100	900		5	398	401	379	408	376	373	384	377	387
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20	200371	456	40	2	9	97	68	4000	3200		8	881	976	1155	1119	1128	904	999	1021	1023
20	200371	456	40	2	9	100	58	2300	1700		8	799	810	730	817	875	765	721	786	788
20	200371	456	40	2	9	102	64	3100	2500		8	697	684	728	641	571	669	668	666	666
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20	200371	456	40	2	9	126	48	1275	1075		5	661	656	639	618	511	555	489	525	582
20	200371	456	40	2	9	140	58	2400	1900		6	1311	1270	1259	1381	1319	1242	1353	1326	1308
20	200371	456	32	2	10	145	62	2400	1900		9	343	306	374	293	283	307	306	310	315
20	200371	456	32	2	10	147	57	2000	1600		7	582	581	572	557	523	493	481	535	541
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20	200371	456	32	2	10	153	66	3400	2500		8	890	936	813	774	867	676	866	831	832
20	200371	456	32	2	10	159	61	2400	2000		8	713	770	833	778	647	652	730	703	728
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20	200371	456	32	2	10	163	57	1900	1500		6	541	549	490	474	539	523	552	585	532
20	200371	456	44	2	11	183	67	3300	2600		9	655	689	604	629	681	695	661	652	658
20	200371	456	44	2	11	200	60	2600	2100		7	947	1018	910	914	918	852	839	867	908
20	200371	456	44	2	11	206	63	2800	2300		8	981	1043	988	887	805	840	797	978	915
20	200371	456	44	2	11	208	70	3200	2600		9	491	450	521	510	465	474	494	494	487
20	200371	456	44	2	11	231	60	2500	2000		8	911	922	918	853	892	981	912	889	910
20	200371	456	44	2	11	233	64	3000	2500		8	1014	973	917	869	781	856	779	731	865
20	200371	456	44	2	11	237	60	2500	2100		7	709	731	669	761	726	763	714	789	733
20	200371	456	44	2	11	244	71	2800	2400		9	815	805	800	855	928	904	887	845	855
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20	200371	456	44	2	11	263	63	2300	1900		8	440	401	405	448	448	400	455	441	430
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20	200371	456	44	2	11	272	56	1800	1475		7	303	362	388	361	351	403	385	396	369
20	200371	456	44	2	11	274	64	2600	2200		9	496	498	578	598	540	631	529	521	549
20	200371	456	44	2	11	279	64	3000	2400		8	1242	1356	1048	1137	1288	1261	1237	1426	1249
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20	200371	456	44	2	11	301	66	2900	2500		8	459	348	352	442	378	385	393	459	402
20	200371	456	44	2	11	308	45	950	800		4	223	235	254	258	241	237	221	254	240
20	200371	456	44	2	11	314	45	875	700		4	146	149	159	146	184	270	171	184	176
20	200371	456	44	2	11	348	69	3900	3000		9	1708	1648	1572	1579	1450	1552	1524	1465	1562
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20	200371	456	44	2	11	361	54	1500	1200		6	440	415	365	369	477	447	451	464	429
20	200371	456	44	2	11	363	52	1500	1100		7	573	674	591	666	571	530	503	530	580
20	200371	456	44	2	11	367	51	1200	1000		5	304	292	388	347	353	360	384	380	351
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20	200371	456	44	2	11	384	64	2700	2200		8	683	657	624	607	654	703	653	561	643
20	200371	456	44	2	11	385	57	2200	1850		5	876	950	1006	1094	1026	1057	1065	1104	1022
20	200371	456	44	2	11	390	55	1500	1350		6	502	487	497	457	580	547	478	485	504
20	200371	456	44	2	11	393	63	2600	2200		7	873	857	822	900	806	756	825	858	837
20	200371	456	44	2	11	404	52	1350	1100		5	643	646	659	684	712	647	645	651	661
20	200371	456	44	2	11	409	46	1000	800		4	295	305	281	285	251	252	264	269	275
20	200371	456	44	2	11	411	50	1300	1100		5	285	334	348	348	372	394	366	440	361
20	200371	456	44	2	11	421	53	1600	1200		6	766	735	841	805	758	759	810	821	787
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20	200371	456	44	2	11	427	61	1900	1700		7	438	448	416	465	489	400	494	415	446
23	70372	456	60	2	12	17	68	3500	3000		8	1501	1359	1488	1288	1580	1427	1401	1377	1428
23	70372	456	60	2	12	19	68	3500	2900		9	1384	1676	1512	1445	1630	1451	1481	1419	1500
23	70372	456	60	2	12	20	69	3600	2900		12	1666	1662	1756	1761	1466	1632	1600	1494	1630
23	70372	456	60	2	12	22	64	2700	2200		8	1032	1159	988	969	983	1005	945	983	1008
23	70372	456	60	2	12	23	62	2400	1900		6	679	788	733	721	958	891	921	874	821
23	70372	456	60	2	12	33	38	550	450		3	205	190	192	172	194	197	145	182	185
23	70372	456	72	2	13	80	47	1150	1000		5	343	355	413	360	343	284	364	414	360
23	90372	458	58	2	16	112	41	700	650		3	241	191	262	221	212	226	231	236	228
23	90372	458	58	2	16	116	50	1300	1250		5	374	437	349	388	440	432	461	434	414
23	90372	458	58	2	16	120	50	1300	1250		4	435	445	436	405	401	431	431	436	428
23	90372	458	58	2	16	124	44	950	900		4	362	378	397	356	447	448	440	369	400
23	90372	458	58	2	16	129	40	600	575		3	179	130	176	168	190	198	156	159	170

23	90372	458	57	2	17	150	55	1950	1900		6	792	773	822	776	812	852	788	787	800
23	90372	458	57	2	17	156	45	1200	1100		5	508	432	477	410	473	496	499	495	474
23	90372	458	57	2	18	193	64	3100	2900		10	964	932	906	996	1138	1045	1049	1000	1004
23	90372	458	57	2	18	205	53	1700	1600		5	560	500	530	537	584	555	530	545	543
23	90372	458	57	2	18	206	51	1400	1250		5	710	737	756	712	855	802	792	819	773
23	90372	458	57	2	18	207	49	1200	1100		5	287	307	322	298	295	289	274	260	292
23	90372	458	57	2	18	211	46	1000	950		4	345	353	364	331	356	428	350	348	359
23	90372	458	57	2	18	213	46	1100	1050		5	394	365	373	345	338	387	324	327	357
23	90372	458	57	2	18	216	47	900	700		5	327	312	311	311	327	340	353	308	324
23	90372	458	57	2	18	257	40	775	625		3	306	383	322	342	307	257	275	283	309
23	90372	458	55	2	19	296	63	2500	2200		8	390	371	485	383	433	465	435	449	426
23	90372	458	55	2	19	297	56	1800	1600		6	800	878	718	705	777	830	811	814	792
23	90372	458	55	2	19	303	52	1200	1150		6	354	436	402	392	340	327	270	354	359
23	90372	458	55	2	19	308	47	950	900		5	416	371	351	363	373	342	321	298	354
23	90372	458	55	2	19	310	45	750	700		5	362	357	312	316	320	341	363	328	337
23	90372	458	55	2	20	433	52	1500	1400			737	749	748	698	610	649	748	662	700
23	90372	458	55	2	20	441	53	1600	1050			279	287	300	288	274	274	282	251	279
23	90372	458	55	2	20	448	46	1150	1100			393	361	372	348	350	307	326	304	345
23	90372	458	55	2	20	450	49	1200	1150			416	444	393	395	402	452	386	334	403
23	90372	458	55	2	20	465	40	600	525			168	160	123	153	158	142	151	141	150
23	90372	458	55	2	21	559	49	1000	950		5	541	494	434	448	353	414	477	425	448
23	90372	458	55	2	21	560	46	800	775		5	282	306	341	334	330	309	343	312	320
23	90372	458	55	2	21	589	46	1000	950		5	357	414	425	412	376	389	300	388	383
23	90372	458	55	2	21	617	37	475	450		3	130	108	117	126	124	111	118	117	119
23	90372	458	55	2	22	656	46	975	800		4	330	374	397	361	350	344	315	363	354
23	90372	458	55	2	22	658	57	2000	1700		6	929	952	818	784	838	806	797	786	839
23	90372	458	55	2	22	665	49	1400	1100		6	476	468	469	495	481	498	509	520	490
23	90372	458	55	2	22	670	49	1200	1000		5	398	355	470	419	390	451	371	402	407
23	90372	458	55	2	22	696	47	1200	1150		5	292	315	339	317	304	330	370	342	326
23	90372	458	55	2	22	712	52	1700	1550		5	612	725	713	741	664	706	722	650	692
23	90372	458	55	2	22	725	48	1100	1000		5	374	327	358	346	436	319	362	341	358
23	90372	458	55	2	22	731	47	900	800		5	368	396	414	376	357	422	367	397	387
23	90372	458	55	2	22	733	45	800	750		3	233	274	358	301	381	291	350	333	315
23	90372	458	55	2	22	750	53	1500	1350		5	430	494	419	502	489	509	605	632	510
23	90372	458	55	2	22	757	45	1000	700		4	509	493	396	426	464	413	474	488	458

27	30373	458	54	1	1	3	58	1700		6	504	574	582	587	503	510	593	505	545
27	30373	458	54	1	1	15	57	1725		8	910	881	793	849	902	861	878	785	857
27	30373	458	54	1	1	18	61	2050		10	1086	1068	1043	989	1041	956	952	944	1010
27	30373	458	54	1	1	22	58	1750		9	825	831	815	828	782	764	840	779	808
27	30373	458	54	1	1	23	62	2125		9	1356	1477	1258	1386	1358	1307	1419	1352	1364
27	30373	458	54	1	1	24	50	1075		6	439	496	389	409	462	489	479	484	456
27	30373	458	54	1	1	29	56	1500		6	688	650	728	651	601	582	666	621	648
27	30373	458	54	1	1	41	64	2225		9	1311	1131	1088	1175	1173	1189	1073	1222	1170
27	30373	458	54	1	1	42	53	1400		6	446	497	479	434	451	466	393	422	449
27	30373	458	54	1	1	43	60	1925		9	964	947	953	1013	1022	997	1102	1032	1004
27	30373	458	54	1	1	45	58	1800		9	771	820	766	753	849	863	770	900	812
27	30373	458	54	1	1	57	57	1725		7	852	848	816	829	745	816	816	707	804
27	30373	458	54	1	1	60	56	1650		8	693	661	685	633	585	620	605	608	636
27	30373	458	54	1	1	70	63	2300		9	1690	1561	1637	1593	1377	1371	1597	1477	1538
27	30373	458	54	1	1	72	54	1450		8	929	821	736	802	793	925	733	812	819
27	30373	458	54	1	1	74	68	2500		9	1812	1828	1982	1901	1652	1641	1636	1817	1784
27	30373	458	54	1	1	75	61	1925		8	1439	1190	1322	1341	1168	1104	1114	1122	1225
27	30373	458	54	1	1	78	60	1875		7	833	938	809	1026	931	980	1107	973	950
27	30373	458	54	1	1	81	68	2600		10	1290	1252	1312	1397	1309	1331	1411	1442	1343
27	30373	458	54	1	1	84	61	2300		10	1107	1328	1345	1262	1210	1169	1294	1164	1235
27	30373	458	54	1	1	88	58	1525		9	586	533	518	533	595	566	632	695	582
27	30373	458	54	1	1	89	60	2100		9	820	897	935	933	1043	1104	1035	1007	972
27	30373	458	54	1	1	92	62	2100		9	1696	1571	1585	1624	1480	1363	1450	1482	1531
27	30373	458	54	1	1	95	64	2500		10	1307	1415	1431	1468	1491	1486	1784	1508	1486
27	30373	458	54	1	1	104	59	1750		8	977	1033	822	871	932	954	902	944	929
27	30373	458	54	1	1	105	68	2400		12	1198	1274	1140	1121	1189	1154	1152	1194	1178
27	30373	458	54	1	1	114	51	1150		6	623	514	586	621	450	437	474	500	526
27	30373	458	54	1	1	119	57	1625		10	953	922	1002	1091	537	602	642	591	793
28	150373	451		1	2	361	59	1750		6	896	757	840	853	747	843	800	692	804
28	150373	451		1	2	362	58	1725		6	975	944	990	940	900	912	858	868	923
28	150373	451		1	2	363	67	2650		10	1115	1023	1088	1150	934	1158	1047	1138	1082
28	150373	451		1	2	364	64	2425		7	1205	1238	1256	1341	1170	1109	1103	1184	1201
28	150373	451		1	2	365	63	2375		7	1557	1499	1546	1404	1426	1556	1474	1370	1479
28	150373	451		1	2	366	52	1325		6	661	618	682	617	606	596	724	620	641
28	150373	451		1	2	369	48	975		5	481	411	349	379	377	357	315	342	376

28	150373	451	1	2	370	51	1150	5	575	561	555	496	534	588	568	537	552
28	150373	451	1	2	373	58	1800	6	729	787	721	682	754	702	726	727	729
28	150373	451	1	2	374	61	2000	6	1251	1177	1066	1070	1247	1281	1125	1108	1166
28	150373	451	1	2	375	56	1550	6	662	738	578	597	686	712	706	643	665
28	150373	451	1	2	376	63	2250	10	1157	1061	1227	1232	1240	1249	1069	1085	1165
28	150373	451	1	2	377	57	1600	6	622	718	832	735	741	742	803	756	744
28	150373	451	1	2	378	64	2500	9	1119	977	1114	1079	1110	1213	1013	1078	1088
28	150373	451	1	2	379	56	1500	7	1049	1096	1171	1046	1068	1004	1127	1131	1087
28	150373	451	1	2	380	54	1400	6	602	630	563	666	629	602	565	607	608
28	150373	451	1	2	382	54	1400	6	620	658	668	788	589	695	686	674	672
28	150373	451	1	2	383	56	1550	6	876	808	816	870	842	767	768	839	823
28	150373	451	1	2	384	59	1700	6	390	436	442	492	494	457	565	481	470
28	150373	451	1	2	386	53	1400	5	583	570	701	571	669	686	555	657	624
28	150373	451	1	2	391	54	1500	6	584	665	638	628	690	761	752	644	670
28	150373	451	1	2	395	64	2325	7	1086	999	995	1153	1055	1026	1052	1163	1066
28	150373	451	1	2	396	53	1275	5	781	829	754	730	667	597	778	675	726
28	150373	451	1	2	399	56	1800	8	770	720	751	790	669	733	646	730	726
28	150373	451	1	2	400	51	1550	5	605	520	494	523	476	501	558	462	517
28	150373	451	1	2	405	55	1575	6	714	675	644	647	742	726	696	806	706
28	150373	451	1	2	407	58	1725	7	899	936	909	1002	919	928	958	1009	945
28	150373	451	1	2	408	60	1950	5	878	937	905	868	783	765	912	949	875
28	150373	451	1	2	409	60	2100	7	925	953	974	978	989	1075	970	924	974
28	150373	451	1	2	411	64	2450	8	1216	1104	1126	1138	1156	1171	1171	1238	1165
28	150373	451	1	2	413	52	1300	5	515	521	539	525	581	594	627	609	564
28	150373	451	1	2	414	56	1450	6	549	517	607	591	638	605	539	571	577
28	150373	451	1	2	416	54	1500	6	623	630	679	607	745	764	746	737	691
28	150373	451	1	2	417	60	1775	7	834	899	890	900	1047	961	1019	1000	944
28	150373	451	1	2	418	55	1375	6	873	732	747	679	760	772	738	659	745

## ANNEX 2

## Inventory of data and results of haddock fecundity estimates for Div. 4X.

S. no.	Date D./M./Y.	Area code	Depth fm.	Orig. S. no.	Fish no.	Len. cm.	Weights			Age	Counts								
							Round	GGI	GGO		1	2	3	4	5	6	7	8	Ave
1	30269	463	60	1	1	12	55	1559		6	772	765	694	706	733	669	695	625	707
1	30269	463	60	1	1	38	53	1474		6	777	779	627	626	721	712	689	591	690
1	30269	463	60	1	1	84	52	1474		10	648	648	662	638	769	724	618	667	672
1	30269	463	60	1	1	129	50	1333		6	623	804	759	693	744	757	787	866	754
1	30269	463	60	1	1	140	59	1956		9	588	617	692	687	723	708	591	675	660
1	30269	463	60	1	1	143	57	1985		7	791	868	906	825	1081	1072	890	936	921
2	150269	463	90	1	2	160	51	1644		6	1265	1214	1113	953	1125	1218	1179	1138	1151
2	150269	463	90	1	2	168	59	2013		7	953	968	1034	1151	1136	976	780	777	972
2	150269	463	90	1	2	177	63	2182		10	1322	1309	1367	1419	1236	1316	1240	1308	1315
2	150269	463	90	1	2	182	56	1871		8	840	747	900	887	821	765	754	725	805
2	150269	463	90	1	2	190	56	1616		7	705	769	668	689	637	634	629	690	678
2	150269	463	90	1	2	196	57	1843		9	852	863	730	733	1001	954	813	824	846
2	150269	463	90	1	2	211	54	1616		8	448	437	531	450	548	524	472	429	480
2	150269	463	90	1	2	213	50	1191		7	407	430	386	414	344	324	345	388	380
2	150269	463	90	1	2	226	54	1531		6	745	803	804	736	662	646	729	675	725
2	150269	463	90	1	2	239	54	1531		8	574	562	586	634	512	551	564	477	558
2	150269	463	90	1	2	260	52	1503		7	628	776	600	724	660	728	637	592	668
2	150269	463	90	1	2	267	53	1474		6	877	809	811	798	911	814	782	793	824
2	150269	463	90	1	2	285	55	1729		9	846	747	917	820	809	771	713	659	785
2	150269	463	90	1	2	293	52	1191		6	686	601	630	704	789	815	560	535	665
2	150269	463	90	1	2	296	49	1162		6	384	332	400	482	623	480	531	515	468
3	70369	463	60	1	3	299	54	1503		6	867	846	816	796	765	779	796	794	807
3	70369	463	60	1	3	301	46	926		7	319	308	374	397	311	295	388	372	346
3	70369	463	60	1	3	303	49	964		6	394	360	370	363	435	398	410	433	395
3	70369	463	60	1	3	325	57	1644		8	786	929	674	652	623	778	728	708	735
3	70369	463	60	1	3	326	56	1644		7	456	375	525	514	540	610	541	470	504

3	70369	463	60	1	3	328	55	1531	6	423	396	376	410	430	460	288	307	386
3	70369	463	60	1	3	332	59	1644	10	1017	1018	922	804	940	969	1051	1057	972
3	70369	463	60	1	3	346	56	1531	7	713	688	728	712	548	515	644	606	644
3	70369	463	60	1	3	347	54	1588	9	458	554	636	540	694	700	578	527	586
3	70369	463	60	1	3	350	53	1389	6	801	741	706	739	665	602	665	609	691
3	70369	463	60	1	3	353	47	992	6	302	305	278	334	358	323	292	298	311
3	70369	463	60	1	3	358	49	1361	7	685	612	680	689	754	757	691	789	707
3	70369	463	60	1	3	365	50	1106	6	262	207	200	220	183	169	197	172	201
3	70369	463	60	1	3	366	48	1077	6	306	344	295	260	358	328	281	328	313
3	70369	463	60	1	3	369	52	1418	6	843	778	855	805	749	777	638	660	763
3	70369	463	60	1	3	377	61	2155	7	1079	989	1040	999	923	896	925	1031	985
3	70369	463	60	1	3	380	62	2155	8	798	775	996	898	779	763	699	787	812
3	70369	463	60	1	3	381	52	1304	6	662	760	904	774	681	755	775	647	745
3	70369	463	60	1	3	382	52	1247	6	504	533	518	572	476	524	625	570	540
3	70369	463	60	1	3	383	59	1758	11	473	410	518	527	746	687	577	667	576
3	70369	463	60	1	3	386	53	1531	6	749	781	821	888	768	824	847	816	812
3	70369	463	60	1	3	389	52	1531	5	560	583	651	664	657	739	714	713	660
3	70369	463	60	1	3	390	65	2268	10	738	873	893	975	862	836	825	790	849
3	70369	463	60	1	3	393	48	1106	7	380	400	335	378	314	369	448	347	371
3	70369	463	60	1	3	394	47	992	5	508	501	358	336	392	429	419	376	415
3	70369	463	60	1	3	399	56	1588	6	534	653	687	738	751	693	304	805	646
3	70369	463	60	1	3	400	65	2608	9	1321	1286	1181	1103	1209	1123	1314	1384	1240
3	70369	463	60	1	3	401	53	1644	7	367	410	496	520	375	416	447	484	439
3	70369	463	60	1	3	403	53	1446	6	493	512	460	489	556	492	524	491	502
3	70369	463	60	1	3	404	39	1361		446	460	385	372	382	466	389	435	417
3	70369	463	60	1	3	411	52	1418	6	476	460	463	504	516	545	560	548	509
3	70369	463	60	1	3	414	56	1956	6	922	781	711	638	712	868	846	811	786
3	70369	463	60	1	3	415	53	1503	6	375	426	498	428	426	408	491	534	448
3	70369	463	60	1	3	417	56	1729	6	1038	878	882	740	762	742	972	818	854
3	70369	463	60	1	3	421	43	680	6	208	222	187	184	171	183	169	208	192
3	70369	463	60	1	3	426	55	1503	6	710	638	685	715	692	729	717	746	704
3	70369	463	60	1	3	431	49	1247	6	143	176	206	195	212	221	179	222	194
3	70369	463	60	1	3	435	58	1588	9	536	591	709	578	551	563	621	666	602
3	70369	463	60	1	3	436	53	1503	6	556	644	675	655	669	688	654	624	646
3	70369	463	60	1	3	450	57	1673	6	557	650	726	706	601	647	756	774	677

4	200369	462	65	1	4	454	51	1162	6	594	649	540	590	599	601	599	608	598
4	200369	462	65	1	4	456	51	1191	7	506	531	502	416	404	555	391	447	469
4	200369	462	65	1	4	457	50	1333	6	485	473	421	529	458	484	471	496	477
4	200369	462	65	1	4	464	55	1506	7	423	520	569	459	584	539	670	682	556
4	200369	462	65	1	4	471	52	1191	6	591	692	669	594	529	616	519	519	591
4	200369	462	65	1	4	473	53	1304	6	512	606	408	497	445	627	463	531	511
4	200369	462	65	1	4	474	48	1049	7	667	582	463	557	542	558	549	463	548
4	200369	462	65	1	4	476	48	1049	6	369	560	351	364	365	357	443	477	411
4	200369	462	65	1	4	477	55	1786	7	698	712	795	829	539	572	564	622	666
4	200369	462	65	1	4	478	52	1219	6	431	452	421	487	418	417	404	435	433
4	200369	462	65	1	4	479	48	992	6	441	355	392	445	400	373	365	372	393
4	200369	462	65	1	4	481	53	1503	6	637	646	526	580	644	587	623	578	603
4	200369	462	65	1	4	483	52	1191	6	494	562	455	525	514	519	510	421	500
4	200369	462	65	1	4	484	66	2835	9	1086	1295	1264	1122	1256	1180	1202	1157	1195
4	200369	462	65	1	4	487	47	992	6	424	452	450	381	468	410	487	484	445
4	200369	462	65	1	4	493	60	1871	6	792	813	823	840	814	846	618	783	791
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4	200369	462	65	1	4	498	51	1106	6	574	438	512	561	522	477	342	413	480
4	200369	462	65	1	4	502	50	1304	6	588	530	500	440	538	550	511	539	525
4	200369	462	65	1	4	504	52	1418	8	740	693	829	756	870	875	873	1018	832
4	200369	462	65	1	4	506	49	1049	6	517	496	445	446	386	469	528	400	461
4	200369	462	65	1	4	508	55	1616	6	1042	787	827	903	808	917	751	655	836
4	200369	462	65	1	4	511	56	1588	6	822	763	951	838	995	976	933	859	892
4	200369	462	65	1	4	513	52	1162	6	367	329	316	328	354	307	410	435	356
4	200369	462	65	1	4	515	54	1418	7	528	459	575	517	537	637	553	434	530
4	200369	462	65	1	4	516	53	1276	6	457	512	380	368	493	573	416	447	456
4	200369	462	65	1	4	518	53	1418	7	668	578	544	609	606	559	524	446	567
4	200369	462	65	1	4	520	51	1191	6	418	452	442	472	432	500	513	443	459
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7	40469	463	74	4	204	14	61			9	2103	1939	1845	1906	1629	1307	1590	1477	1725
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8	280270	463	80	1	1	10	58	1843		7	672	643	694	772	813	863	880	738	759
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9	150370	462	80	1	2	222	57	1701	739	749	743	779	699	843	858	881	786	
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12	200370	464	53	2	42	1363	54	1900	1550		7	670	705	738	773	725	802	683	684	723
12	200370	464	53	2	42	1364	48	1250	1075		7	570	647	603	771	515	435	496	548	573
12	200370	464	53	2	42	1365	61	2475	2100		7	723	720	790	744	619	683	746	755	723

21	270371	462	52	2	34	634	61	2400	2150	8	591	642	613	633	728	652	691	706	657
21	270371	462	52	2	34	635	55	1950	1700	7	731	860	732	743	727	693	673	687	731
21	270371	462	52	2	34	637	55	1450	1350	8	302	332	369	331	348	297	332	373	336
21	270371	462	56	2	35	640	54	1850	1500	5	641	724	721	651	692	666	750	744	699
21	270371	462	56	2	35	642	59	2100	1850	7	754	724	677	771	655	640	601	747	696
21	270371	462	56	2	35	644	57	1800	1600	8	566	536	471	538	443	441	592	528	514
21	270371	462	56	2	35	645	66	3200	2600	9	1599	1502	1392	1341	1532	1419	1405	1466	1457
21	270371	462	56	2	35	646	58	2000	1650	8	855	827	715	746	734	847	702	702	766
21	270371	462	56	2	35	647	57	2100	1700	8	505	517	485	625	655	558	490	594	554
21	270371	462	56	2	35	649	60	2250	1950	8	718	712	702	571	667	558	538	580	631
21	270371	462	56	2	35	650	60	2400	2100	8	562	594	464	391	558	625	556	447	525
21	270371	462	56	2	35	651	57	2050	1550	8	691	615	553	604	742	729	633	623	649
21	270371	462	56	2	35	652	61	2400	2100	8	1042	1205	1105	1074	1119	1021	1012	937	1064
21	270371	462	56	2	35	653	58	2150	1800	8	751	762	722	797	674	787	838	730	758
21	270371	462	56	2	35	654	53	1400	1200	5	317	348	295	280	281	267	272	316	297
21	270371	462	56	2	35	656	58	2100	1750	7	484	476	486	511	507	463	558	465	494
21	270371	462	56	2	35	657	54	1600	1250	7	547	524	576	556	592	620	567	590	572
21	270371	462	56	2	35	659	54	1800	1500	8	471	595	567	476	474	471	502	539	512
21	270371	462	56	2	35	660	51	1450	1250	6	327	303	300	398	366	348	318	327	336
21	270371	462	56	2	35	661	53	1500	1300	6	545	568	495	549	660	569	568	527	560
21	270371	464	50	2	36	668	67	2650	2300	8	376	346	296	356	334	348	297	267	328
21	270371	464	50	2	36	669	64	2900	2400	9	1037	944	973	1027	1036	1114	1206	1098	1054
21	270371	464	50	2	36	671	60	2250	1825	8	585	529	695	583	744	610	730	639	639
21	270371	464	50	2	36	674	59	2200	1800	8	704	714	838	865	733	801	880	865	800
21	270371	464	50	2	36	676	53	1500	1300	6	578	561	589	538	552	604	522	554	562
21	270371	464	50	2	36	677	57	1900	1600	8	678	730	643	663	696	645	737	693	686
21	270371	464	50	2	36	682	58	2200	1850	8	767	837	804	811	716	709	843	838	791
21	270371	464	50	2	36	686	56	1900	1625	8	799	892	815	888	762	721	850	686	802
21	270371	464	50	2	36	689	61	2675	2125	8	922	1057	1033	1086	1116	1078	1080	1059	1054
21	270371	464	50	2	36	690	66	3800	3100	8	1305	1448	1425	1375	1419	1523	1494	1421	1426
21	270371	464	50	2	36	693	61	2350	1950	8	588	630	616	567	644	603	726	676	631
21	270371	464	50	2	36	694	61	2675	2250	8	1048	881	976	1030	955	1190	1094	1052	1028
21	270371	464	50	2	36	696	54	2000	1600	7	546	581	501	525	562	536	561	559	546
21	270371	464	50	2	36	704	58	2175	1900	8	498	666	633	657	632	564	606	641	612
21	270371	464	50	2	36	705	60	2350	1900	8	758	780	750	741	768	860	922	567	768

21	270371	464	50	2	36	707	58	2200	1800		8	619	663	485	552	611	627	462	517	567
21	270371	464	50	2	36	708	54	1600	1400		5	502	520	494	546	577	565	589	628	553
21	270371	464	50	2	36	709	47	1100	975		5	427	419	362	349	359	423	379	415	392
21	270371	464	50	2	36	710	57	2050	1750		8	649	640	610	611	631	731	572	670	639
21	270371	464	50	2	36	715	57	2250	1900		9	752	708	638	751	632	652	530	527	649
21	270371	464	50	2	36	716	62	2750	2200		7	836	864	939	903	989	864	911	885	899
21	270371	464	50	2	36	724	56	2100	1800		8	422	426	536	451	384	472	470	478	455
21	270371	464	50	2	36	731	61	2300	1950		8	690	653	740	730	651	625	703	760	694
21	270371	464	50	2	36	732	58	2100	1725		7	775	760	879	892	854	942	1033	923	882
21	270371	464	50	2	36	743	60	2400	2000		8	836	799	620	800	721	671	733	770	744
21	270371	464	50	2	36	745	67	3600	3000		9	927	935	988	931	905	866	912	888	919
21	270371	464	50	2	36	746	59	2350	2000		8	710	780	713	747	805	616	803	867	755
21	270371	464	50	2	36	749	59	2250	1800		9	531	691	575	648	777	762	698	781	683
21	270371	464	50	2	36	752	61	2500			8	916	944	1000	929	902	907	1031	914	943
21	270371	464	50	2	36	756	55	1800	1600		8	430	384	377	357	365	389	342	351	374
21	270371	464	50	2	36	760	63	2700	2200		9	678	606	709	748	749	864	746	729	729
21	270371	464	47	2	37	769	57	2200	1950		8	706	785	772	801	750	717	744	737	752
21	270371	464	47	2	37	775	57	1925	1700		8	717	655	711	717	620	598	670	693	673
21	270371	464	47	2	37	780	64	2950	2400		8	899	854	838	926	1043	907	1005	909	923
21	270371	464	47	2	37	786	57	1975	1625		8	658	641	583	627	645	540	645	554	612
21	270371	464	47	2	37	791	59	2500	1950		8	1181	1112	1114	1095	1074	1033	1076	1131	1102
21	270371	464	47	2	37	796	61	2550	2125		9	922	929	918	957	879	802	750	838	874
21	270371	464	47	2	37	797	55	1950	1600		7	564	560	605	620	609	632	659	788	630
21	270371	464	47	2	37	801	55	1850	1500		8	569	632	511	506	525	537	488	488	532
21	270371	464	47	2	37	804	68	2900	2400		8	981	1130	1059	1092	1104	1152	1073	1106	1087
21	270371	464	47	2	37	807	57	2100	1750		8	1009	963	1035	1033	1084	1046	1007	1130	1038
21	270371	464	47	2	37	809	67	3100	2600		8	627	602	803	806	783	835	875	871	775
21	270371	464	47	2	37	813	60	2300	1850		8	807	775	747	669	735	639	802	768	743
21	270371	464	47	2	37	820	54	1450	1250		5	417	442	432	433	431	428	386	431	425
21	270371	464	47	2	37	863	51	1200	1050		5	302	287	289	274	289	281	275	283	285
24	100372	462	65	2	23	806	55	1900	1750		6	722	653	746	789	757	798	680	826	746
24	100372	462	65	2	23	813	53	1600	1500		5	611	632	627	600	642	591	596	601	613
24	100372	462	65	2	23	814	56	1900	1750		6	905	854	828	831	756	888	796	837	837
24	100372	462	65	2	23	820	64	2700	2500		6	707	734	717	604	764	781	741	819	733
24	100372	462	65	2	23	827	55	1900	1700		5	767	746	751	734	840	827	912	919	812

24	100372	462	65	2	23	829	59	2400	2200	6	429	435	473	343	477	383	473	423	430
24	100372	462	65	2	23	843	65	3400	3000	8	1103	1053	1000	893	1018	911	961	1021	995
24	100372	462	65	2	23	845	63	2650	2400	6	1074	1034	1067	1065	1042	1017	1039	1105	1055
24	100372	462	65	2	23	851	56	1900	1600	6	695	683	718	666	693	625	826	686	699
24	100372	462	65	2	23	861	59	2200	1850	8	1033	1020	1161	1237	1065	1137	964	985	1075
24	100372	462	65	2	23	862	56	2000	1600	6	962	1034	929	1017	965	878	987	941	964
24	100372	462	65	2	23	863	56	1800	1500	6	625	569	540	460	534	571	567	572	555
24	100372	462	65	2	23	873	65	3000	2500	9	1295	1360	1372	1299	1245	1163	1250	1261	1281
24	100372	462	65	2	23	901	44	1000	900	4	280	293	280	312	280	269	286	244	281
24	100372	462	65	2	23	903	44	950	925	4	416	426	471	512	400	432	392	436	436
24	100372	462	71	2	24	944	61	3000	2900	7	1186	1392	1574	1501	1327	1341	1637	1468	1428
24	100372	462	71	2	24	945	52	1750	1625	9	686	650	735	564	629	799	623	613	662
24	100372	462	71	2	24	946	53	1750	1625	7	667	724	700	656	716	621	623	602	664
24	100372	462	71	2	24	947	58	2200	2050	6	1071	966	920	872	874	778	921	978	923
24	100372	462	71	2	24	948	57	2450	2200	7	1327	1276	1340	1346	1119	1178	1341	1330	1282
24	100372	462	71	2	24	950	52			5	723	719	707	628	852	816	826	811	760
24	100372	462	71	2	24	951	52	1650	1500	5	524	533	623	544	619	599	547	607	575
24	100372	462	71	2	24	952	50	1400	1350	5	394	440	366	381	394	377	410	358	390
24	100372	462	71	2	24	953	60	2450	2200	8	787	743	879	912	707	810	765	721	791
24	100372	462	71	2	24	954	53	1600	1450	4	686	709	668	695	632	646	571	603	651
24	100372	462	71	2	24	955	58	2250	2100	7	881	1060	987	822	1028	1022	1040	985	978
24	100372	462	71	2	24	956	53	1600	1500	5	540	520	508	488	548	489	527	537	520
24	100372	462	71	2	24	957	57	2250	2100	6	713	700	843	712	784	739	771	750	752
24	100372	462	71	2	24	958	53	1650	1500	9	719	717	709	775	790	809	755	765	755
24	100372	462	71	2	24	959	55	2150	1950	8	828	775	869	842	967	934	839	940	874
24	100372	462	71	2	24	960	60	2450	2250		1211	1215	1176	1154	1304	1217	1250	1427	1244
24	100372	462	71	2	24	961	52	1650	1550	4	917	898	820	767	794	976	829	844	856
24	100372	462	71	2	24	962	52	1700	1500	6	768	811	851	759	846	782	800	812	804
24	100372	462	71	2	24	963	63	3000	2850	9	1607	1679	1576	1620	1527	1562	1696	1641	1614
24	100372	462	71	2	24	964	58	2200	2100	6	691	687	726	724	639	643	598	678	673
24	100372	462	71	2	24	965	59	2850	2600	9	1210	1174	1195	1168	1109	1172	1136	1101	1158
24	100372	462	71	2	24	966	54	1650	1600	5	772	736	851	842	647	613	707	678	731
24	100372	462	71	2	24	967	57	2350	2200	9	1082	927	1018	1015	1007	1045	967	1082	1018
24	100372	462	71	2	24	968	65	2750	2550	9	1173	1366	1191	1265	1302	1364	1298	1250	1276
24	100372	462	71	2	24	970	51	1500	1400	4	862	678	941	921	798	843	687	809	817
24	100372	462	71	2	24	971	61	2550	2250	7	600	580	532	571	524	538	530	462	542



26	200472	462	4	282	35	61		222											945
26	200472	462	4	282	51	64		285											1277
26	200472	462	4	282	64	58		165											1063
29	90373	460	1	3	201	68													1477
29	90373	460	1	3	203	55	1450		7	1168	1064	1012	1169	1081	1152	1178	1102	1116	
29	90373	460	1	3	205	47	725		4	451	361	369	388	370	376	357	418	386	
29	90373	460	1	3	206	52	1100		5	190	154	191	152	192	165	184	165	174	
29	90373	460	1	3	207	49	1075		4	608	561	624	626	598	547	559	555	585	
29	90373	460	1	3	208	47	900		4	723	652	643	677	742	730	842	797	726	
29	90373	460	1	3	222	50	1100		4	555	699	677	662	682	634	661	705	659	
29	90373	460	1	3	225	46	950		4	339	410	348	423	453	470	425	407	409	
29	90373	460	1	3	230	46	875		4	364	396	354	348	345	376	417	402	375	
29	90373	460	1	3	232	47	865		4	358	343	383	373	348	359	434	357	369	
29	90373	460	1	3	239	57	1575		5	793	737	743	732	662	784	707	704	733	
29	90373	460	1	3	240	58	1750		5	714	685	781	678	637	545	730	679	681	
29	90373	460	1	3	242	61	1725		6	832	949	911	942	855	889	987	997	920	
29	90373	460	1	3	244	60	1925		6	870	877	1032	906	728	722	804	895	854	
29	90373	460	1	3	245	55	1625		6	419	457	422	418	492	494	442	452	450	
29	90373	460	1	3	248	64	2525		7	1103	1175	1103	1134	1041	1117	1066	1049	1099	
29	90373	460	1	3	249	65	2450		7	1065	1088	929	902	1078	1000	1057	1075	1024	
29	90373	460	1	3	251	64	2300		7	1581	1610	1432	1481	1518	1565	1448	1463	1512	
29	90373	460	1	3	252	59	2000		7	1037	904	1158	1151	1169	1160	1209	1164	1119	
29	90373	460	1	3	254	57	1625		6	822	838	914	885	817	753	1009	909	868	
29	90373	460	1	3	256	61	2125		7	982	989	1012	1000	911	966	1019	930	976	
29	90373	460	1	3	257	58	1725		6	809	951	903	943	982	968	1000	918	934	
29	90373	460	1	3	258	54	1400		5	726	720	811	885	713	763	779	813	776	
29	90373	460	1	3	260	63	2525		6	1029	1131	1009	989	898	940	957	907	983	
29	90373	460	1	3	262	54	1300		5	958	930	998	1041	1086	1022	1021	928	998	
29	90373	460	1	3	264	56	1525		5	823	896	966	920	924	865	847	908	894	
29	90373	460	1	3	265	58	1825		6	598	545	616	583	732	573	688	623	620	
29	90373	460	1	3	266	56	1550		6	893	845	907	818	858	855	793	834	850	
29	90373	460	1	3	267	61	2200		10	1186	1284	1163	1181	1032	1070	1106	1128	1144	
29	90373	460	1	3	270	57	1775		6	1185	1338	1164	1146	1059	1111	1080	1000	1135	
29	90373	460	1	3	271	56	1650		5	764	755	719	715	713	693	657	678	712	
29	90373	460	1	3	272	65	2600		7	1205	1131	1284	1276	1267	1243	1225	1143	1222	



30	70273	462	3	169	69	58	2130	91		1134
30	140273	464	3	170	1	60	3250	211	10	1546
30	140273	464	3	170	2	56	2110	89		981
30	140273	464	3	170	7	56	2100	104	4	1235
30	140273	464	3	170	10	70	4430	343	10	2465
30	140273	464	3	170	11	57	2040	151		1340
30	140273	464	3	170	12	53	1570	78	4	855
30	140273	464	3	170	15	61	2530	146	4	1433
30	140273	464	3	170	19	52	1660	78	4	764
30	140273	464	3	170	20	57	2780	151	10	1340
30	140273	464	3	170	22	69	4180	318		1924
30	140273	464	3	170	26	65	2780	238	5	1908
30	140273	464	3	170	27	60	2340	111	4	1151
30	140273	464	3	170	29	63	2960	243	10	1421
30	140273	464	3	170	39	73	4340	268	13	2678
30	140273	464	3	170	40	65	3010	182	7	1407
30	140273	464	3	170	50	52	1810	87	4	1046
30	140273	464	3	170	57	60	2500	90	7	1181
30	140273	464	3	170	58	65	3700	207	10	1937
30	140273	464	3	170	59	70	4440	315	10	2318
30	140273	464	3	170	60	64	3530	148	10	1705
30	140273	464	3	170	61	59	2450	97	4	1431

## ANNEX 3

## Inventory of data and results of haddock fecundity estimates for SA5.

S. no.	Date D./M./Y.	Area code	Depth fm.	Orig. S. no.	Fish no.	Len. cm.	Weights			Age	Counts									
							Round	GGI	GGO		1	2	3	4	5	6	7	8	Ave	
6	170369	521	87	3	67	8	67	3260		230	803	836	716	843	885	797	974	963	852	
6	170369	521	87	3	67	18	62	2750		410	6	970	1120	963	736	1077	971	923	932	962
6	170369	521	87	3	67	28	60	2523		226	934	816	710	722	878	781	818	849	814	
6	170369	521	87	3	67	31	64	3033		212	930	1024	705	991	825	1030	732	731	871	
6	170369	521	87	3	67	36	66	2863		240	6	606	841	805	656	800	656	651	664	710
6	170369	521	87	3	67	66	63	2750		174	6	836	726	795	811	610	656	625	694	719
6	170369	521	87	3	67	78	62	2835		296	6	810	920	732	843	930	964	981	883	883
6	170369	521	87	3	67	87	73	4734		322		1351	1289	1172	1237	1271	1304	1240	951	1227
6	170369	521	87	3	67	99	62	2835		261	7	816	810	843	806	429	390	346	318	595
6	240369	523	105	3	68	22	60	3112		172		1288	1131	1116	1082	915	978	1091	935	1067
6	240369	523	105	3	68	23	69	2338		165		503	427	478	491	429	457	445	463	462
6	240369	523	105	3	68	28	53	1704		135		325	360	366	385	440	440	430	341	386
6	240369	523	105	3	68	34	56	2145		164		751	907	1026	1013	669	684	631	707	799
6	240369	523	105	3	68	42	53	1765		198		1349	1424	1257	1176	1248	1064	975	959	1182
6	240369	523	105	3	68	61	49	1442		93		329	435	401	440	378	280	263	305	354
6	240369	523	105	3	68	79	49	1372		158		517	457	496	390	374	434	377	440	436
6	240369	523	105	3	68	83	60	2740		298		1335	1032	1373	1241	1254	1164	926	1054	1172
6	240369	523	105	3	68	88	61	3350		428		1172	1231	1200	1190	1224	1306	1194	1089	1201
6	240369	523	105	3	68	115	63	3194		228		609	635	728	692	490	379	452	514	562
6	240369	523	105	3	68	141	61	3090		436		1348	1215	1097	1262	1498	1604	1581	1285	1361
6	230369	524	32	3	69	13	64	2750		170	6	999	956	835	764	771	659	792	705	810
6	230369	524	32	3	69	29	68	4082		351	6	1389	1286	1542	1263	1069	1122	1151	1103	1241
6	310369	524	33	3	71	30	66	3809		288	6	785	972	1187	1016	921	823	772	831	913
6	310369	524	33	3	71	32	61	2910		152		335	483	350	285	333	363	450	343	368
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6	10469	522	17	3	73	40	63	3770		127	6	214	234	239	166	175	407	222	214	234
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6	10469	522	17	3	73	81	60	2609		136	7	453	324	470	316	406	380	383	373	388
6	40469	524	32	3	75	3	63	3260		222	6	555	520	485	480	629	519	510	522	528
6	40469	524	32	3	75	6	65	3175		298	6	727	682	756	689	745	688	866	901	757
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6	90469	523	34	3	77	66	55	1712		117	6	368	403	349	301	296	336	263	278	324
6	140469	523	37	3	79	22	55	2000		133	6	754	722	693	592	612	704	553	583	652
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6	140469	522	85	3	81	7	51	1640		165	6	355	379	318	315	348	367	396	411	361
6	200469	522	80	3	82	4	49	1540		116	7	397	457	421	418	382	407	254	269	376
6	200469	522	80	3	82	24	65	3430		253	7	958	989	1018	1062	816	774	808	722	893
6	220469	523	30	3	84	4	48	1382			6	113	109	114	113	126	150	92	109	116
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6	230369	524	30	4	131	2	68			496	6	817	798	753	671	552	634	674	567	683
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13	200370	523	113	2	45	1474	54	1900		5	718	682	679	719	1054	922	834	789	800
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14	220270	521	19	3	96	11	65		331	7	1454	1637	1381	1256	1378	1497	1720	1686	1501
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22	150371	525	46	4	53	2	87										1547	
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22	160171	524	44	3	126	18	69	4850		403	9	1808	2290	2149	2109	1876	2147	2020
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22	160171	524	44	3	126	44	64	4190		353	8	1836	2104	2185	1997	2131	2009	2245	2171	2085
22	160171	524	44	3	126	46	57	2490		173	8	1066	958	889	1070	836	729	1022	906	935
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22	160171	524	44	3	126	49	72	4930		473	4								2019	
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22	170171	525	25	3	127	13	69	4055		133	8	567	609	649	476	549	427	402	412	511
22	170171	524	35	3	127	19	75	5790		280	8	2110	1931	1850	1803	1899	1824	2121	2075	1952
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22	190171	525	25	3	127	53	73	6250		464									2953	
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22	170171	525	25	3	127	80	80			392		2060	2240	2117	2158	1885	1895	1946	1919	2028
22	180171	525	93	3	128	20	64	3500		135	8	812	847	720	853	965	1031	1061	890	897
22	180171	525	93	3	128	23	59	2890		128	8	1143	1068	1016	1132	845	965	1000	908	1010
22	180171	525	93	3	128	24	67	3665		93		400	438	375	391	489	481	407	348	416
22	180171	525	93	3	128	32	74	6000		321		2004	2037	2120	2342	1815	1920	1803	1860	1988
22	260171	524	35	3	129	6	63	3560		262	6	1323	1281	1236	1155	955	817	1165	854	1098
22	300171	524	30	3	130	11	73	5380		336	9	1564	1764	1784	2041	1904	1671	1574	1648	1744
22	300171	524	30	3	130	12	67	4165		308	8	1308	1251	1422	1613	1632	1742	1351	1378	1462
22	300171	524	30	3	130	15	70	4860		406	7	1589	1507	1668	1466	1475	1635	1552	1516	1551
22	300171	524	30	3	130	16	71	4300		304	6	1251	1432	1376	1314	1426	1255	1384	1461	1362



25	240272	523	4	1	6	50	61	3	604
25	240272	523	4	1	7	52	83	4	763
25	250272	523	4	2	2	75	428	9	949
25	250272	524	4	10	1	68	335	8	1002
25	240272	523	4	13	2	60	200	9	1898
25	260272	523	4	14	1	71	289	9	1291
25	260272	523	4	17	1	52	125	3	630
25	260272	523	4	17	2	64	200	7	1423
25	260272	523	4	18	7	66	342	9	2289
25	260272	523	4	18	9	57	187	9	941
25	260272	523	4	20	2	51	30	3	495
25	270272	523	4	22	1	70	380	9	2087
25	270272	523	4	22	2	66	203	9	1139
25	270272	523	4	22	3	71	252	10	1767
25	270272	523	4	22	7	69	271	9	1994
25	270272	523	4	23	1	57	125	4	980
25	270272	523	4	24	1	68	257	10	1593
25	270272	523	4	24	3	60	226	9	1522
25	270272	523	4	25	7	51	150	3	809
25	270272	523	4	25	9	50	47	3	488
25	270272	523	4	25	14	60	275	6	1331
25	270272	523	4	25	17	60	189	4	1104
25	280272	523	4	29	11	73	400	9	2570
25	280272	523	4	29	12	77	640	9	2128
25	280272	523	4	29	17	53	115	3	933
25	280272	523	4	29	18	54	140	3	763
25	280272	523	4	29	19	55	88	3	812
25	280272	523	4	30	1	72	261	10	1913
25	280272	523	4	30	6	49	77	3	763
25	290272	523	4	36	1	46	45	3	401
25	290272	523	4	36	2	42	29	3	431
25	290272	523	4	36	19	49	63	3	586
25	290272	523	4	36	21	73	265	9	1517
25	290272	523	4	39	4	51	71	3	591
25	290272	523	4	39	5	48	22	3	193
25	290272	523	4	39	6	56	109	3	984

25	290272	523	4	39	7	51	52		663
25	290272	523	4	39	22	50	87	3	851
25	290272	523	4	39	23	53	80	3	709
25	290272	523	4	39	26	49	49	3	613
25	290272	523	4	39	41	75	412	10	1767
25	290272	523	4	40	15	71	202	9	1634
25	290272	523	4	40	16	50	56	3	676
25	290272	523	4	40	17	47	38	3	534
25	290272	523	4	40	23	44	38	3	545
25	10372	524	4	46	3	49	95	4	709
25	10372	524	4	46	4	47	33	3	443
25	10372	524	4	46	5	44	33	3	394
25	10372	524	4	46	7	47	52	3	601
25	10372	524	4	53	3	42	90	3	388
25	10372	524	4	53	7	46	74	3	348
25	10372	524	4	53	15	61	253	6	1179
25	10372	524	4	54	1	46	85	3	648
25	20372	524	4	59	1	77	399	12	1134
25	20372	524	4	59	19	72	340	10	1966
25	180172	523	3	150	3	66	3380	9	1569
25	180172	523	3	150	6	59	2580	6	1680
25	180172	523	3	150	7	68	3570	9	1950

180172

25		523	3	150	15	66	3880	215	9	1455
25	180172	523	3	150	42	71	4840	257	9	2208
25	230172	523	3	151	1	51	1590	43	3	736
25	230172	523	3	151	3	61	3490	305	7	1781
25	230172	523	3	151	5	75	6243	710	10	3449
25	230172	523	3	151	6	50	1591	66	3	783
25	230172	523	3	151	8	72	4570	320	7	2993
25	230172	523	3	151	13	70	4230	356	9	2771
25	230172	523	3	151	17	75	4370	193	9	1612
25	230172	523	3	151	20	60	3020	164	11	1867
25	230172	523	3	151	26	71	4330	92	10	1721

25	230172	523	3	151	28	64	3832	342	7	1858
25	230172	523	3	151	31	66	4523	218	6	1008
25	30272	523	3	152	1	67	3225	141	6	1525
25	30272	523	3	152	2	70	4060	453	9	2333
25	30272	523	3	152	4	63	3145	108	6	1441
25	30272	523	3	152	6	60	2585	89	9	1186
25	30272	523	3	152	8	57	2090	103	9	1035
25	30272	523	3	152	10	60	2760	216	9	1419
25	30272	523	3	152	17	64	3525	104	9	2005
25	30272	523	3	152	20	60	2650	134	4	1597
25	30272	523	3	152	21	68	2200	144	8	1171
25	30272	523	3	152	23	67	4550	303	9	2164
25	30272	523	3	152	25	64	3455	169		1875
25	120272	523	3	153	3	73	5105	226	9	1883
25	120272	523	3	153	4	73	5490	519	9	4170
25	120272	523	3	153	7	70	5002	228	9	2259
25	120272	523	3	153	8	54	2610	84	9	826
25	120272	523	3	153	9	70	5209	300	9	2828
25	120272	523	3	153	10	61	3525	131	8	1355
25	120272	523	3	153	11	63	3909	309	9	1538
25	120272	523	3	153	16	60	3356	188	9	1381
25	120272	523	3	153	18	64	3810	217	6	1388
25	120272	523	3	153	21	71	5435	321	10	3216
25	120272	523	3	153	22	59	3245	140	10	1768
25	120272	523	3	153	23	51	2038	71	3	715
25	120272	523	3	153	25	72	5360	211	6	2308
25	120272	523	3	153	26	69	4460	271		2287
25	120272	523	3	153	28	45	1542	40	3	703
25	120272	523	3	153	31	62	3500	184		1503
25	120272	523	3	153	35	52	2162	74	3	842
25	120272	523	3	153	39	70	4780	176	9	1538
25	120272	522	3	154	1	60	3000	86	9	1136
25	120272	522	3	154	3	62	3700	181	9	1551
25	120272	522	3	154	5	53	2293	109	3	1163
25	160272	523	3	156	2	66	4075	196	9	938
25	160272	523	3	156	3	68	5605	256	8	3171

25	160272	523	3	156	4	62	3585	181	9	1391
25	160272	523	3	156	6	56	2622	96	9	939
25	160272	523	3	156	8	71	4635	181	9	1620
25	160272	523	3	156	9	65	3662	74	9	1189
25	160272	523	3	156	10	62	4308	266	9	1821
25	160272	523	3	156	11	67	4657	174	9	1469
25	160272	523	3	156	15	68	4598	154	8	1445
25	160272	523	3	156	16	70	4208	200	9	1699
25	160272	523	3	156	17	68	5098	290	9	1675
25	160272	523	3	156	19	67	4523	223	9	1788
25	160272	523	3	156	20	62	3490	202	11	1422
25	160272	523	3	156	21	64	4475	181	10	1388
25	160272	523	3	156	22	64	4095	188	9	1616
25	170272	521	3	157	7	68	4572	244		2061
25	30472	524	4	165	20	56		93		376
25	30472	524	4	199	1	72		464	11	1936
25	260472	523	4	344	12	65		206	10	400
31	130473	521	4	164	6	69		490	10	3678
31	180273	523	3	171	1	75	4750	666	10	3304
31	180273	523	3	171	8	71	3950	176	10	2349
31	180273	523	3	171	9	71	4080	376	10	1080
31	180273	523	3	171	10	69	4030	399	10	2684
31	180273	523	3	171	13	68	3590	393	7	1726
31	180273	523	3	171	15	73	4320	308	11	2307
31	180273	523	3	171	22	68	3990	442	10	1180
31	180273	523	3	171	50	72	4410	398	10	1738
31	180273	523	3	171	58	61	2810	235	4	1503
31	180273	523	3	171	67	60	3720	204	10	1779
31	180273	523	3	171	72	64	3370	235	10	2399
31	240273	523	3	172	46	71	2910	486	10	2632
31	240273	523	3	172	55	69	3940	188	10	1818
31	240273	523	3	172	57	62	2600	205	10	1702
31	240273	523	3	172	68	50	1365	60	4	529
31	190473	524	4	213	1	69		308	10	885
31	200473	523	4	223	27	70		231	10	2301

31	200473	523	4	223	28	64	209	7	1992
31	200473	523	4	223	29	64	146		1029
31	220473	521	4	243	1	64	353	10	1594



33	356	523	3	3	5	62	177	8	1174
33	356	523	3	3	6	55	121	6	615
33	356	523	3	3	7	65	196	7	1022
33	356	523	3	3	8	53	204	4	879
33	356	523	3	3	9	56	75	4	535
33	356	523	3	3	10	63	280	6	1217
33	356	523	3	3	11	53	67	6	1028
33	356	523	3	3	12	53	73	6	617
33	456	523	3	7	1	55	135	8	461

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