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Group
23 April-2 May 2003

**Acoustic abundance of spawning Northeast Arctic cod
in the Lofoten survey spring 2003**

Preliminary results

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NORWAY

Table 4a NEA and coastal cod, numbers in thousand and biomass in tonnes

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stratum North
,fffff.ffffffffffffffffffffffffffffffffffffffff.fffffffffffffff+
,      Spawning history
,      }ffffffffffffffff.ffffffffffffffff.ffffffffffffffff%
,      ,      Immature ,First time spawn , Repeat spawners ,      Total
,      ,      }ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff%
,      ,      ,      Numbers,Biomass , Numbers,Biomass , Numbers,Biomass , Numbers,Biomass
,      }fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff%
,Age ,      ,      ,      ,      ,      ,      ,      ,      ,      ,
,1 ,      6, 4.5,      ,      ,      ,      ,      6, 4.5
,2 ,      2, 0.3,      ,      ,      ,      ,      2, 0.3
,3 ,      75, 40.4,      ,      ,      ,      ,      75, 40.4
,4 ,      370, 409.7,      3, 5.8,      11, 5.5,      385, 421.0
,5 ,      668, 1173.6,      495, 1056.2,      16, 35.7,      1180, 2265.6
,6 ,      2268, 5433.9,      4482, 12057.5,      193, 589.4,      6943, 18080.9
,7 ,      735, 2598.1,      2533, 9485.0,      168, 744.0,      3436, 12827.0
,8 ,      ,      ,      96, 556.3,      276, 1306.1,      372, 1862.4
,9 ,      ,      ,      ,      ,      88, 648.4,      88, 648.4
,10 ,      ,      ,      ,      ,      125, 931.1,      125, 931.1
,Sum ,      4123, 9660.5,      7610, 23160.0,      877, 4260.2,      12610, 37081.6
$ffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff$

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Table 4b NEA and coastal cod, numbers in thousand and biomass in tonnes

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stratum Vestfjorden
,fffff.ffffffffffffffffffffffffffffffffffffffff.fffffffffffffff+
,      Spawning history
,      }ffffffffffffffff.ffffffffffffffff.ffffffffffffffff%
,      ,      Immature ,First time spawn , Repeat spawners ,      Total
,      ,      }ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff%
,      ,      ,      Numbers,Biomass , Numbers,Biomass , Numbers,Biomass , Numbers,Biomass
,      }fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff%
,Age ,      ,      ,      ,      ,      ,      ,      ,      ,      ,
,2 ,      0, 0.0,      ,      ,      ,      ,      0, 0.0
,3 ,      16, 5.9,      0, 0.0,      2, 4.6,      18, 10.5
,4 ,      38, 36.5,      109, 134.6,      1, 0.6,      148, 171.6
,5 ,      9, 11.7,      1918, 4859.7,      1, 1.5,      1929, 4872.9
,6 ,      33, 100.9,      5112, 12632.1,      24, 61.1,      5169, 12794.0
,7 ,      23, 61.0,      8663, 34525.4,      716, 2199.7,      9402, 36786.1
,8 ,      ,      ,      978, 6804.3,      1597, 6961.3,      2575, 13765.6
,9 ,      8, 74.2,      66, 488.8,      175, 1031.6,      249, 1594.6
,10 ,      ,      ,      ,      ,      16, 197.5,      16, 197.5
,11 ,      ,      ,      ,      ,      1, 19.0,      1, 19.0
,Sum ,      128, 290.2,      16846, 59444.9,      2532, 10476.9,      19506, 70211.9
$ffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff$

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Table 4c. NEA and coastal cod, numbers in thousand and biomass in tonnes

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stratum Outer side
,fffff.ffffffffffffffffffffffffffffffffffffffff.fffffffffffffff+
,      Spawning history
,      }ffffffffffffffff.ffffffffffffffff.ffffffffffffffff%
,      ,      Immature ,First time spawn , Repeat spawners ,      Total
,      ,      }ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff.ffffffff%
,      ,      ,      Numbers,Biomass , Numbers,Biomass , Numbers,Biomass , Numbers,Biomass
,      }fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff%
,Age ,      ,      ,      ,      ,      ,      ,      ,      ,      ,
,2 ,      8, 2.5,      ,      ,      ,      ,      8, 2.5
,3 ,      47, 35.8,      ,      ,      ,      ,      47, 35.8
,4 ,      9, 10.0,      ,      ,      ,      6, 4.8,      15, 14.7
,5 ,      114, 193.6,      916, 1675.7,      27, 40.2,      1058, 1909.5
,6 ,      40, 98.2,      24531, 55493.6,      252, 543.2,      24823, 56135.0
,7 ,      122, 318.0,      19197, 64930.7,      3743, 10434.5,      23662, 75683.2
,8 ,      ,      ,      8418, 37732.6,      4008, 17401.4,      12426, 55134.0
,9 ,      ,      ,      779, 4580.7,      1072, 6108.0,      1851, 10688.7
,11 ,      ,      ,      ,      ,      45, 1102.4,      45, 1102.4
,12+ ,      ,      ,      ,      ,      22, 623.2,      22, 623.2
,Sum ,      340, 658.0,      53841,164413.2,      9176, 36257.8,      63357,201329.0
$ffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff.fffff$

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Table 5a Coastal cod, population parameters

Coastal cod																
Area																
	North			Vestfjorden			Outer side			Average						
	Length	Weight	Gonad	Liver	Length	Weight	Gonad	Liver	Length	Weight	Gonad	Liver				
Age																
1	41.2	0.79		4.33%									41.2	0.79		4.33%
2	25.0	0.18		2.75%	22.0	0.11		4.72%	31.8	0.32		2.55%	30.4	0.29		2.65%
3	38.7	0.57		2.70%	39.1	0.72		1.86%	42.3	0.77		1.57%	38.9	0.60		2.53%
4	51.3	1.60	0.39%	5.20%	49.5	1.16	8.09%	3.42%	46.7	1.01		2.44%	50.0	1.31	0.51%	4.01%
5	57.1	1.75		4.54%	57.5	1.90	16.7%	3.89%	58.2	1.89		5.51%	57.6	1.85	16.7%	4.71%
6	59.0	1.97	1.22%	5.21%	64.6	2.63	12.0%	4.59%	62.7	2.15	12.7%	4.78%	62.3	2.26	11.9%	4.83%
7	79.0	4.55		2.95%	57.5	1.94	15.8%	3.75%	69.3	3.42		3.92%	61.7	2.47	15.8%	3.81%
8					76.1	5.59	22.6%	4.24%					76.1	5.59	22.6%	4.24%
9					76.8	5.22	20.2%	5.67%					76.8	5.22	20.2%	5.67%
10					87.0	7.93	13.1%	7.14%					87.0	7.93	13.1%	7.14%
11					112.0	18.72	21.7%	5.53%					112.0	18.72	21.7%	5.53%
Average	53.2	1.57	0.42%	4.54%	57.5	2.06	17.1%	3.92%	59.7	2.07	12.7%	4.89%	56.7	1.91	10.2%	4.39%

Table 5b NEA cod, population parameters

Skrei																
Area																
	North			Vestfjorden			Outer side			Average						
	Length	Weight	Gonad	Liver	Length	Weight	Gonad	Liver	Length	Weight	Gonad	Liver				
Age																
3	37.0	0.36		1.38%	30.0	0.26		0.78%	45.0	0.75		1.59%	42.3	0.64		1.49%
4	46.0	0.93	0.70%	3.20%									46.0	0.93	0.70%	3.20%
5	56.9	1.95	9.53%	5.41%	64.5	2.58	11.5%	6.46%	59.3	1.79		6.51%	61.1	2.22	11.4%	6.18%
6	64.2	2.61	7.28%	5.93%	66.4	2.47	14.7%	4.71%	64.7	2.26	8.18%	5.09%	64.9	2.36	8.77%	5.19%
7	72.4	3.73	10.8%	6.44%	74.9	3.93	12.5%	7.22%	72.6	3.28	9.61%	5.73%	73.2	3.49	10.9%	6.19%
8	78.0	5.01	13.9%	5.03%	83.0	5.34	11.8%	6.33%	80.5	4.44	8.39%	5.91%	80.9	4.60	9.77%	5.96%
9	89.5	7.35	19.4%	8.40%	94.9	6.52	10.7%	4.33%	88.3	5.77	11.0%	5.02%	89.0	5.92	11.7%	5.09%
10									120.0	24.50	11.2%	6.56%	120.0	24.50	11.2%	6.56%
11									122.0	27.70	19.7%	4.55%	122.0	27.70	19.7%	4.55%
12+									71.4	3.18	9.11%	5.50%	71.1	3.25	10.2%	5.73%
Average	66.3	2.99	8.87%	5.96%	73.0	3.64	12.5%	6.32%								

Table 6 Mature NEA cod, numbers in millions

Year	Age									Sum
	5	6	7	8	9	10	11	12+		
1985	0.68	7.45	12.36	3.11	1.15	1.01	0.45			26.21
1986	2.49	3.3	5.54	2.71	0.16		0.4	0.08		14.66
1987	8.77	7.04	0.23	2.83	0.04		0.03	0.03		18.97
1988	1.57	4.43	2.56	0.05	0.01	0.05				8.66
1989	0.04	13.19	9.73	2.2	0.38	0.12		0.06		25.73
1990	0.13	2.6	27.02	4.85	0.49	0.32				35.41
1991	0	5	19.83	32.67	2.75	0.19	0.17			60.61
1992	2.74	5.23	20.8	20.87	79.6	4.17	1.61	0.22		135.25
1993	4.87	14.58	17.35	20.22	25.44	41.95	4.74	0.71		129.86
1994	23.78	25.85	10.36	8.21	7.68	3.49	17.53	2.61		99.51
1995	6.49	35.24	12.34	2.27	3.62	2.56	2.15	7.96		72.63
1996	1.41	14.43	24.00	3.65	0.79	0.25	0.8	1.3		46.63
1997	0.4	4.95	27.56	16.5	1.5	0.42		0.75		52.09
1998	0.05	0.3	7.06	11.05	3.24	0.51	0.18	0.02		22.41
1999	0.25	1.92	4.84	14.58	8.42	0.75	0.19	0.1		31.05
2000	3.61	3.85	3.25	2.15	2.23	0.45	0.39	0.05		15.98
2001	3.91	15.73	7.17	0.84	0.3	0.31	0.23	0.06		28.55
2002	1.53	12.06	11.71	4.72	0.64	0.18	0.23	0.01		30.61
2003	3.01	34.31	34.90	15.36	2.16	0.14	0.05	0.02		89.95

Table 7 Mature NEA cod, biomass in thousand tonnes

Year	Age									Sum
	5	6	7	8	9	10	11	12+		
1985	1.36	25.48	56.96	20.76	10.23	10.79	6.5			132.09

1986	5.52	10.62	26.24	17.34	0.9		4.31	1.04	65.97
1987	12.6	13.67	0.84	15.27	0.22		0.39	0.38	43.37
1988	2.29	12.46	8.69	0.3	0.08	0.74			24.57
1989	0.05	23.31	28.16	10.45	3.12	1.2		1.58	67.88
1990	0.2	6.02	68.93	18.34	2.33	2.78			98.6
1991	0	12.61	69.69	169.19	20.35	2.11	0.9		274.84
1992	7.03	14.89	83.05	113.27	505.18	33.47	15.27	3.99	776.15
1993	8.7	37.67	61.64	107.36	157.84	322.43	43.97	10.44	750.06
1994	55.02	84.59	52.44	52.5	51	27.6	135.58	26.36	485.09
1995	14.31	114.32	59.63	13.58	28.23	25.69	22.36	84.94	363.06
1996	3.13	39.63	98.61	20.56	6.27	2.59	8.43	15.76	194.98
1997	0.97	14.44	106.25	94.18	14.48	5.67		9.53	245.52
1998	0.09	0.63	21.08	53.53	25.71	5.02	2.02	0.38	108.46
1999	0.37	5.37	14.31	61.49	49.82	7	1.73	1.59	141.69
2000	6.16	9.62	10.26	8.28	11.84	3.2	2.95	0.63	52.94
2001	7.4	42.67	24.96	5.04	2.04	3.31	2.36	1.81	89.58
2002	2.68	30.26	40.85	19.76	3.89	1.85	1.98	0.13	101.40
2003	6.98	80.74	122.04	70.71	12.74	1.13	1.10	0.62	296.06

Table 8 Mature NEA cod, length at age (cm)

Year	Age							
	5	6	7	8	9	10	11	12+
1985	59.6	71.1	79	88.2	97.3	105.2	114	
1986	62.7	70	80	89.4	86.6		105.8	115
1987	58.2	64.5	76.7	86.2	88		118.5	116
1988	53.1	67.1	71.6	94	97	119.6		
1989	54	59	69.8	80.8	96.6	103		125
1990	56.9	65.1	69.2	79.5	83.7	100.1		
1991	59	67.3	74.4	81	91.3	99.8	85	
1992	66.3	68.7	78.3	83.9	89.2	92.2	101.9	127
1993	58.3	66.1	72.8	83.6	87.4	92.7	95.4	111.2
1994	64.3	70.6	82	87.3	90	95.3	92.4	101.4
1995	61.5	69.7	77.8	84.4	92.6	96.7	100.3	99.5
1996	62.2	67.1	75.9	81	93.6	100.9	97.4	104.1
1997	63.7	68.6	74.2	83.8	99.9	108.4		109
1998	55	62.6	70.2	80	92	98	96.7	115
1999	52.7	67	69.4	78.6	85.8	100.3	102	125
2000	58.4	66.5	72.6	77	83.9	90.6	93.7	112.4
2001	59.2	66.8	73.1	86.4	88.9	101.8	98.1	128.2
2002	57.8	65.8	73.0	80.8	88.2	102.0	91.2	101.4
2003	62.3	65.0	73.2	80.9	89.0	86.2	120.0	122.0

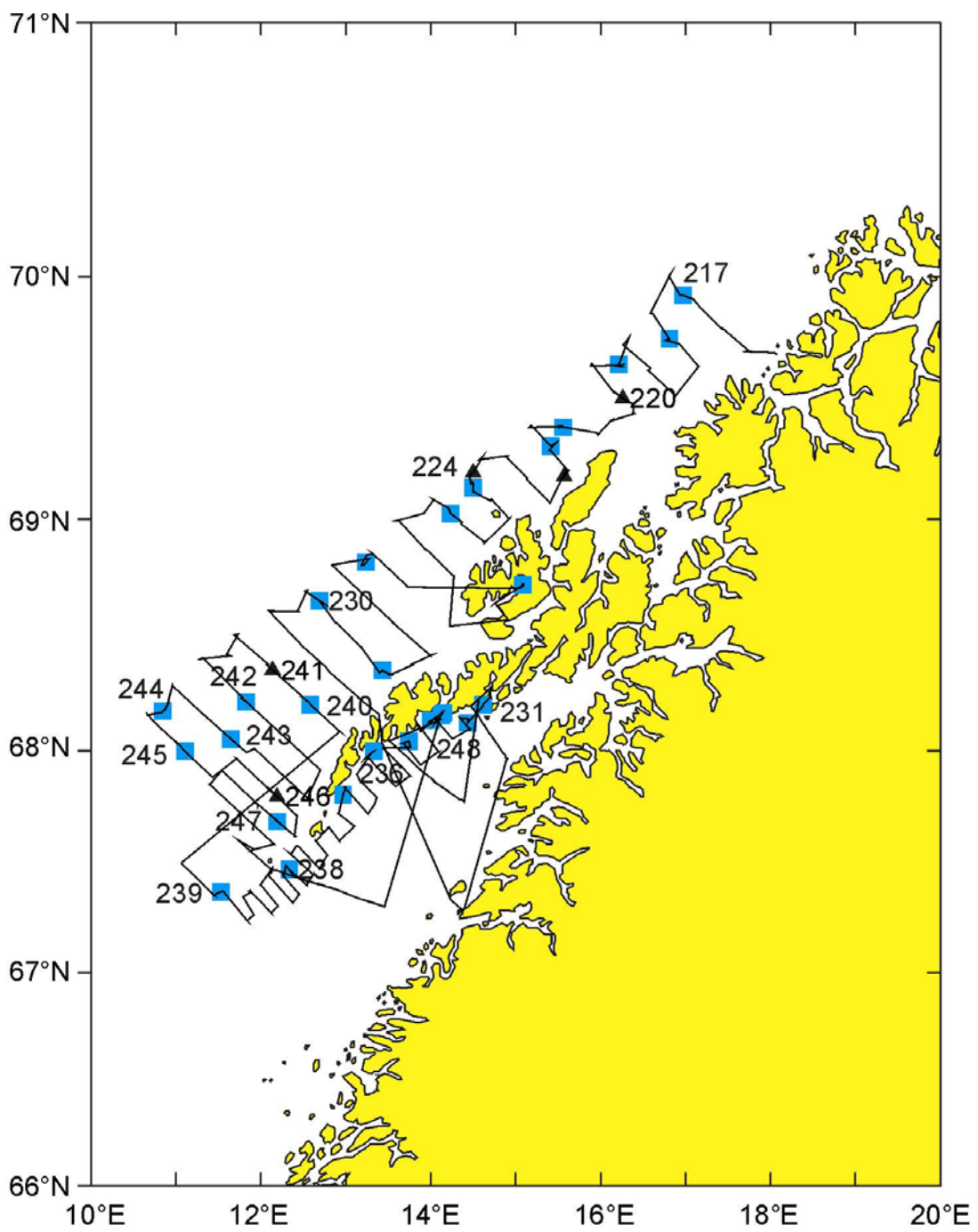
Table 9 Mature NEA cod, weight at age (kg)

År	Alder							
	5	6	7	8	9	10	11	12+
1985	2	3.42	4.61	6.67	8.89	10.73	14.29	

1986	2.22	3.22	4.74	6.4	5.8		10.84	13.48
1987	1.44	1.94	3.61	5.4	5.64		13.15	12.55
1988	1.46	2.82	3.39	6.63	7.27	13.64		
1989	1.3	1.77	2.89	4.74	8.28	9.98		26
1990	1.54	2.32	2.55	3.78	4.77	8.8		
1991	2.21	2.52	3.51	5.18	7.4	11.36	5.35	
1992	2.56	2.85	3.99	5.43	6.35	8.03	9.5	17.8
1993	1.79	2.58	3.55	5.31	6.21	7.69	9.28	14.71
1994	2.31	3.27	5.06	6.39	6.64	7.92	7.73	10.1
1995	2.2	3.24	4.83	5.98	7.8	10.03	10.39	10.68
1996	2.22	2.75	4.11	5.63	7.92	10.53	10.58	12.08
1997	2.42	2.92	3.86	5.71	9.65	13.41		12.67
1998	1.88	2.09	2.98	4.85	7.92	9.91	11.05	18.34
1999	1.51	2.8	2.96	4.22	5.92	9.33	9.17	16
2000	1.71	2.5	3.16	3.85	5.32	7.07	7.62	12.84
2001	1.89	2.71	3.48	6.02	6.88	10.69	10.19	28.58
2002	1.76	2.51	3.49	4.62	6.12	10.59	8.74	10.48
2003	2.32	2.35	3.50	4.60	5.90	8.03	24.5	27.7

Table 10 NEA saithe, numbers in millions

År	Alder											Sum
	2	3	4	5	6	7	8	9	10	11	12+	
1996												139.60
1997	0.10	3.49	23.5	69.1	11.2	7.92	3.49	0.15	0.13	0.02	0.03	119.10
1998		0.12	30.0	31.0	16.5	2.61	1.69	0.63	0.12			81.70
1999	0.04	21.1	5.47	24.2	14.2	6.29	1.78	4.57	1.19	0.02		78.80
2000		11.3	131.80	14.4	8.78	4.16	4.93	1.31	2.42	1.08	0.05	180.20
2001	14.64	17.9	88.54	115.45	19.71	8.7	5.59	7.97	2.45	1.32	0.48	282.74
2002		50.60	240.56	26.91	16.16	10.52	5.03	2.83	1.72	1.3	1.13	356.76
2003		3.89	74.52	44.19	10.99	8.29	2.90	1.01	1.59	0.98	0.85	149.21



21 March - 6 April 2003

Trawl st.no 217-248

"G.O.Sars"/"Sarsen"

▲ Pelagic trawl

■ Bottom trawl

Figure 1. Survey tracks and trawl stations in the Lofoten survey 22.3-6.4 2003.

Utbredelse av torsk 2003

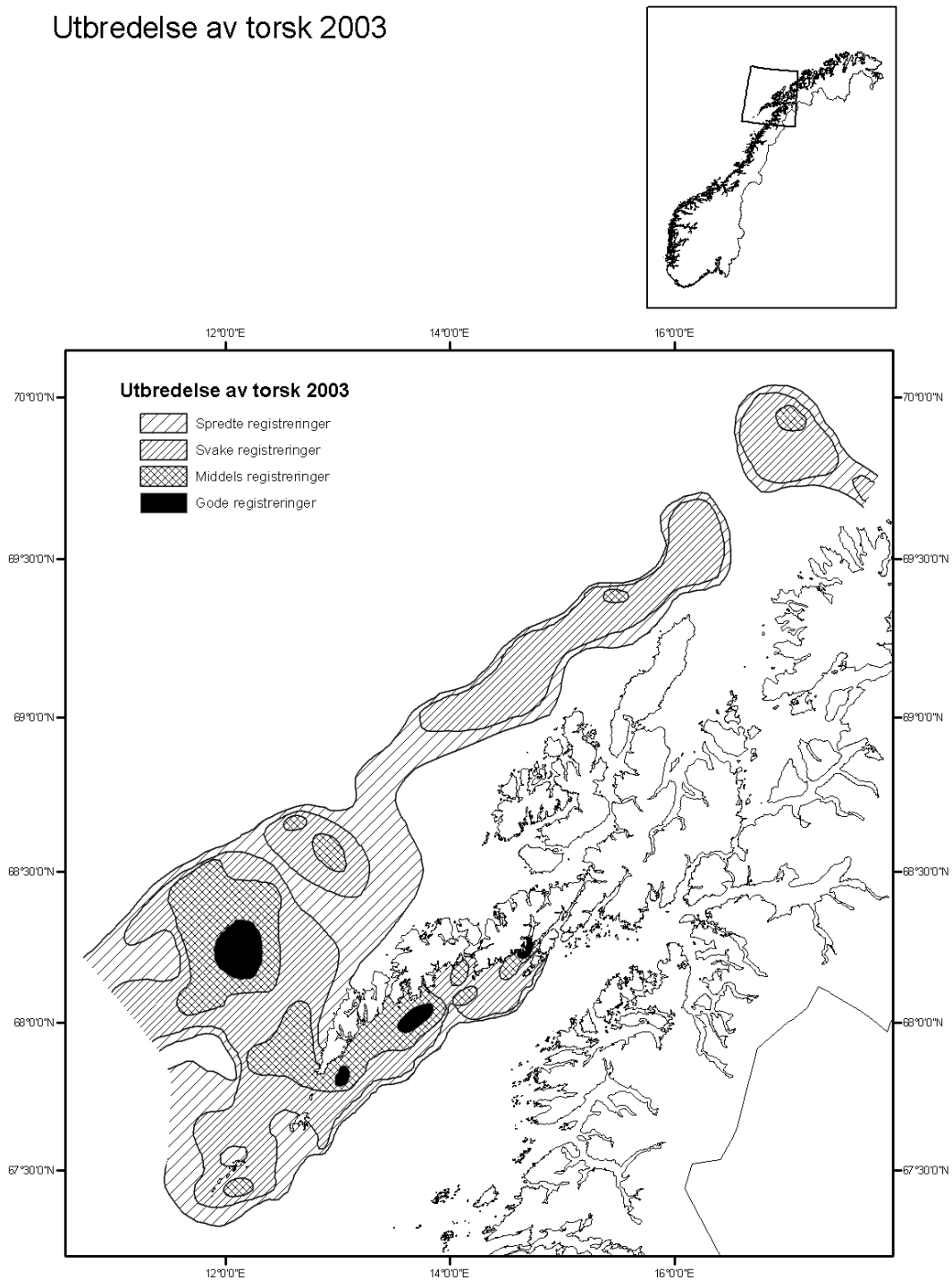


Figure 2. Distribution of NEA and coastal cod in the Lofoten survey 22.3-6.4 2003 based on echo density (10-49, 50-249 and 250-1249 m^2/nm^2 hatched, $>1250 m^2/nm^2$ in black).