HELSINKI COMMISSION
Baltic Marine Environment
Protection Commission

Annual 2007 HELCOM Report on Illegal Discharges Observed During Aerial Surveillance

(June 2008)

Katajanokanlaituri 6 B
FI-00160 Helsinki
Finland

phone: +358-(0)-207 412 649
fax: +358-(0)-207 412 639

e-mail: firstname.lastname@helcom.fi
internet: http://www.helcom.fi

Introduction

The purpose of aerial surveillance is to detect spills of oil and other harmful substances which can threaten the marine environment of the Baltic Sea area. If possible, an identity of a polluter should be established and a spill sampled from both the sea surface and on board the suspected offender.

Co-operation on aerial surveillance within the Baltic Sea area has been established within the framework of the Helsinki Convention, which requires the Contracting Parties to take measures to conduct regular surveillance outside their coastlines and to develop and apply, individually or in co-operation, surveillance activities covering the Baltic Sea area in order to spot and monitor oil and other substances released into the sea.

Additionally, HELCOM Recommendation 12/8 recommends the Contracting Parties to take actions to cover the whole of the Baltic Sea Area with regular and efficient airborne surveillance, develop and improve the existing remote sensing systems and to co-ordinate surveillance activities which take place outside territorial waters.

Data on illegal discharges observed during national aerial surveillance activities of the coastal states in the Baltic Sea area are complied by HELCOM on annual basis. This report is updated with 2007 data.

Surveillance activity

In total, 3969 flight hours were carried out within the surveillance activities of the Baltic Sea countries in 2006 (**Table 1**), which is 23% less than the year before. The main reason behind the decreased surveillance in the Baltic was reduced surveillance activity in Sweden following aircraft accident in 2006. Sweden will operate at full capacity, including with new aircraft, starting from May 2008. Additionally, some cancellations of planned flights in Latvia and Estonia due to bad weather conditions took place.

Most parts of the Baltic with regular traffic zones are covered by national aerial surveillance, but still some Contracting States do not carry out surveillance flights in accordance with the HELCOM Response Manual and the Recommendation. The number of hours flown by individual HELCOM countries in years 1989-2007 is shown in **Figure 1.**

Certain flight proportion should be ensured for detections in darkness, when deliberate discharges are more likely to occur, which means that the aircraft should be properly equipped to detect oil at night or during poor visibility. In 2007, five countries carried out their flights at night (**Figure 2**).

In addition to the aerial surveillance the Contracting Parties utilize the satellite images to detect illegal discharges of oil. The satellite surveillance in the Baltic Sea area has been intensified since 2007 thanks to the CleanSeaNet satellite surveillance service provided to the HELCOM countries by EMSA.

In 2007, 313 detections were made by satellite surveillance, out of which 54 were confirmed as mineral oil. Satellite surveillance detections, including confirmed oil, in 2007 is presented in **Table 2**.

Oil spills

Altogether 238 oil spills were observed in 2007 (**Table 1)**, which is two more comparing to 2006. In general, the number of detected oil spillages in the Baltic Sea has been decreasing over the past years, even though the density of shipping has rapidly grown and the aerial surveillance activity in the countries has been substantially improved, e.g. the number of flight hours has increased and remote sensing equipment on board aircrafts, like Side Looking Airborne Radar, has been more widely used. The number of oil spills observed during aerial surveillance activity in individual countries in 1990-2007 is presented in **Figure 3**.

The best way to evaluate the number of illegal oil discharges is to reflect it as Pollution per Flight Hour (PF) Index, which compares the total number of observed oil spills to the total number of flight hours. Decreasing PF Index over the years indicates less oil spills or/and increased surveillance activity.

PF Index for individual countries as well as for the whole Baltic Sea in the period of 1990-2007 is presented in **Figure 4** and **Figure 5**, respectively. Additionally, **Figure 6** shows the total number of flight hours and observed oil spills during 1988-2007.

84 % of the oil discharges detected in 2007 were smaller than 1 m^3, and none of the oil spills were bigger than 100 m^3. The total estimated volume of oil spills observed in 2007 amounted to 125.4 m^3. The number of oil spills in each size category is presented in **Figure 7** and **Table 3**, and their location is depicted in **Figure 8**.

In a vast majority of cases of detected illegal discharges polluters remain unknown. In 2007, out of the total number of confirmed illegal discharges (238) only in 7 cases the polluters were identified (**Table 1**), which is 11 less than in 2006, in which year 236 oil spills were observed.

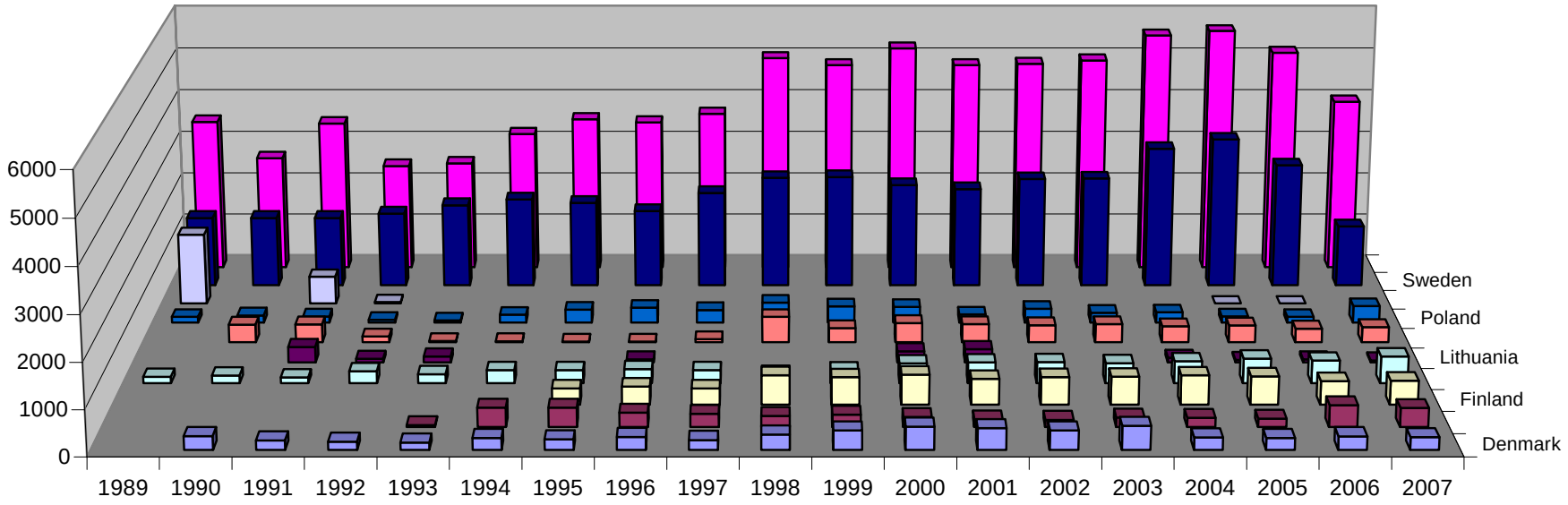
Aerial surveillance data for the years 1998-2007, including the number of observations by countries and PF Index by countries, are contained in **Table 4**.

Explanation of terms used in this report is provided in **Annex**.

Table 1. Annual HELCOM aerial surveillance data, 2007

Country	No. of flight hours			No. of detections by CP (incl. in other CPs EEZ)			Detections confirmed/ observed as oil spills in own EEZ (incl. reports by other CPs)			Estimated volume m3 (in own EEZ)	No. of polluters (including reports from other CPs)				Remarks
	Daylight	Darkness	Total	Daylight	Darkness	Total	Daylight	Darkness	Total		Rigs	Ships	Unknown	Total	
Denmark	197,43	73,2	270,63	76	24	100	36	7	43	11,1205			43	43	
Estonia	410		410	60		60	53	5	58	105,2767		1	57	58	
Finland	418	111	529	49	3	52	29		29	1,822		3	26	29	1 from sunken platform (1,7 l); 18 spills were confirmed by helicopters (these are not included in the statistics)
Germany	399,5	198,58	598,08	26	19	45	21	9	30	1,093		2	28	30	
Latvia	343		343	2		2	2		2	0,43			2	2	
Lithuania	41		41	0		0			0					0	
Poland	374,09	5,92	380,01	15		15	15		15	0,1792			15	15	
Russia			0			0			0					0	
Sweden	1317	80	1397	42	4	46	54	7	61	5,5051		1	60	61	
Total	3500,02	468,7	3968,72	270	50	320	210	28	238	125,4265	0	7	231	238	

Figure 1. Number of flight hours per HELCOM country (hours)



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark		292	199	172	153	253	225	275	209	325	416	497	463	412	510	265	251.19	289.78	270.63
Estonia					40	420	420	305	284	236	268	212	161	153	201	198.16	178.49	470.53	410
Finland							355	400	355	649	603	660	567	605	615	644	625	517	529
Germany	142	168	129	267	201	290	291	313	288	206	286	439	466	469	446	491.43	548.82	503.5	598.08
Lithuania			348	78	133			65				250	300			100	54	64	41
Latvia		400	408	127	24	18	8	8	64	577	320	436	412	387	414	365.02	384	311	343
Poland	131	164	140	62	49	179	301	345	291	465	375	362	187	320	228	239.4	141.08	130.53	380.01
Russia	1618		629	32													0	0	
Sweden	1600	1600	1600	1700	1900	2038	1953	1763	2189	2544	2565	2374	2281	2518	2532	3231	3455	2842	1397
Total	3491	2624	3453	2438	2500	3198	3553	3474	3680	5002	4833	5230	4837	4864	4946	5534	5637.6	5128.3	3968.7

Figure 2. Number of flight hours in darkness per HELCOM country in 2007

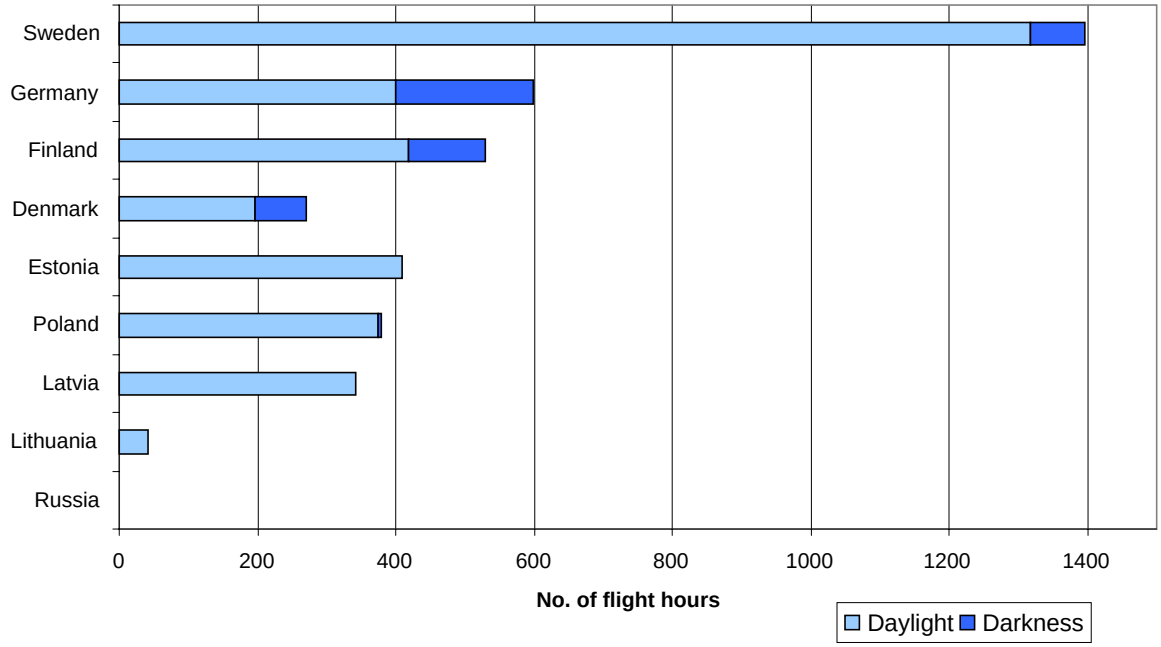
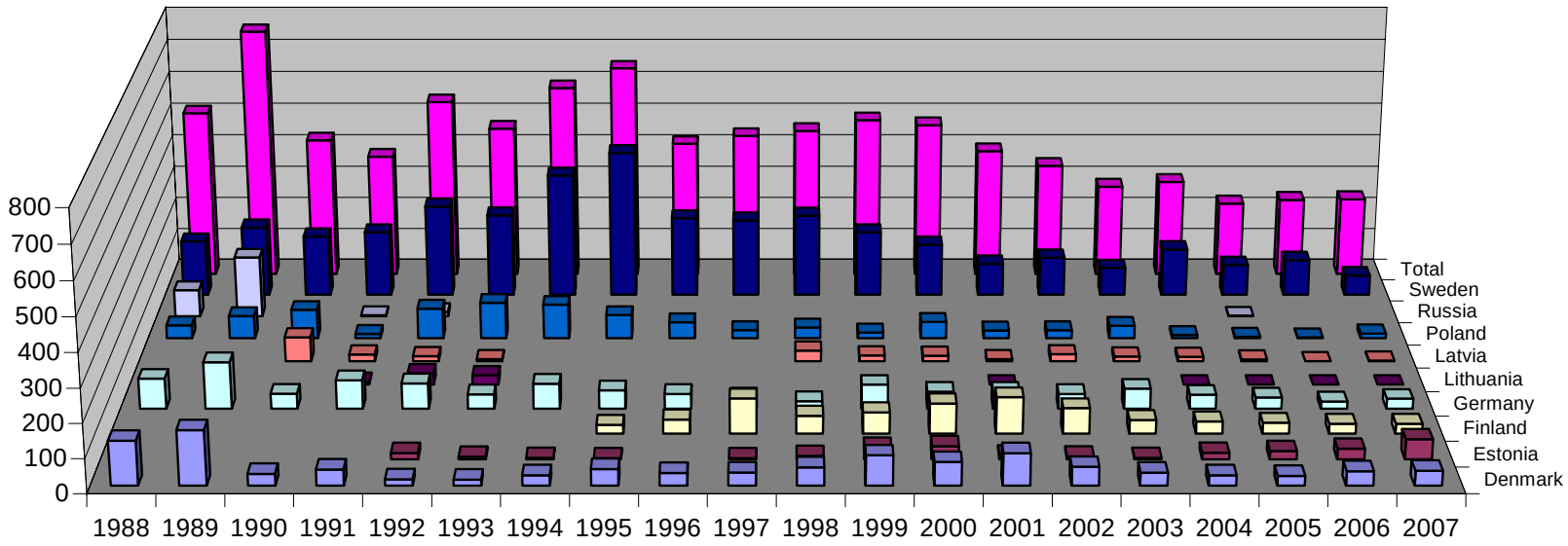


Table 2. Detections of oil spills by satellite surveillance, 2007

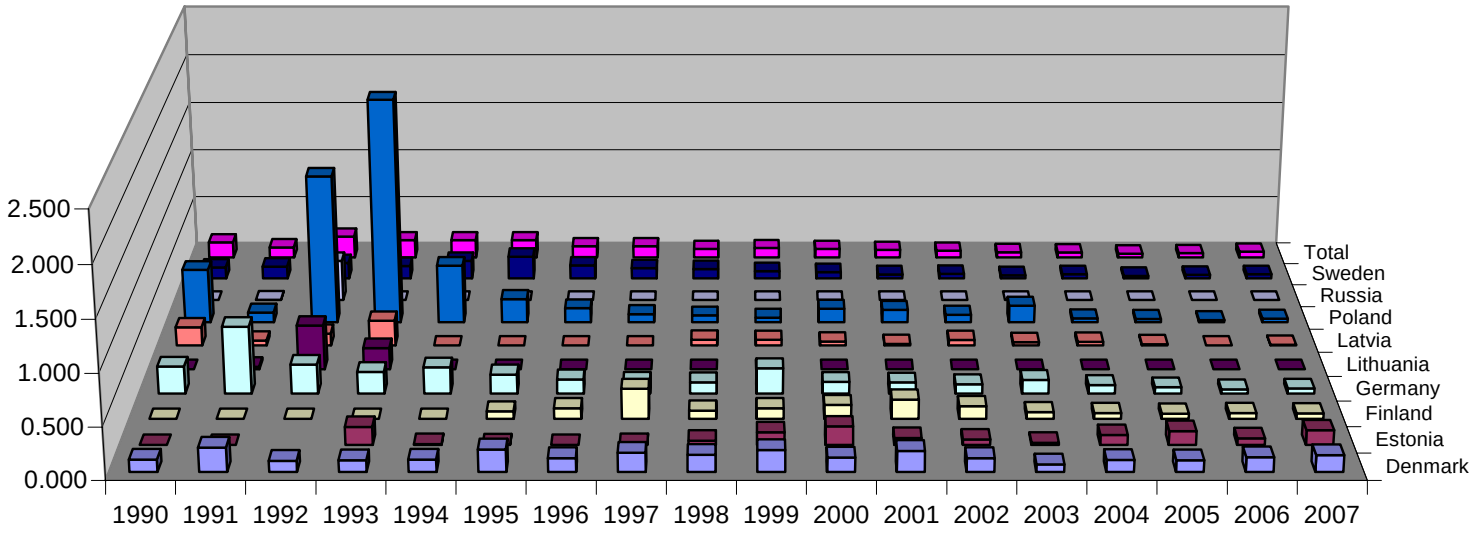
Country	Satellite detections	Confirmed oil	Confirmed other pollution or unknown substance	Confirmed natural phenomena	No detections
Denmark	22	6	0	2	14
Estonia	58	11	1	1	4
Finland	35	12	4	7	5
Germany	16	2	4	0	10
Latvia	20	0			
Lithuania	1			1	110
Poland	13	0			
Russia					
Sweden	148	23	2	6	45
Total	**313**	**54**	**11**	**17**	**188**

Figure 3. Number of confirmed oil spills per HELCOM country, 1988-2007



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark	129	159	34	46	18	17	30	48	36	38	53	87	68	93	54	37	30	28	41	43
Estonia					18	7	4	3		3	10	33	38	11	8	4	19	24	31	58
Finland								26	42	104	53	63	89	107	75	40	36	32	29	29
Germany	90	139	45	85	76	43	75	55	44	34	23	72	51	51	44	60	42	34	22	30
Lithuania				8	34	28								0			0	0	0	0
Latvia			73	20	15	6					33	18	17	6	21	14	13	5	0	2
Poland	40	69	88	14	92	110	104	72	50	25	33	18	51	24	25	39	10	5	3	15
Russia	82	184		3	13													2		
Sweden	168	212	184	197	278	250	375	445	241	234	249	197	158	98	117	84	143	94	110	61
Total	509	763	424	373	544	461	588	649	413	438	454	488	472	390	344	278	293	224	236	238

Figure 4. PF Index per HELCOM country, 1990-2007



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark	0.116	0.231	0.105	0.111	0.119	0.213	0.131	0.182	0.163	0.209	0.137	0.201	0.131	0.073	0.113	0.111	0.141	0.159
Estonia	0.000	0.000		0.175	0.010	0.007	0.000	0.011	0.042	0.123	0.179	0.068	0.052	0.020	0.096	0.134	0.066	0.141
Finland	0.000	0.000	0.000	0.000	0.000	0.073	0.105	0.293	0.082	0.104	0.135	0.189	0.124	0.065	0.056	0.051	0.056	0.055
Germany	0.268	0.659	0.285	0.214	0.259	0.189	0.141	0.118	0.112	0.252	0.116	0.109	0.094	0.135	0.085	0.062	0.044	0.050
Lithuania	0.000	0.023	0.436	0.211	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Latvia	0.183	0.049	0.118	0.250	0.000	0.000	0.000	0.000	0.057	0.056	0.039	0.015	0.054	0.034	0.036	0.013	0.000	0.006
Poland	0.537	0.100	1.484	2.245	0.581	0.239	0.145	0.086	0.071	0.048	0.141	0.128	0.078	0.171	0.042	0.035	0.023	0.039
Russia	0.000	0.005	0.406	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sweden	0.115	0.123	0.164	0.132	0.184	0.228	0.137	0.107	0.098	0.077	0.067	0.043	0.046	0.033	0.044	0.027	0.039	0.044
Total	0.162	0.108	0.223	0.184	0.184	0.183	0.119	0.119	0.091	0.101	0.090	0.081	0.071	0.056	0.053	0.040	0.046	0.060

Figure 5. PF Index for the HELCOM area, 1989-2007

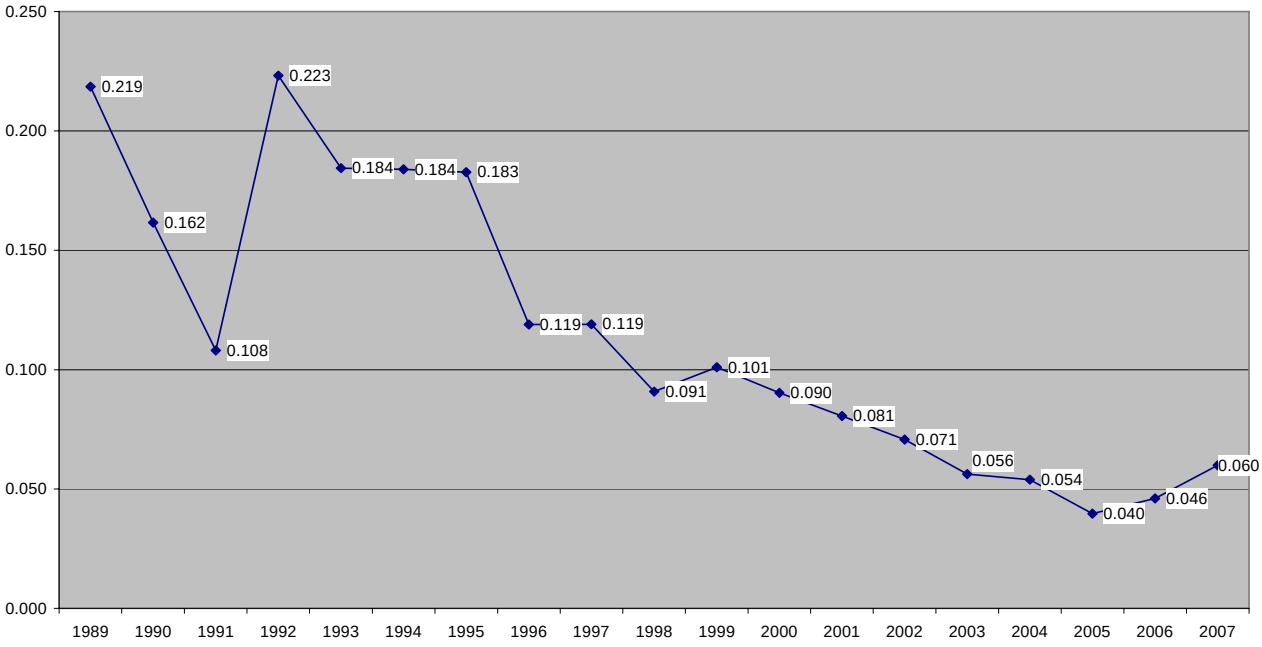


Figure 6. The total number of flight hours and observed oil spills in the HELCOM area during aerial surveillance, 1988-2007

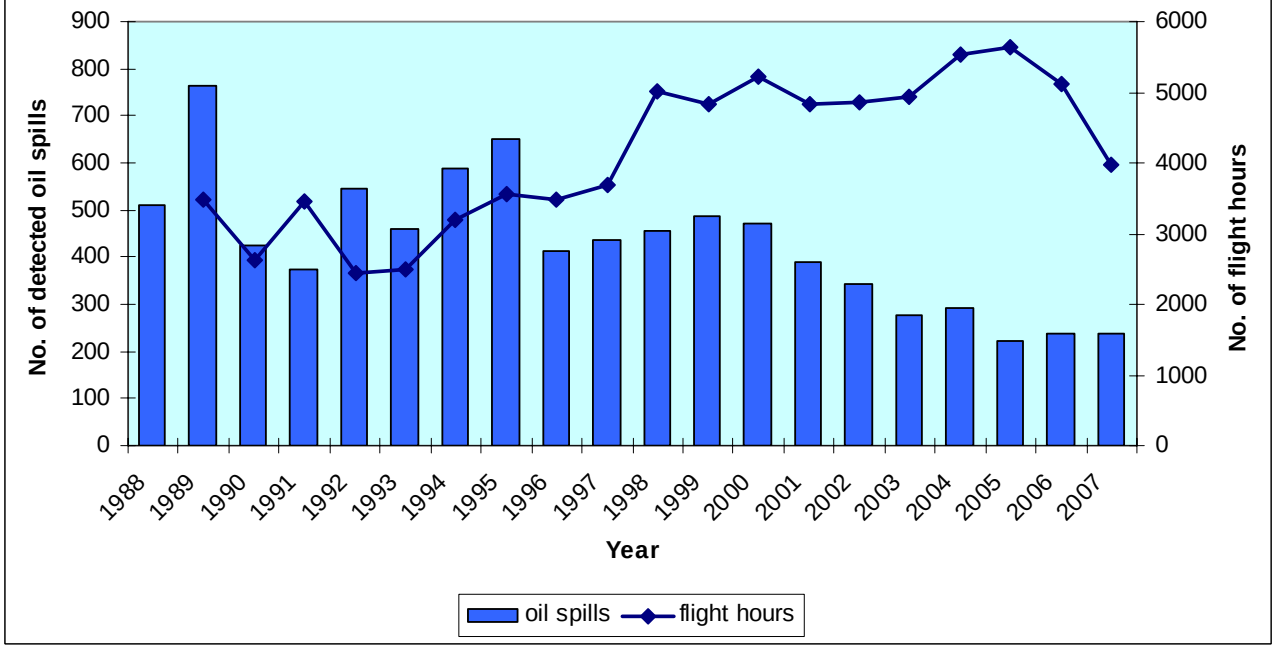
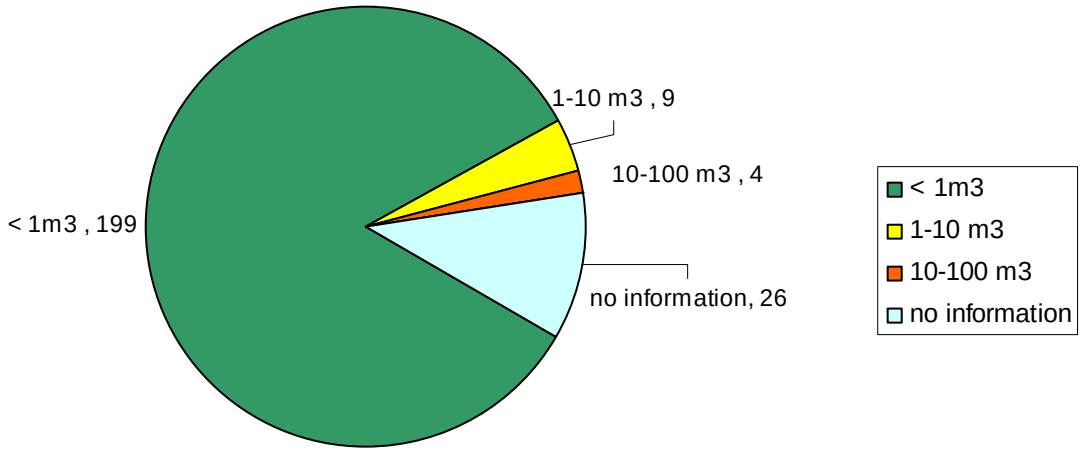


Figure 7. Illegal oil discharges detected in the Baltic Sea during HELCOM aerial surveillance, according to size of spill in 2007



Total no. of illegal oil discharges confirmed: 238

Table 3. Confirmed oil spills in HELCOM countries' exclusive economic zone by size, 2007

Size	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Russia	Sweden	**Total**
< 1m3	33	48	28	13	2	0	15	0	60	199
1-10 m3	3	5							1	9
10-100 m3		4								4
> 100 m3										0
unknown	7	1	1	17						26
Total	**43**	**58**	**29**	**30**	**2**	**0**	**15**	**0**	**61**	**238**

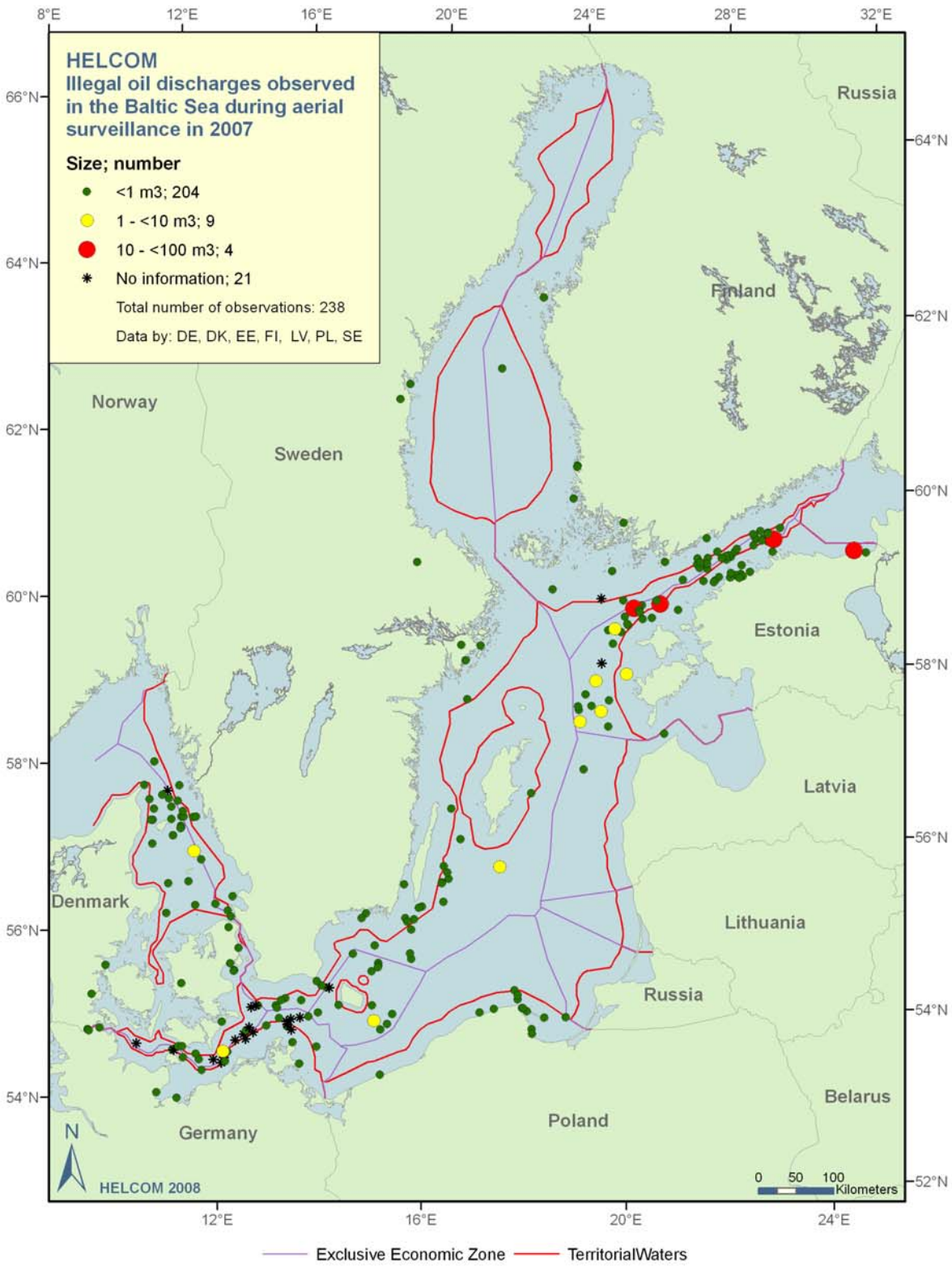


Figure 8. Location of the oil spills observed in the Baltic Sea area in 2007

Table 4. Aerial surveillance data 1998-2007

Number of observations by country

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark	129	159	34	46	18	17	30	48	36	38	53	87	68	93	54	37	30	28	41	43
Estonia					18	7	4	3		3	10	33	38	11	8	4	19	24	31	58
Finland								26	42	104	53	63	89	107	75	40	36	32	29	29
Germany	90	139	45	85	76	43	75	55	44	34	23	72	51	51	44	60	42	34	22	30
Lithuania				8	34	28								0			0	0	0	0
Latvia			73	20	15	6					33	18	17	6	21	14	13	5	0	2
Poland	40	69	88	14	92	110	104	72	50	25	33	18	51	24	25	39	10	5	3	15
Russia	82	184		3	13													2		
Sweden	168	212	184	197	278	250	375	445	241	234	249	197	158	98	117	84	143	94	110	61
Total	**509**	**763**	**424**	**373**	**544**	**461**	**588**	**649**	**413**	**438**	**454**	**488**	**472**	**390**	**344**	**278**	**293**	**224**	**236**	**238**

Pollution/flight index

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark	0,116	0,231	0,105	0,111	0,119	0,213	0,131	0,182	0,163	0,209	0,137	0,201	0,131	0,073	0,113	0,111	0,141	0,159
Estonia				0,175	0,010	0,007		0,011	0,042	0,123	0,179	0,068	0,052	0,020	0,096	0,134	0,066	0,141
Finland						0,073	0,105	0,293	0,082	0,104	0,135	0,189	0,124	0,065	0,056	0,051	0,056	0,055
Germany	0,268	0,659	0,285	0,214	0,259	0,189	0,141	0,118	0,112	0,252	0,116	0,109	0,094	0,135	0,085	0,062	0,044	0,050
Lithuania		0,023	0,436	0,211														
Latvia	0,183	0,049	0,118	0,250					0,057	0,056	0,039	0,015	0,054	0,034	0,036	0,013		0,006
Poland	0,537	0,100	1,484	2,245	0,581	0,239	0,145	0,086	0,071	0,048	0,141	0,128	0,078	0,171	0,042	0,035	0,023	0,039
Russia		0,005	0,406															
Sweden	0,115	0,123	0,164	0,132	0,184	0,228	0,137	0,107	0,098	0,077	0,067	0,043	0,046	0,033	0,044	0,027	0,039	0,044
Total	**0,162**	**0,108**	**0,223**	**0,184**	**0,184**	**0,183**	**0,119**	**0,119**	**0,091**	**0,101**	**0,090**	**0,081**	**0,071**	**0,056**	**0,053**	**0,040**	**0,046**	**0,060**

Calculations

	pollutions	763	424	373	544	461	588	649	413	438	454	488	472	390	344	278	293	224	236	238
Total	flight hours	3491	2624	3453	2438	2500	3198	3553	3474	3680	5002	4833	5230	4837	4864	4946	5434	5637,58	5128	3969
	year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
	PF index	0,219	0,162	0,108	0,223	0,184	0,184	0,183	0,119	0,119	0,091	0,101	0,090	0,081	0,071	0,056	0,054	0,040	0,046	0,060

Annex

Definitions used in the report

No. of flight hours	Nationally allocated flight hours carried out by trained observers per Contracting Party
Day (daylight)	From 30 minutes after Morning Civil Twilight, until 30 minutes before Evening Civil Twilight as given in the Air Almanac
Night (darkness)	From 30 minutes before Evening Civil Twilight, until 30 minutes after Morning Civil Twilight as given in the Air Almanac
Detections	Number of first reports on possible pollutions obtained in aerial operations (raw data)
Detections confirmed	Number of the total detections (first reports) that have been verified and/or identified by means of instruments or visually and are confirmed by a trained operator as a mineral oil pollution
Estimated volume of a spill	Total volume of one spill calculated using the Bonn Agreement Oil Appearance Code
Identified polluter	Name of vessel, platform or other source positively identified as the polluter
Slick	An area of (possible) pollution
Spill	A collection of one or more slicks originating from the same source
Satellite detections	The number of satellite detections is the number of reports obtained through satellite detections within the EEZ of the contracting party – including those obtained from other countries
Confirmed mineral oil	The number of verified/investigated satellite detections consisting of mineral oil.
Confirmed other oil or chemical	The number of verified/investigated satellite detections consisting of vegetable or fish oil or chemical.
Confirmed natural phenomena	The number of verified/investigated satellite detections consisting of algae or natural phenomena as currents, waves, ice etc.
No detections	The number of verified/investigated satellite detections that nothing has been found.