

HELSINKI COMMISSION

Baltic Marine Environment

Protection Commission



## **HELCOM Report on Illegal Discharges Observed During Aerial Surveillance in 2006**

**(Note: updated in February 2008 with minor editorial changes)**

# Annual 2006 HELCOM report on illegal discharges observed during aerial surveillance

## 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 compiled by HELCOM on annual basis. This report is updated with 2006 data.

## Surveillance activity

In total, 5128 flight hours were carried out within the surveillance activities of the Baltic Sea countries in 2006 (**Table 1**), which is 9% less than the year before, and which reverses the increasing trend in the number of flights hours observed in the previous five years. Some technical problems and the accident of one of the aircraft are the main reasons behind the decreased surveillance.

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 1989-2006 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 2006, only few 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 will be intensified starting from 2007 thanks to the satellite surveillance service to be provided to the HELCOM countries by EMSA.

In 2006, 141 detections were made by satellite surveillance, out of which 26 were confirmed as oil. Satellite surveillance detections, including confirmed oil, in 2006 is presented in **Table 2**.

## Oil spills

Altogether 236 oil spills were observed in 2006 (**Table 1**), which is 12 more comparing to 2005. 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 1990-2005 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 1990-2006 is presented in **Figure 4** and **Figure 5**, respectively. Additionally, **Figure 6** shows the total number of flight hours and observed oil spills during 1988-2006.

86% of the oil discharges detected in 2006 were smaller than 1 m<sup>3</sup>, and only one oil spill of more than 100 m<sup>3</sup> has been reported. The total estimated volume of oil spills observed in 2006 amounted to 269.3 m<sup>3</sup>. The size of oil spills is presented in **Table 3** and their location is depicted in **Figure 7**.

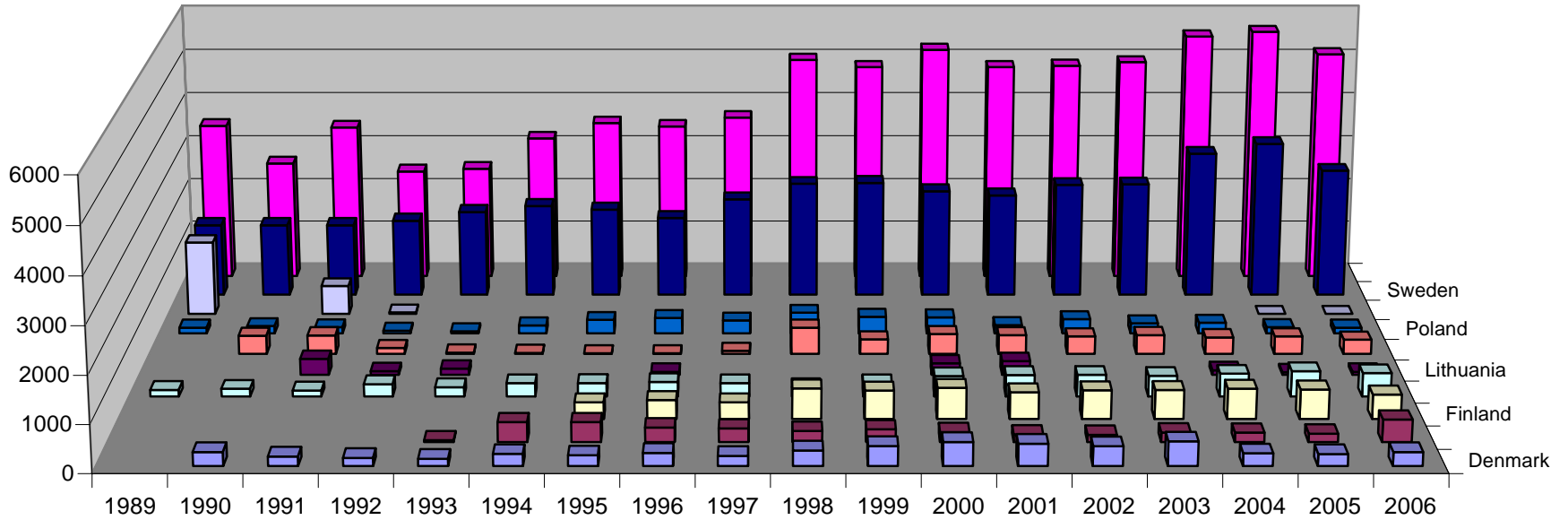
In a vast majority of cases of detected illegal discharges polluters remain unknown. In 2006, out of the total number of confirmed illegal discharges (236) only in 18 cases the polluters were identified (**Table 1**), which is however 8 more than in 2005, in which year 224 oil spills were observed.

Aerial surveillance data for the years 1998-2006, including the number of observations by countries and PF Index by countries, are contained in **Table 4**.

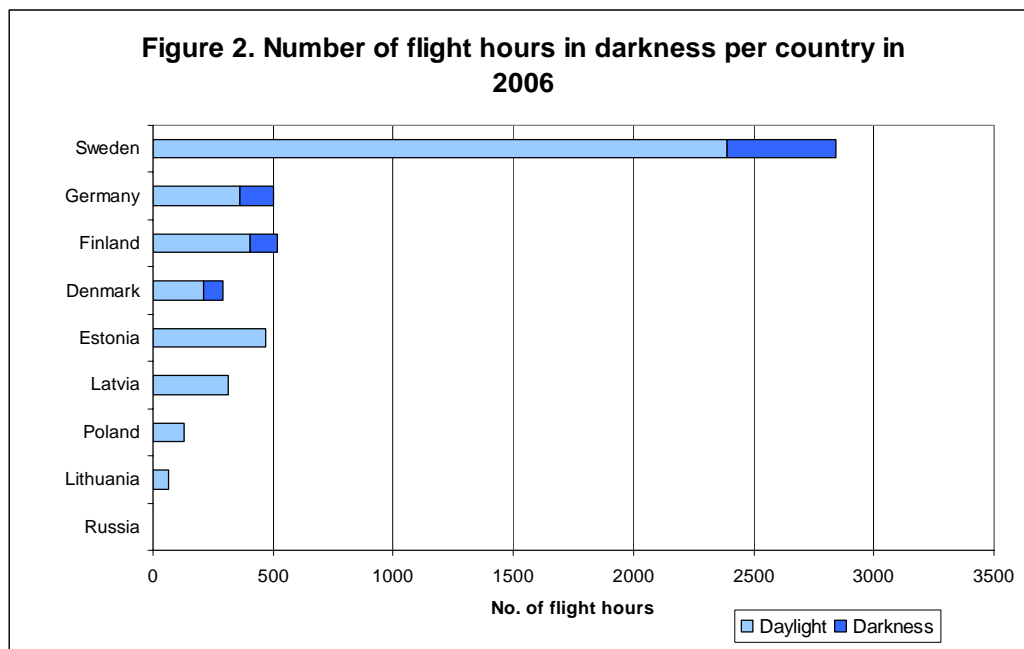
**Table 1. Annual HELCOM aerial surveillance data, 2006**

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	No. of polluters (including reports from other CPs)				Remarks
	Daylight	Darkness	Total	Daylight	Darkness	Total	Daylight	Darkness	Total		Rigs	Ships	Unknown	Total	
Denmark	211.41	78.37	289.78	47	12	59	33	8	41	4.536		5	36	41	14 reported by DE, 5 by SE
Estonia	470.53	0	470.53	31	0	31	31	0	31	101.36	0	4	27	31	
Finland	406	111	517	43	2	45	29	0	29	2.076		5	24	29	Of the detection: 1- fish oil, 1- leakage from oil refinery, 2- unconfirmed due to darkness.
Germany	360.5	143	503.5	25	19	44	14	8	22	1.824		0	22	22	2 reported by DK and 2 by SE
Latvia	311	0	311	0	0	0	0	0	0	0	0	0	0	0	All observations made only visually
Lithuania	64	0	64	0	0	0	0	0	0	0	0	0	0	0	
Poland	130.53	0	130.53	5	0	5	3	0	3	0.238	0	1	2	3	
Russia			0			0			0					0	
Sweden	2390	452	2842	88	14	102	94	16	110	159.27		3	107	110	8 reported by DK, 8 by DE
<b>Total</b>	<b>4343.97</b>	<b>784.37</b>	<b>5128.34</b>	<b>239</b>	<b>47</b>	<b>286</b>	<b>204</b>	<b>32</b>	<b>236</b>	<b>269.304</b>	<b>0</b>	<b>18</b>	<b>220</b>	<b>236</b>	

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



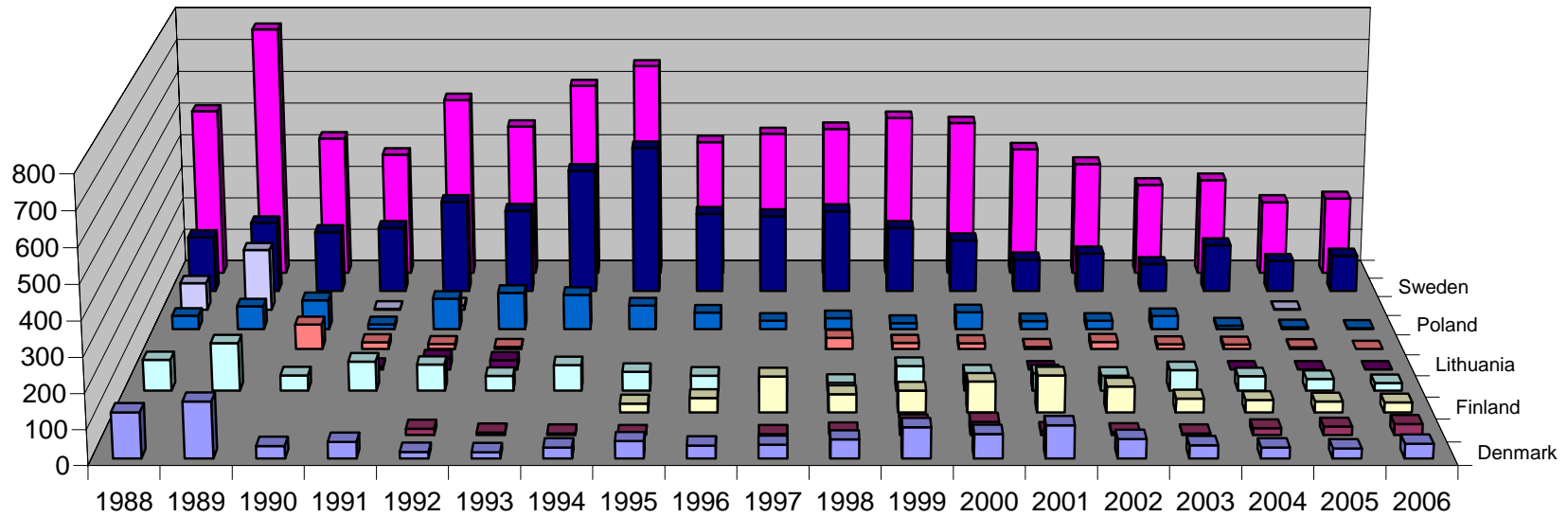
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Denmark		292	199	172	153	253	225	275	209	325	416	497	463	412	510	265	251.19	289.78
Estonia					40	420	420	305	284	236	268	212	161	153	201	198.16	178.49	470.53
Finland							355	400	355	649	603	660	567	605	615	644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



**Table 2. Detections of oil spills by satellite surveillance, 2006.**

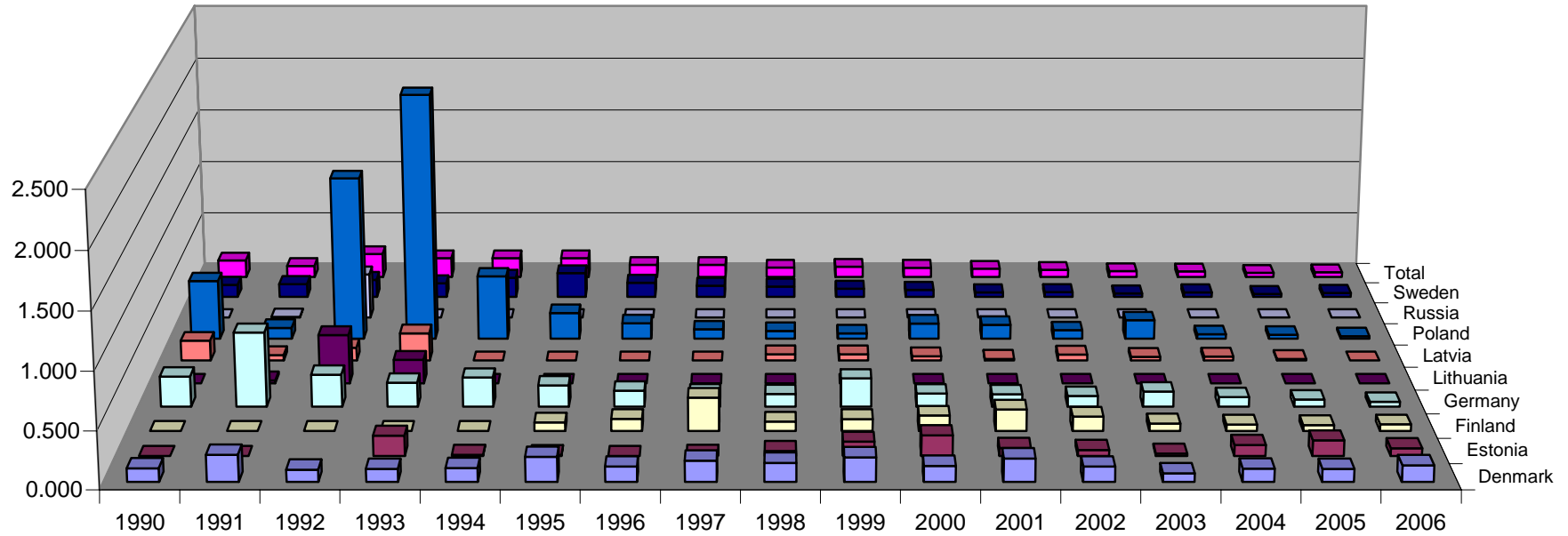
Country	Satellite detections	Confirmed oil	Remarks
Denmark	26	4	
Estonia	3	3	
Finland	7	0	
Germany	0	0	
Latvia	0	0	
Lithuania	0	0	
Poland	0	0	
Russia	0	0	
Sweden	105	19	
<b>Total</b>	<b>141</b>	<b>26</b>	

**Figure 3. Number of confirmed oil spills per HELCOM country, 1988-2006.**



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

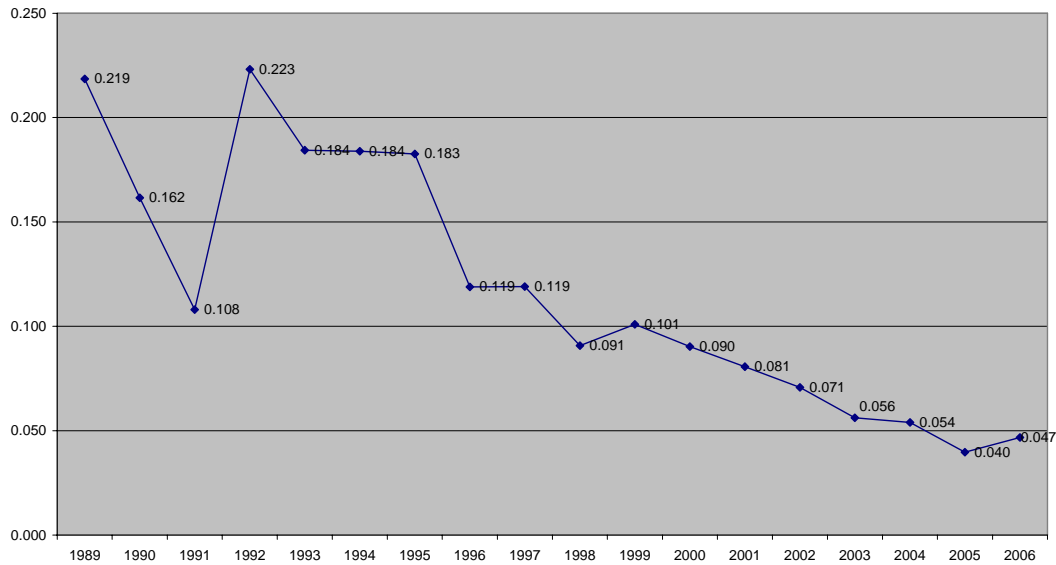
Figure 4. PF Index per HELCOM country, 1990-2006.



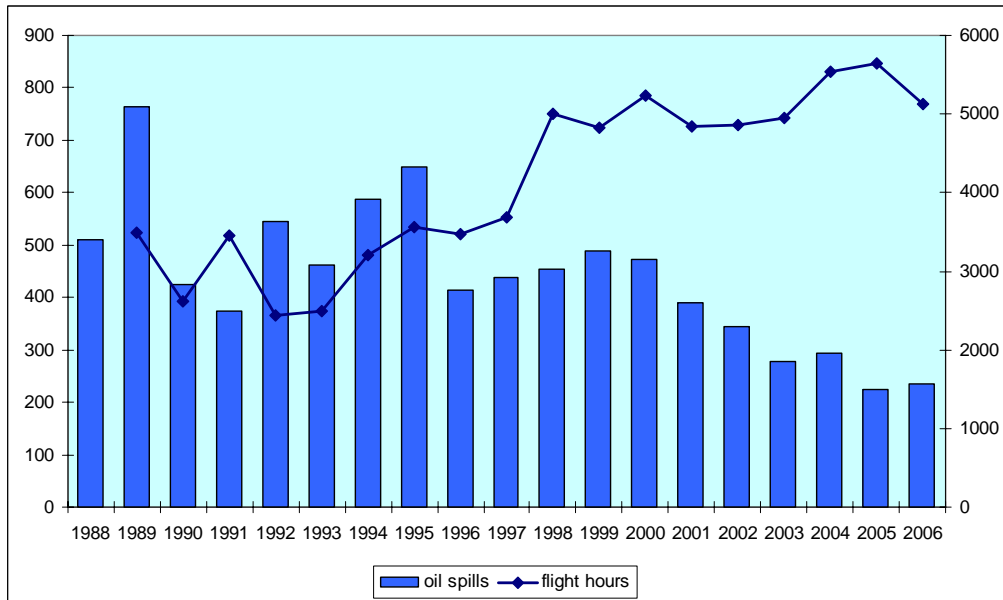
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Denmark	0.116	0.231	0.105	0.111	0.119	0.213	0.131	0.182	0.163	0.209	0.137	0.201	0.131	0.073	0.113	0.111	0.141
Estonia	0.000	0.000		0.175	0.010	0.007	0.000	0.011	0.042	0.123	0.179	0.068	0.052	0.020	0.096	0.134	0.066
Finland	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
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
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
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
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
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
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
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



**Figure 5. PF Index for the HELCOM area, 1989-2006**



**Figure 6. The total number of flight hours and observed oil spills in the HELCOM area during 1988-2006**



**Table 3. Observed oil spills in HELCOM countries by size, 2006.**

Size	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Russia	Sweden	Total
< 1m3	40	19	29	15	0	0	3	0	98	204
1-10 m3	1	10	0	0	0	0	0	0	7	18
10-100 m3		2	0	0	0	0	0	0	0	2
> 100 m3		0	0	0	0	0	0	0	1	1
unknown			0	7					4	11
<b>Total</b>	<b>41</b>	<b>31</b>	<b>29</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>110</b>	<b>236</b>

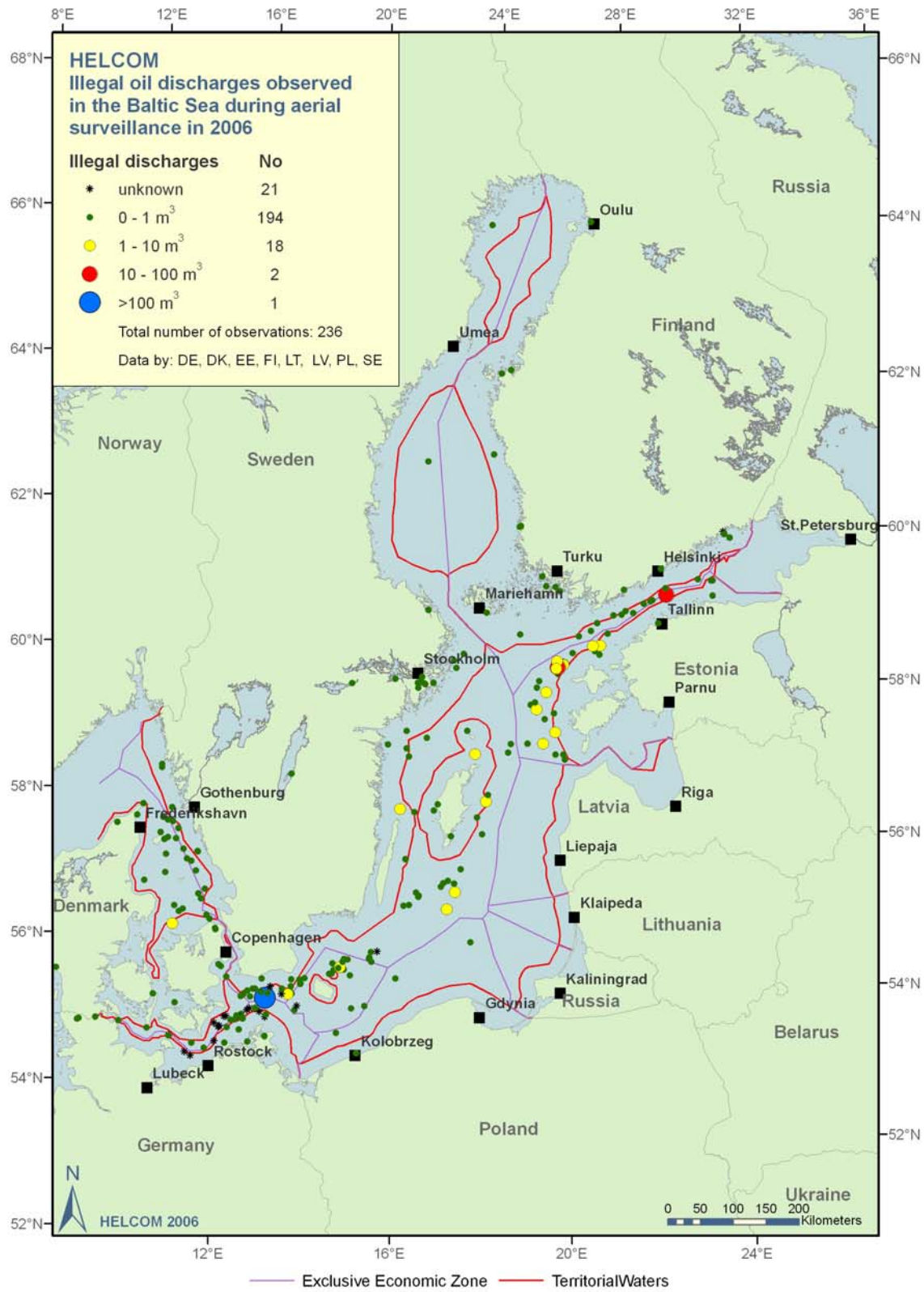


Figure 7. Location of the oils spills observed in the Baltic Sea area in 2006.

**Table 4. Aerial surveillance data 1998-2006**

Number of observations by country

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

Pollution/flight index

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	
<b>Denmark</b>	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	
<b>Estonia</b>				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	
<b>Finland</b>						0.073	0.105	0.293	0.082	0.104	0.135	0.189	0.124	0.065	0.056	0.051	0.056	
<b>Germany</b>	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	
<b>Lithuania</b>		0.023	0.436	0.211														
<b>Latvia</b>	0.183	0.049	0.118	0.250					0.057	0.056	0.039	0.015	0.054	0.034	0.036	0.013		
<b>Poland</b>	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	
<b>Russia</b>		0.005	0.406															
<b>Sweden</b>	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	
<b>Total</b>		<b>0.162</b>	<b>0.108</b>	<b>0.223</b>	<b>0.184</b>	<b>0.184</b>	<b>0.183</b>	<b>0.119</b>	<b>0.119</b>	<b>0.091</b>	<b>0.101</b>	<b>0.090</b>	<b>0.081</b>	<b>0.071</b>	<b>0.056</b>	<b>0.053</b>	<b>0.040</b>	<b>0.046</b>

Calculations

	pollutions	763	424	373	544	461	588	649	413	438	454	488	472	390	344	278	293	224	240
<b>Total</b>	flight hours	3491	2624	3453	2438	2500	3198	3553	3474	3680	5002	4833	5230	4837	4864	4946	5434	5637.58	5128
	year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	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	0.047