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Final report on implementation of hot spots programme under the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP), 1992-2013

This document was a background document for the
2013 HELCOM Ministerial Meeting

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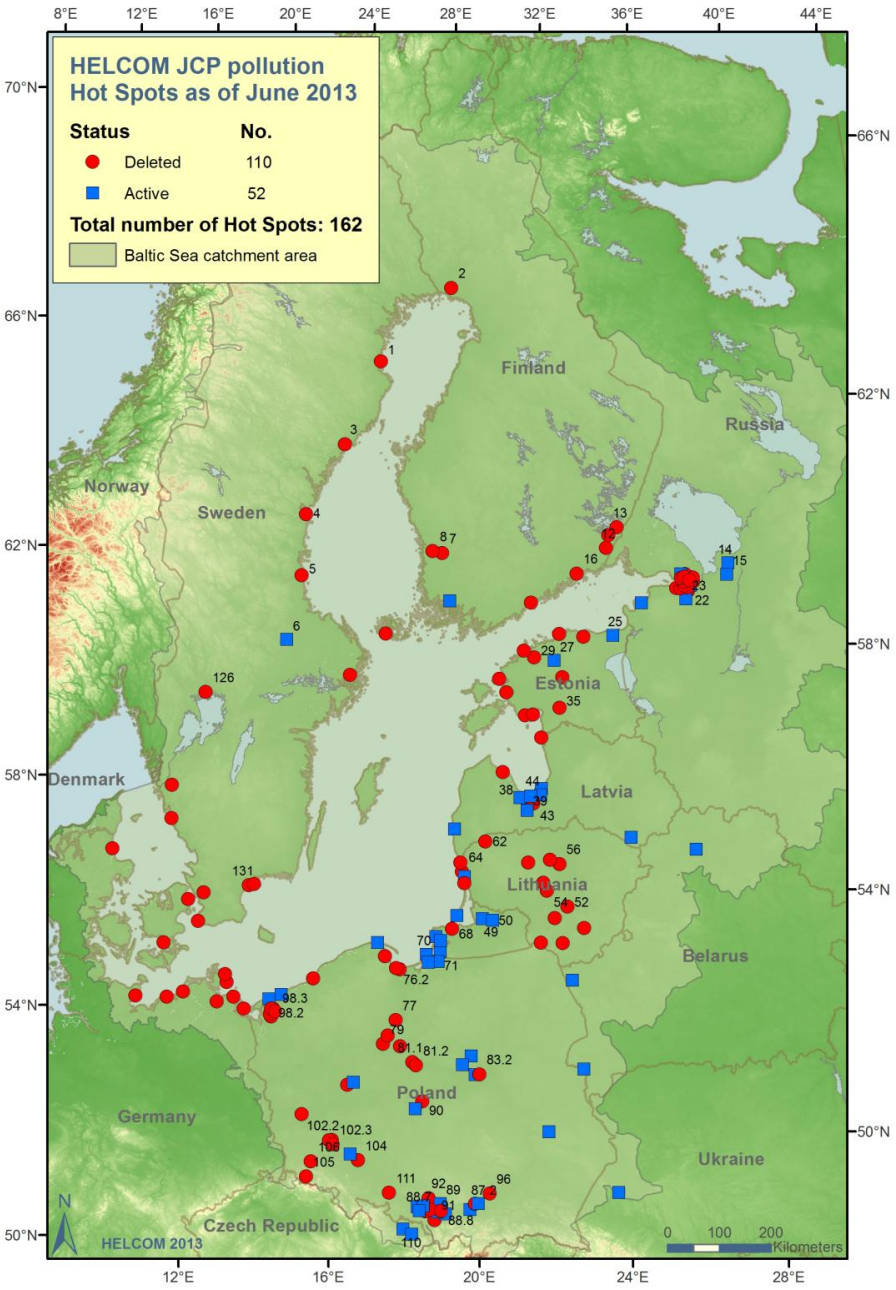
Baltic Marine Environment Protection Commission

THE BALTIC SEA JOINT COMPREHENSIVE ENVIRONMENTAL ACTION PROGRAMME (JCP)

IMPLEMENTATION OF HOT SPOTS PROGRAMME, 1992-2013

Final Report



Baltic Marine Environment Protection Commission – Helsinki Commission

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1. Executive Summary

Many pollution sources within the Baltic Sea drainage basin may harm the marine environment as well as affect people's health and livelihoods. Co-ordinated international co-operation on reducing pollution is vital.

The Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) was established in 1992 as the international environmental management framework for the long-term restoration of the ecological balance of the Baltic Sea.

The main objective of the JCP was to support both "preventive" and "curative" measures in the Baltic drainage basin, and to restore the ecological balance of the Baltic Sea by reducing pollution loads. Identifying and cleaning up pollution Hot Spots has been an important part of this work. The programme was designed to have been completed by 2012 at the latest.

The JCP had six main complementary elements:

1. Policies, Laws and Regulations
2. Institutional Strengthening and Human Resource Development
3. Investment Activities Addressing Point and Non-point Source Pollution
4. Management Programmes for Coastal Lagoons and Wetlands
5. Applied Research
6. Public Awareness and Environmental Education.

A Programme Implementation Task Force (PITF), consisting of representatives from the European Union and every country in the Baltic Sea drainage basin as well as international financing institutions and governmental and non-governmental organisations, coordinated the implementation of the JCP during its first decade and continued successful coordination though expert network. Focus was on investments made to reduce pollution from a variety of sources, including serious pollution "Hot Spots" designated by HELCOM, and on drafting management plans for sensitive coastal lagoons and wetlands. Due to a change in priorities the Programme Implementation Task Force was closed down in June 2003 and since then HELCOM LAND group has been responsible for the implementation of the JCP.

At the establishment of the JCP in 1992, the total costs of the Programme were estimated at 18 billion Ecu[1]. In 1999 it was estimated that total funding of 10 billion Ecu would still be needed to finance the necessary measures at all the Hot Spots. By 2013, the reported costs for remediation of 2/3 of original hot spots were estimated at a level of 3 billion Euro, however this figure is not complete due to lack reliable information on e.g. deletion of agricultural hotspots.

Sources of financing included countries own funding, contribution by International Financial Institutions (NIB, NEFCO, EBRD, etc.), European structural and cohesion funds, especially after 2004, when new EU Member States joined the EU. Major progress of the JCP can be reflected by:

- decreasing discharges and emissions from Hot Spots
- the increasing number of Hot Spots deleted
- additional actions which will result in further reduction of pollution, e.g. the implementation of Annex III to the Convention (Agriculture), the development of Codes of Good Agricultural Practice, etc.

1 The European Currency Unit (ECU) was a basket of the currencies of the European Community member states, used as the unit of account of the European Community before being replaced by the euro on 1 January 1999, at parity

This report provides an overview of the activities carried out especially in relation to the Investment Activities Addressing Point and Non-point Source Pollution (hot spots component).

Some of the main activities, and possibly the most visible, have been the investment activities concerning point-source and non-point source pollution since the adoption of the JCP and the establishment of the HELCOM PITF. These activities have resulted in cleaning up and the formal deletion of over two-thirds (109) of the 162 serious pollution areas identified around the Baltic Sea since 1992.

Estimates of pollution load reductions have been made for the purposes of this report. Specifications of Hot Spots, information about deletion and load reductions as percentages and as tonnes/year are given for each deleted Hot Spot, along with the investments until deletion.

It can be seen that the deleted Hot Spots (at the time of deletion) have contributed to a 31% reduction of the originally estimated load of BOD, 27 % of the COD load, 32 % of the tot-N load, 36 % of the tot-P load, 89% of the AOX load, and only 4% and 5% of the NOx and SOx loads, respectively.

With one third of original hot spots still remaining in the list, there is a need to continue the work on remediation of the remaining 52 pollution sites, till the very last of those will be removed from the List. Setting up a timeline for the completion of the JCP programme is necessary, having in mind that many of the remaining municipal hot spots are in the pipeline for completion. The 2013 HELCOM Ministerial Meeting in Copenhagen is expected to decide on how to continue with the hot-spots beyond the timeframe of the JCP.

2. JCP: Review of twenty years of implementation

2.1 Establishment and organisation

The Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) was established in 1992 and provided a practical basis for realising the objectives of the Helsinki Commission. A brief overview of the history of the JCP is provided in Table 1.

Table 1. The history of the JCP

1988	Declaration on the Protection of the Environment of the Baltic Sea
1989	Liberalisation in Eastern Europe leads to closer contacts between all the countries around the Baltic Sea and increased commitment to environmental co-operation.
1990	The Baltic Sea Declaration is signed in Ronneby, Sweden, by Heads of Governments and High Political Representatives. The Declaration defines the JCP as a tool for the implementation of the 1974 Helsinki Convention
1992	The Diplomatic Conference of the Helsinki Commission approves the JCP's 20-year programme of action, anticipating phased strategic investment throughout the region with an estimated total cost of about 18 billion ECU.
1998	The JCP is reviewed and updated. Communique of the Ministerial Session on 26 March 1998
2003	HELCOM Bremen Declaration took into account Strategy paper on the future of the JCP implementation mechanism, dissolved Programme Implementation Task Force (PITF) and agreed that the tasks concerning JCP implementation, in particular monitoring the development in relation to the Hot Spots, should be continued under the umbrella of HELCOM
2007	HELCOM Baltic Sea Action Plan agreed to establish list of Hot Spots identifying existing installations for the intensive rearing of cattle, poultry and pigs not fulfilling the requirements in the revised Annex III of the Convention
2010	HELCOM Moscow Ministerial Meeting welcomed the significant progress achieved in the remediation of the HELCOM hot spots under the JCP with the help of funding provided from consolidated national and external sources, and agreed to undertake necessary steps for alignment of funding, also bearing in mind the environmental remediation of the HELCOM hot spots JCP to be accomplished by 2012.
2013	HELCOM Ministerial Meeting in Copenhagen will assess the effectiveness of the implementation of the HELCOM JCP (1992--2012) and the need for its prolongation, including also the extension of the List of HELCOM Hot Spots, at the 2013 HELCOM Ministerial Meeting.

In addition to the ten HELCOM Contracting Parties, the JCP involved the Governments of Belarus, the Czech Republic, Norway, Slovak Republic and Ukraine, the Council of Europe Development Bank, the European Bank for Reconstruction and Development, the European Investment Bank, the Nordic Environment Finance Corporation, the Nordic Investment Bank, the World Bank as members. A range of non-governmental organisations also take active part in the activities as observers.

The Programme Implementation Task Force (PITF) had been co-ordinating the implementation of the JCP as an autonomous body within the HELCOM framework. The PITF included representatives from the European Union and every country in the Baltic Sea drainage basin as well as international financial institutions and international governmental and non-governmental organisations. Since 2003, monitoring of the JCP implementation was carried out by HELCOM Land-based Pollution Group (HELCOM LAND), which identified the following actions to achieve the goals of the JCP:

1. Assess the development and support the Contracting Parties when addressing the problems of the Hot Spots;
2. Review the List of Hot Spots according to the latest development and pollution alleviation priorities leading to deletion of existing Hot Spots;
3. Ensure a stronger coordination and cooperation with similar programmes and activities.

In 1992 a total of 132 especially polluting sites and areas within the Baltic Sea catchment area were identified by an international group of scientists, engineers, environmental managers, bankers and representatives of national authorities of the countries in the catchment area. During the course of the JCP implementation, some Hot Spots have been split into Sub-Hot Spots in order to facilitate the management and identification of pollution reduction measures.

These were included in an official “List of Hot Spots”. The locations per-country of the Hot Spots are given in Table 2 and Table 3 as well as on the maps in Annex 2.

At some Hot Spots pollution has already been successfully reduced, leading to deletion from the list. The List of Hot Spots (comprising of both deleted as well as active sites) as of November 2012 is presented in Annex 1.

Table 2. Polluting sites included in the “List of Hot Spots” in 1992.
The total sum is 137 because five Hot Spots are shared between countries (in brackets)

Locations of the 132 JCP Hot Spots (1992)		
Belarus	3	
Czech Republic	3	(1)
Denmark	4	
Estonia	13	(1)
Finland	10	
Germany	9	(1)
Latvia	10	(1)
Lithuania	16	(1)
Poland	37	(3)
Russia	19	(2)
Sweden	12	
Ukraine	1	

Table 3. List of Hot Spots in 2013 (total sum is 162)

Country	Agricultural		Municipal		Industrial		Coastal		Total	
	deleted	active	deleted	active	deleted	active	deleted	active	deleted	active
Denmark	3		1						**4**	**0**
Estonia	2	-	5		2	2	2		**11**	**2**
Finland	1	1	1		7				**9**	**1**
Germany	1	-	7					1	**8**	**1**
Latvia	1	-		3	1	4	1		**3**	**7**
Lithuania		1	9		5			1	**14**	**2**
Poland		2	11	11	20	4		2	**31**	**19**
Russia		2	16	6	2	6		2	**18**	**16**
Sweden	3		2		6	1			**11**	**1**
Belarus				3					**0**	**3**
Ukraine				1					**0**	**1**
Czech Rep.			1	1		1			**1**	**2**
TOTAL	**11**	**6**	**53**	**25**	**42**	**19**	**3**	**6**	**110**	**55**
								Transboundary (coastal) management programmes	-1	-3
								TOTAL (162)	**109**	**52**

* - fish-farming
** - mining-waste
*** - salt-control
**** - hazardous waste
D – deleted hot-spot
A – active hot spot

Total number of deleted/active is different from presented in the reports due to transboundary nature of hot spots addressing coastal zone management programmes, namely Estonia/Latvia (removed) and Lithuania/Russia, Russia/Poland, Poland/Germany – active.
Municipal category includeds both waste water and waste utilities

Several Regional Workshops have been organised in 1999-2001 together with the countries involved in the JCP in order to review Hot Spot activities and the implementation of the JCP, and to produce Thematic Reports.

2.2 Objectives and activities of the Programme

The main objectives of the JCP were to support both "preventive" and "curative" measures in the Baltic drainage basin, and to restore the ecological balance of the Baltic Sea by reducing pollution loads. This involves identifying pollution sources and carrying out measures to reduce the inputs of organic matter, nutrients and other harmful substances. Identifying and cleaning up pollution Hot Spots is an important part of this work.

The JCP had six main complementary elements:

1. Policies, Laws and Regulations
2. Institutional Strengthening and Human Resource Development
3. Investment Activities Addressing Point and Non-point Source Pollution
4. Management Programmes for Coastal Lagoons and Wetlands
5. Applied Research
6. Public Awareness and Environmental Education.

After a review of the work of HELCOM in 1999, it was decided to incorporate the implementation of elements 1, 2, 5 and 6 into the daily work of HELCOM, thereby

leaving elements 3 and 4 (planning and investment) as the focus for the PITF. Since 2003, these elements were left under monitoring of the HELCOM Land-based Pollution Group (HELCOM LAND).

2.3 Financing

Alleviating pollution at Hot Spots involves considerable investments. At the establishment of the JCP in 1992 the total costs of the Programme were estimated at 18 billion Ecu. In 1999 it was estimated that total funding of 10 billion would still be needed to finance the necessary measures at all the Hot Spots. By 2013, the reported costs for remediation of 2/3 of original hot spots were estimated at a level of 3 billion Euro, however this figure is not complete due to lack reliable information on e.g. deletion of agricultural hotspots.

Financing the JCP has been possible thanks to the shared vision of the Programme, sustained political and public commitment, and the development of strong partnerships between the co-operating parties. Financial support for the Programme to date provides a record of action demonstrating the linkage of environmental priorities established under the JCP with a range of financial resources provided by many different sources.

In practice, financing has been agreed between the owners responsible for the Hot Spots, governments, donors, national banks, the private sector and international financial institutions. HELCOM has no special financial resources for the implementation of the JCP, but relies on contributions from the Contracting Parties and donor projects. Most investments come from domestic sources.

In the former countries in transition, where affordability is still a critical constraint on investments, the use of co-financing, combining loans from the International Financial Institutions and grants from the European Union and bilateral donors, has been vital.

When grants are also available, projects can be larger, allowing greater impacts and reducing the effective cost to the co-operating government or investors. This approach also reduces the impacts in terms of the adjustment of tariffs for services, thus decreasing potential adverse impacts on populations with low or fixed incomes.

2.4 Reporting

Reporting on the results and activities of PITF has always been considered vital. The aims of reporting were:

- to increase awareness and get public support for the implementation of the JCP
- to produce information for decision-makers, in particular in the field of investments
- to reflect results and ongoing work, in order to help identify problems and deficiencies.

Hot Spot Activity Inventories and Annual Reports on activities under Elements 1, 2, 4, 5 and 6 were published from 1993. From 1996, the Annual Reports were published including selected parts of Activity Inventories, which were also published in separate editions. Since 1998, the Annual Report has contained the whole Activity Inventory as well as a comprehensive chapter on municipal and industrial waste water treatment based on Swedish Lead Party Reports. Additional means have been used to inform the public about the work of the PITF and progress with the JCP (e.g. BSEP, HELCOM News and the HELCOM website as well as special brochures and posters etc. published for various occasions.

Since 2003 status reports were compiled by the Secretariat for annual meeting of the Land-based Pollution Group. The Hot Spot Status questionnaires that form the basis

for these inventories have repeatedly been changed to include extended or improved information. They were also annually updated on the HELCOM website.

The annual status report from 17th Meeting of HELCOM LAND in 2012 is the most recent of these publications. The latest compilation of national questionnaires regarding active hot spots is provided in Annex 4 to this report.

2.5 JCP implementation – Activities Addressing Point and Non-point Source Pollution

This report will only focus on activities related to hot spots component of the HELCOM JCP.

2.5.1 Combined Municipal and Industrial Waste Water Treatment

There were originally 54 Municipal or Municipal/Industrial Hot Spots designated in 1992. At some Hot Spots there may be one or more municipal or combined waste water systems, including sewerage networks and treatment plants (existing or planned).

During the Regional Workshops in Poland (2001), it was proposed that certain Hot Spots should be split into several Sub-Hot Spots in order to facilitate their management and actions to reduce the pollution. Subsequently the total number of listed municipal Hot Spots and Sub-Hot Spots has risen to 75, of which now 53 have been deleted. The deleted Hot Spots are situated in Denmark (1), Estonia (5), Finland (1), Germany (7), Lithuania (9), Poland (11), Russia (16), Sweden (2) and Czech Republic (1).

2.5.2 Industrial hot spots

Although significant progress has been made at industrial hot spots, continued and substantial support will be required to reach the targets of the programme. Originally 50 industrial hot spots were identified by the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP).

Additionally, many industries are connected to municipal sewerage systems listed as municipal Hot Spots. Out of the 50 industrial Hot Spots, 37 were located in the countries in transition, including 9 classified as "priority Hot Spots". At least three pulp and paper mills and two food processing plants have been closed in these countries, and production has decreased at several other plants as well.

Certain industrial Hot Spots have been split into Sub-Hot Spots, as was the case for some municipal Hot Spots, in order to facilitate their management and actions to reduce pollution. This has resulted in a total of 65 industrial Hot Spots/Sub-Hot Spots. But by June 2013, 43 of these sites had been deleted. The deleted industrial Hot Spots are situated in Estonia (2), Finland (7), Latvia (1), Lithuania (5), Poland (21), Russia (2) and Sweden (6).

Finland has the responsibility to co-ordinate and assess the implementation of measures at the industrial Hot Spots. A Finnish report presents a comprehensive review of the environmental and economic progress at the industrial Hot Spots in the Baltic Sea catchment area during 1991-1998.

The "Review of progress at industrial hot spots", prepared by the Finnish Environment Institute SYKE, is available online. The report includes a review on industrial Hot Spots based on data compiled from available sources by SYKE during the summer of year 2000.

In 2012-2013, following findings of significant input of phosphorus into the Baltic Sea from the fertilizer production site in Russia, an inventory of similar sites in the catchment area was performed. It resulted in evaluation of potential nutrient loads originating from this branch of industry, development of necessary abatement

measures and consideration of a need to follow-up environmental performance of already deleted hotspots (as two of the assessed industrial sites were previously listed as JCP hotspots).

2.5.3 Agriculture

Large areas of the Baltic Sea catchment area have been identified as agricultural Hot Spots. The list of JCP Hot Spots established in 1992 contained 17 Agricultural Hot Spots. The List also contains five Coastal Lagoon/Wetlands Hot Spots which are influenced by agricultural activities and where relevant management programmes are needed. Out of these 22 Hot Spots, 13 are located in the former countries of transition.

So far 12 Hot Spots have been deleted from the List: three in Denmark, three in Estonia, one shared by Estonia and Latvia, one in Finland, one in Latvia, one in Germany and three in Sweden. The main reason for deletion has been a remarkable decrease in agricultural activities in Estonia and Latvia due to economic recession.

The EU co-funded projects ARTWEI and BASE will contribute to the assessment of current environmental status of the coastal lagoons that are still on the HELCOM hot spot list.

2.6 Developments concerning Hot Spots and pollution load reductions

Since the adoption of the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) and the establishment of the HELCOM Programme Implementation Task Force (PITF), investment activities concerning point-source and non-point source pollution have been amongst the most prominent and significant activities. Many investment and remediation projects have been conducted in relation to the identified and listed Hot Spots. These activities have subsequently resulted in the formal deletion of many Hot Spots.

Over the past two decades several Hot Spots have been redefined, and in several cases divided into Sub-Hot Spots. These actions have facilitated the management and evaluation of these Hot Spots, as well as the identification of remediation actions needed.

By adoption of the Baltic Sea Action Plan, the HELCOM Contracting Parties agreed to establish by 2009 a list of Hot Spots identifying existing installations for the intensive rearing of cattle, poultry, and pigs not fulfilling the requirements in the revised Annex III of the Helsinki Convention. Further steps for elaboration of the List included elaboration of Criteria for point-source hot spots, compilation of available national information and integration of national nominations to the new List. However, none of the Contracting Parties has to this moment provided clear indication of specific farms to be included in the new List of point-source agricultural hot spots.

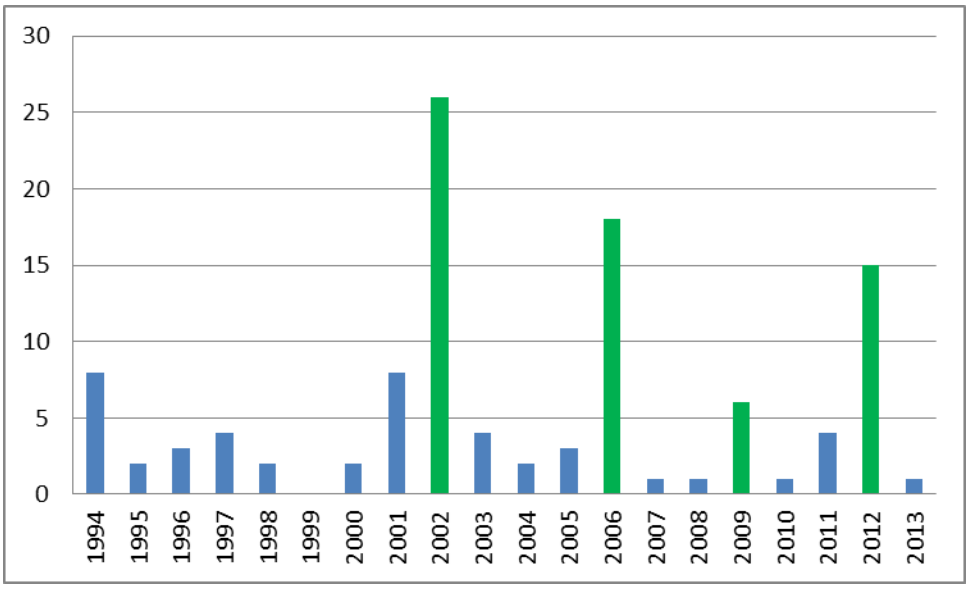
One much debated issue has been the development of Criteria for the Inclusion and Deletion of Hot Spots in the List of Hot Spots. In May 1999, the "Criteria for Inclusion and Deletion of Hot Spots: Procedures and Guidelines for Inclusion and Deletion of Hot Spots" were adopted by PITF 14/1999. This document establishes a replicable mechanism for Hot Spot addition or deletion, and provides a mechanism for setting targets for the planning and implementation of investment activities at the Hot Spots.

2.6.1 Number of deleted Hot Spots

Over two-thirds (109) of the 162 hot spots - identified around the Baltic Sea since 1992 have already been cleaned up (Figure 1), leaving 52 still to be deleted.

In certain cases the political will to work towards the deletion of Hot Spots seems to be missing – maybe reflecting an aim to maintain a high political profile for the Hot Spots and environmental policy at national level. It inevitably takes some time before projects are prepared, with financing put in place and measures implemented, leading to conditions that make proposals for deletion timely. A steady increase in the deletion of Hot Spots was observed till 2002. It was also foreseen that if these trend will continue, the chances are good for the deletion of nearly all the remaining Hot Spots before the planned JCP finalisation in 2012. However as can be seen above, since the peak of 26 hot spots deleted in 2002, this process has slowed down with higher national (reporting) activity observed in relation to preparation of milestone events in HELCOM's activities (e.g. ministerial level meetings).

Figure 1. Number of Hot Spots/sub-Hot Spots deletions, 1994-2013



2.6.2 Review of applications for Hot Spot deletion

For the purpose of this report, estimates of pollution load reductions have been made. All the documents forming the basis for the Hot Spot deletions accepted by the PITF/LAND have been reviewed, in order to estimate the pollution load reductions obtained through the investment activities implemented at the deleted Hot Spots/Sub-Hot Spots. This means that the reductions obtained at those Hot Spots which have not yet been deleted are not accounted for even if some reductions have taken place. Consequently, the real reductions must be supposed to be larger.

A general observation during the reviews of applications for Hot Spot deletion is that there has been a change from a pollution load approach to a more technology oriented approach.

During the first years of JCP implementation, countries provided data for pollution before and after the remediation, allowing reductions to be easily calculated in most cases. More recently, applications have described in detail the technologies implemented, along with the reductions in concentrations compared to HELCOM Recommendations. Often the overall emission flow or size is not indicated, so it is not possible to estimate the pollution load. In such cases load reductions have been calculated (1991-98) using data from the Annual Report 1999. In the second period, very few load reductions for heavy metals and other hazardous substances were reported, which reflects the general trend with less industrial and more municipal sites

being deleted from the List (cf. Table 3). Specific information about each of the deleted hot spots is contained in Annex 6.

Comparing two periods of JCP implementation (cf. Table 4 and Figure 2), it becomes obvious that industrial hot spots represented major part of sites deleted during 1994-2003, with pulp-and-paper, food- and metal-processing as well as smelters/foundries as leading branches. In the second period, 2004-2012, municipal waste water treatment plants were on top of the list of deleted hot spots, with significant support of infrastructure projects by EU funding in new EU Member States and IFI support of projects in Russia.

Table 4. Categories of hot spots deleted in 1994-2003 and 2004-2013

Period	Agriculture & Fish-farming	Industry	Municipal & Industrial	Management programme	All
1994-2003	4	37	16	1	58
2004-2013	6	9	36	1	52
1994-2013	10	46	52	2(1)	110

Figure 2. Number of deleted Hot Spots per sector in 1994-2003 and 2004-2013

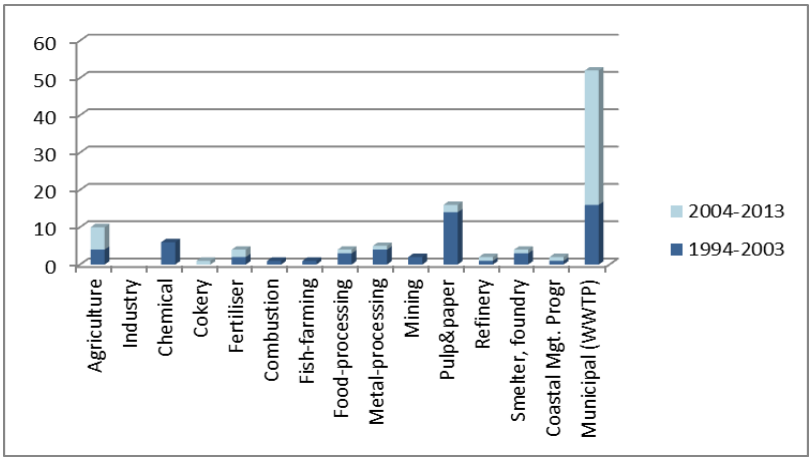
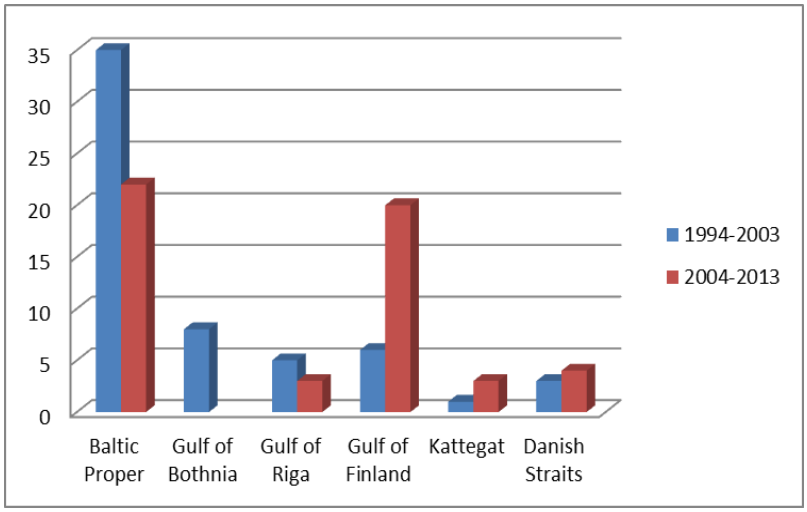


Figure 3. Number of deleted hot spots per sub-basin per period, 1994-2003 and 2004-2013



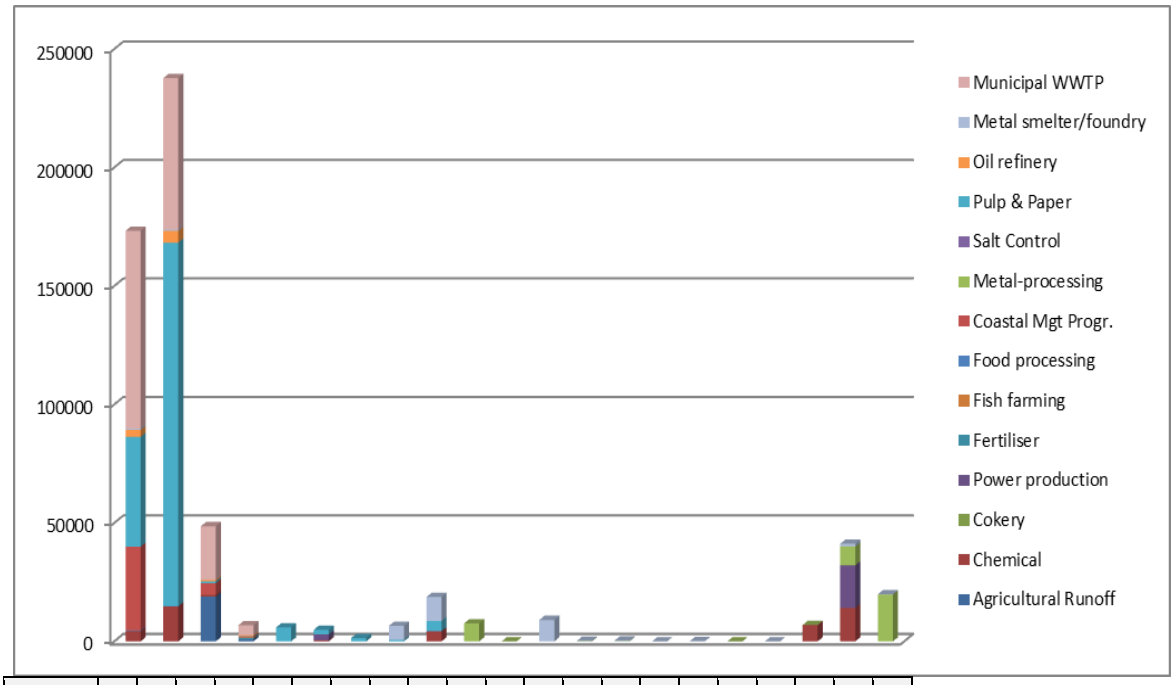
Similar observations can be made for deletion of hot spots per sub-basins (cf. Figure 3) for the first and second reporting periods, namely showing that most of activities in the first period were carried out in the Baltic Proper catchment and by western Baltic States, while in the second period major activities were carried out also in Baltic Proper catchment (by Poland) and in the Gulf of Finland (by Russia).

2.6.3 Pollution load reductions

The validity of the data is in some respects debatable. It can be supposed that the quality of monitoring data has improved during the period, due to improved planning and monitoring methods. In situations where Hot Spots have been divided into Sub-Hot Spots, it can be difficult to verify the relationship between the reported data in the deletion document and the data provided in the annual status reports on JCP implementation. Also, in a few cases the load data for the Sub-Hot Spot could not be determined, and consequently no estimates could be made for reductions.

Overall load reductions achieved with deletion of hotspots, both total and per industrial brach is presented in Figure 4. It clearly shows the importance of reduction of organic matter and nutrient loads from pulp & paper and municipal waste water treatment sectors.

Figure 4. Pollution load reductions from deleted Hot Spots (1994-2013)



	BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl-	dust	H_2SO_4
1994-2003	123510	235410	34189	3990	5866	4858	1442	6361	18349	7580	11	9037	230	323	30	60	10	27	6867	41170	19877
2004-2013	49797	2259	14404	2839	0	0	0	187	0	0	0	0	0	0	0	0	0	0	0	0	0
1994-2013	173307	237669	48593	6828	5866	4858	1442	6548	18349	7580	11	9037	230	323	30	60	10	27	6867	41170	19877

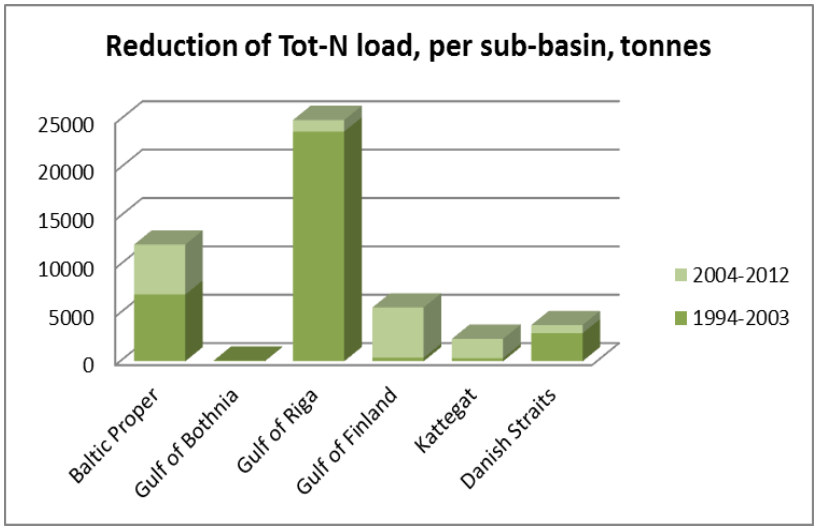
The results of the review are shown in Annex 3, which shows for each deleted Hot Spot the Hot Spot's specifications, information about investments and subsequent deletion, and the load reductions as percentages and as tonnes/year.

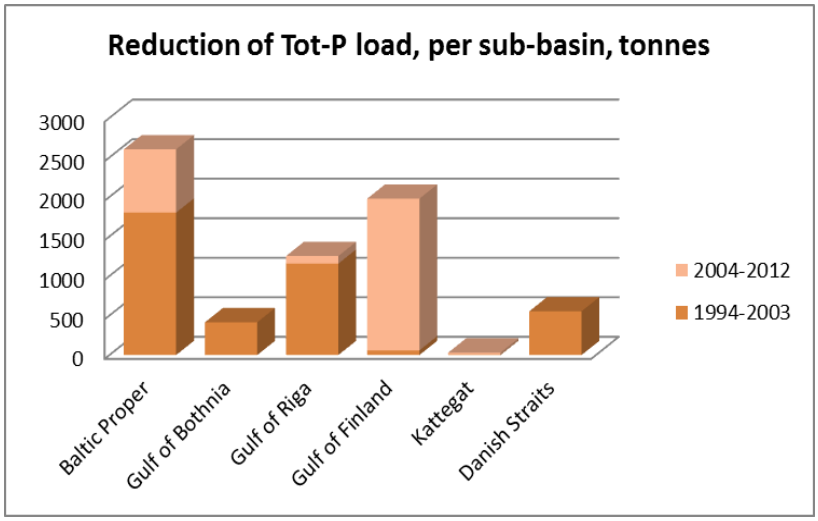
The overall estimation of the total pollution load reductions indicates the reductions obtained at the moment of deletion from the Hot Spot List. Subsequently production may have increased or decreased, which may have increased pollution loads in some cases; although in other cases new technology or BAT may have been introduced, leading to further reductions in loads even where production has increased.

The pollution load reductions at individual Hot Spots have been summarised for each "catchment area" on the List of Hot Spots (Figure 5 and Annex 4). Also the total reductions obtained for each parameter are shown in Annex 4. Taking into account the uncertainty of the estimations, pollution load reduction totals can be calculated as shown in Figure 4.

Data presented in Figure 5 reflects nitrogen load reduction achieved in the Gulf of Riga by deletion of agricultural and coastal hot spots in the first period (1994-2003), as well as major reduction in phosphorus load in the Baltic Proper and Gulf of Riga in the first period (1994-2003) and the Gulf of Finland in the second period (2004-2012).

Figure 5. Reduction of total nitrogen and phosphorus load per sub-basin, tonnes





The pollution loads (waste water discharges/air emissions) from reported Hot Spots in 1991 (Annual Report 1999) and the estimated load reductions obtained by the deleted Hot Spots are shown in Table 5.

Table 5. Pollution load in 1991 and reductions achieved in 1994-2013 (t/year)

Year	BOD	COD	tot-N	tot-P	AOX	NOx	SOx
1991	564200	874700	150800	18700	6600	131300	338700
1994-2013	173307	237669	48593	6828	5866	4858	1442
Reduction, %	31	27	32	36	89	4	5

The 1991 load must be considered as the "original" (reported) load when the JCP was initiated. It can be seen that the deleted Hot Spots (at the time of deletion) have contributed to a 31% reduction of the BOD load, 27 % of the COD load, 32 % of the tot-N load, 36 % of the tot-P load, 89% of the AOX load, and only 4% and 5% of the NOx and SOx loads, respectively.

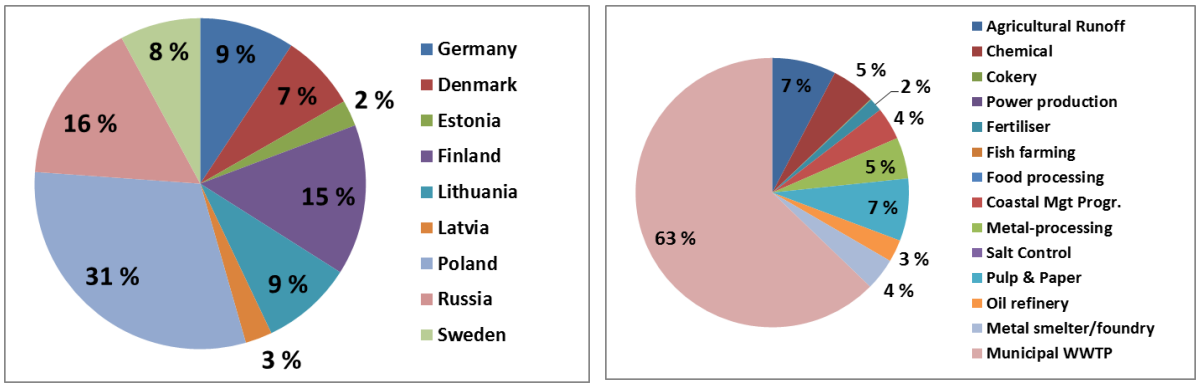
2.6.4 Investments

The investments made at the Hot Spots are shown in Table 6. There seems to have been a change in the quality of the data provided when the Contracting Parties apply for deletion. In recent years, less information has been provided regarding the investments made. The total sum of all the investments reported to HELCOM amounts to about 2 905 million Euros. For some hot spots the information was also reported as annual environmental cost, while for some it comprised mainly of incurred capital/infrastructure costs required for improvement of the situation. Thus, presented figures must be considered as an absolute minimum, because information is missing from number Hot Spots.

Table 6. Reported investments in remediation of hot spots (March 2013)

Country	**1994-2003, M EUR**	**2004-2012, M EUR**	**1994-2012, M EUR**
Germany	228	45	273
Denmark		219	219
Estonia	14	61	75
Finland	208	225	433
Lithuania		263	263
Latvia	77		77
Poland	700	200	900
Russia		471	471
Sweden	156	76	156
TOTAL, M EUR	**1382**	**1560**	**2942**

Figure 6. Distribution of investments for deletion of hot spots per country and per sector



Sources of financing included countries own funding, contribution by International Financial Institutions (NIB, NEFCO, EBRD, etc.), European structural and cohesion funds, especially after 2004, when new Member States joined the EU. However reflection of respective shares is not possible due to lack of reliable information.

2.7 Remaining JCP hotspots

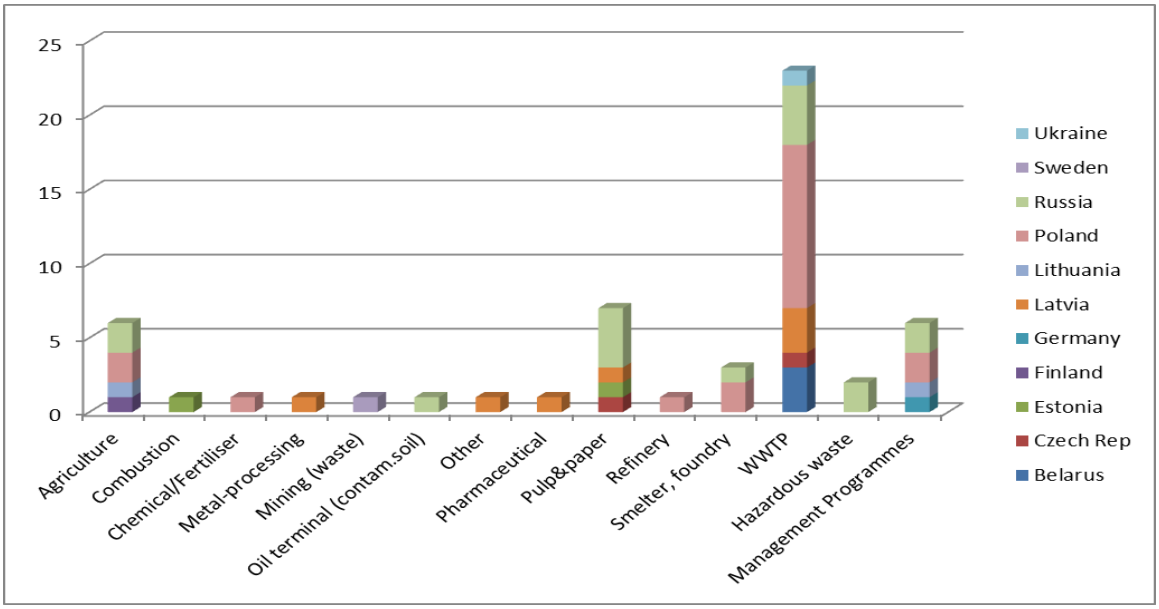
The remaining JCP hot spots are distributed between the countries as follows:

Table 7. Remaining JCP hot spots (as of March 2013)

	Agricultural	Municipal	Industrial	Coastal	Total
Denmark					0
Estonia	-		2		2
Finland	1				1
Germany	-			1	1
Latvia	-	3	4		7
Lithuania	1			1	2
Poland	2	11	4	2	19
Russia	2	3	8	2	15
Sweden			1		1
Belarus		3			3
Ukraine		1			1
Czech Rep.		1	1		2
ALL	6	23	20	6	55 (52)

Remaining biggest sector of active hotspots is still municipal waste-water treatment (23), followed by pulp & paper industry (7) and most challenging agricultural (6) and coastal management (3) hot spots (see Figure 7).

Figure 7. Number of active hot spots per sector per country (as of June 2013)



Estonia	– further assessment is needed for evaluating the time for deletion of remaining two hot spots (Kehra and Narva), as it is connected with the needs of certain technological changes to be applied
Germany	– integrated management in Odra Lagoon is a transboundary hot spot with Poland, and further work needs to be carried out to define when the hot spot could be submitted for deletion
Finland	– only remaining hot spot is agricultural runoff to the Archipelago Sea and it is not proposed for deletion within the coming years, due to the low effect demonstrated with measures undertaken so far
Latvia	– municipal hotspots (Riga, Liepaja, Daugavpils) are expected to be submitted for deletion soon; industrial sites would still require further efforts
Lithuania	– Nevezis River catchment and Curonian Lagoon integrated management programme are the two remaining hot spots and a comprehensive approach is needed for their deletion, due to the current implementation of the programme of measures under the EU WFD, as well as to the transboundary nature of the latter hot spot
Poland	– evaluation of the four remaining industrial hot spots (out of total 19 remaining) is on-going
Sweden	– mining waste in Dalälven River catchment is still remaining a hot spot and it will require further activities to clean it up due to accumulated environmental impact
Belarus	– remaining three municipal hot spots in Brest, Grodno and Vitebsk are currently undergoing environmental remediation projects, co-financed by the Belarus and the IFIs, including NDEP and NIB, as well as that further work is on-going with the support of NEFCO/NIB BSAP Fund to identify pilot activities addressing the List of priority installations in the field of wastewater treatment and agriculture in the Republic of Belarus contributing to transboundary pollution of the Baltic Sea.

Detailed information on specific active hotspots is presented in Technical Annex 5.

For the Russian Federation the proposals for the remaining hotspots based on the outcomes of a study on the current state of affairs with Russian "hot spots" of the JCP Program within the EU-funded HELCOM BASE Project are contained in Table 8.

Table 8. Proposals for next steps towards deleting the Russian "hot spots" from the HELCOM JCP List

HS #	Hot spot name	Proposed action
18.1	Municipal sewage water treatment in St. Petersburg, The sewage collectors	To prepare the application for exclusion of the hot sub-spot № 18.1 and to submit it at the 19th meeting of the HELCOM LAND Group in 2014
18.11	Municipal sewage water treatment in St. Petersburg, WWTP Kolpino	To postpone the consideration of exclusion of these hot sub-spots from the list of "hot spots" until commissioning the treatment plants in these settlements after 2015
18.15	WWTP Metallostroy	
23	Hazardous Waste Landfill - State Unitary Nature Conservation Enterprise (SUNE) Krasny Bor Landfill	To postpone the consideration of excluding the hot spot from the list of "Hot Spots" until commissioning the plant of hazardous waste treatment after 2015.
14	Syaskiy Pulp and Paper Mill (PPM)	Solution of the enterprise ecological problems is associated with high financial costs. Taking into account the economic situation of the Mill, the problem of exclusion of the enterprise from the "hot spots" list cannot be quickly solved now without the investment support.
15	Volkhov Aluminium Plant (Limited Liability Company "Metankhim")	As far as the "Volkhov Aluminium Plant" was divided into three independent enterprises after reorganization, it is proposed to divide this hot spot into three hot sub-spots: № 15.1 Limited Liability Company "Parosilovoe Hozyaystvo - Volkhov" - should be excluded from the HELCOM's list of hot spots in view of the minor negative impact. № 15.2. VAZ-SUAL of OJSC "SUAL" is a serious source of emissions into the atmosphere. № 15.3 Limited Liability Company "Metakhim" is the source of sewage water discharge. The construction of the sewage water treatment plant is scheduled to 2013 – 2014.
24	"Large livestock farms (sewage water treatment and sediment treatment)"	Introduction of the Technological regulations for handling manure and dung at all large livestock enterprises of the Leningrad Region will allow to reduce significantly the nutrients load on the Baltic Sea and to exclude the agricultural sector of the Region from the HELCOM's List
49	Sovetsk PPM	The input of nutrients from the former Sovietsk PPM operation has been reduced so considerably, that it is possible to request the exclusion of this enterprise from the List

50	Neman PPM	At present the LLC “Neman PPM” does not seriously endanger the environment and can be excluded from the HELCOM’s List
67	Sewage water treatment plant of Kaliningrad	Construction of the sewage water treatment plant of the Kaliningrad City will be finished in 2014. Therefore, the consideration of this hot spot exclusion from the HELCOM’s list of “hot spots” is proposed to postpone to 2015.
69	Cepruss PPM	In view of the closure of paper and cellulose production at the Cepruss PPM, the water consumption and sewage water discharge to the Pregel River have been ceased. Therefore, the exclusion of this enterprise from the list of “Hot Spots” is proposed.
70	Landfill of Hazardous Wastes of the City of Kaliningrad	The Landfill of Hazardous Wastes of Kaliningrad continues to expose the environment to a considerable negative impact and cannot be excluded from the list of “hot spots”.
71	Fuel and Cargo Complex of FSUE “State Sea Fishing Port”(Port Bunkering Station of Kaliningrad)”	The enterprise continues to expose the environment to a considerable negative impact. The permanent discharge of oil products into the Pregel River is recorded. In the enterprise's territory the areal contamination of soil with oil products still remains, the open sludge tank has not been liquidated and the reclamation of adjacent lands has not been fulfilled. The comparative analysis of the hot spot state for the previous period shows that, in spite of reconstruction of a certain part of the tank stock and putting into operation of the modular plant for purification of oil, bilge and ballast waters the level of negative impact remains high. Solution of ecological problems of the enterprise requires significant financial costs. Currently, the enterprise exclusion from the list of "hot spots" is not possible.
72	Agricultural runoff from Kaliningrad Oblast	Agriculture in the Kaliningrad Region is currently experiencing a period of rapid development. However, the enterprises created in the Soviet epoch, when the requirements to environmental aspects of their activities were not so strict, continue to work in the Region. The regional authorities are developing mechanisms to stimulate the introduction of advanced technologies, including the ecologically safe management of manure, at these enterprises. In general, the level of compliance with environmental requirements in livestock sector of the Kaliningrad Region is still low and does not allow excluding this sector from the HELCOM’s list.

The full report on the current state of the remaining Russian hot spots is available on HELCOM website in the section of BASE Project publications:
http://www.helcom.fi/stc/files/Projects/BASE/FinalReportHS2013Eng.pdf

2.7.1 JCP follow-up

2010 HELCOM Moscow Ministerial meeting welcomed the significant progress achieved in the remediation of the HELCOM hot spots under the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) with the help of funding provided from consolidated national and external sources and amongst them:

- the breakthrough with the completion of the South-West and Central Waste Water Treatment Plants in the City of St. Petersburg, utilizing an innovative phosphorus-removal technique, contributing to the improvement of the environmental conditions of the Gulf of Finland and the Baltic Sea in general.
- the implementation by the Government of Poland of the National Wastewater Treatment Programme (NWWTP) which is the largest with regard to investment and most costly from among all the tasks resulting from the implementation of the EU directives in the field of environmental protection in Poland. The NWWTP, requiring in the period until 2015 over 8 billion Euro, foresees construction of 30 thousand km of collecting systems, construction of 177 wastewater treatment plants, modernization and expansion of 569 wastewater treatment plants, including:
  - Czajka wastewater treatment plant in Warsaw which is one of the largest investments in Europe with a value of 650 million Euro. It will handle over 1.5 million residents in 2012 and ensure a high level of purification in accordance with EU standards;
  - the Pomorzany wastewater treatment plant in Szczecin with the cost of 282 million Euro, handling about 340 thousand residents, reducing pollutant loads in wastewater by 84.6% for nitrogen and 90% for phosphorus and enabling the deletion of Szczecin from the “Hot Spots” list;
  - Płaszów wastewater treatment plant in Cracow, handling now about 560 thousand residents, reducing pollutant loads in wastewater by 88.8% of nitrogen and 96.1% of phosphorus including the scheduled thermal utilization of sewage sludge station allowing to nearly 9-fold reduction in the amount of waste generated in the process wastewater treatment.

These improvements, especially within EU Member States became possible within implementation of the EU *acquis communautaire* as a part of respective accession treaties and are strictly followed with regard to relevant EU Directives and regulations. For industrial facilities, it implies that as soon as the EU Industrial Emission Directive will be transposed into national legislation (by 07.01.2013), all the industrial sites will have to comply with respective BAT conclusions under it.

Hence, it seems that the prospects of remediating the municipal waste water treatment plants and industrial sites from the List of hot spots within EU Member States are quite optimistic and can be reached within coming several years, given also that countries will be ready to proceed further with application of stricter HELCOM requirements, e.g. in municipal waste water treatment. As such a positive example, Estonian Government decided on 22 November 2012 for a new regulation setting up requirements on municipal waste water treatment plants over 300 p.e. (entry into force on 1 January 2013) to meet the HELCOM BSAP treatment standard on advanced sewage treatment in line with HELCOM Recommendations 28E/5 and 28E/6.

However, the Ministerial meeting also reconfirmed the need to establish the List of Agricultural Hot Spots represented by installations for intensive rearing of cattle, poultry and pigs not in compliance with part 2, Annex III of the Helsinki Convention, as well as agreed to further review, the existing List of Agricultural Hot Spots under the Joint

Comprehensive Environmental Action Programme; and to take measures to bring all installations for the intensive rearing of cattle, poultry and pigs as well as other agricultural activities in compliance with part 2, Annex III of the Helsinki Convention and thus make possible to finally remove all agricultural hot spots, including those from the List of Hot Spots under the Joint Comprehensive Environmental Action Programme.

The Meeting also decided that necessary steps to be undertaken for alignment of funding, also bearing in mind the environmental remediation of the HELCOM hot spots under the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) to be accomplished by 2012. At the same time, based on the assessment effectiveness of the implementation of the HELCOM Baltic Sea Joint Comprehensive Environmental Action Programme to be accomplished by 2012, the need for its prolongation, including also the extension of the List of HELCOM Hot Spots, at the 2013 HELCOM Ministerial Meeting should be addressed.

Based on the above report, it is important to stress that with one third of original hot spots still remaining in the list, there is a need to continue the work on remediation of the remaining major pollution sites, till the very last of those will be removed from the List.

Setting up a timeline for the completion of the JCP programme with regards to deletion of the remaining 53 hotspots is necessary, having in mind that many of the remaining municipal hot spots are in the pipeline for completion and anchoring this process e.g. to the next HELCOM Ministerial Meeting. For this purpose, the list of remaining (active) JCP hot spots could be included as an Attachment/Annex to 2013 Ministerial meeting with a call/request to the Contracting Parties to finalise their deletion within time-limits of the Baltic Sea Action Plan (2021). Countries should be invited to re-evaluate the situation with remediation of remaining HELCOM hot spots at the next Ministerial Meeting (after 2013 Copenhagen meeting).

3. Conclusions

The hot spots-component of the JCP represents an important instrument of the HELCOM work, *inter alia,* to raise general awareness at local and national levels about the necessity of environmental improvements at major pollution sources.

It can be seen that the deleted Hot Spots (at the time of deletion) have contributed to a 31% reduction of the BOD load, 27 % of the COD load, 32 % of the tot-N load, 36 % of the tot-P load, 89% of the AOX load, and only 4% and 5% of the NOx and SOx loads, respectively.

At the establishment of the JCP in 1992 the total costs of the Programme were estimated at 18 billion Ecu. In 1999 it was estimated that total funding of 10 billion would still be needed to finance the necessary measures at all the Hot Spots. By 2012, the reported costs for remediation of 2/3 of original hot spots were estimated at a level of 3 billion Euro, however this figure is not complete due to lack reliable information on e.g. deletion of agricultural hotspots. Therefore, proper assessment of cost-efficiency is not feasible.

Financing the JCP has been possible thanks to the shared vision of the Programme, sustained political and public commitment, and the development of strong partnerships between the co-operating parties. Financial support for the Programme to date provides a record of action demonstrating the linkage of environmental priorities established under the JCP with a range of financial resources obtained from many different sources.

In the former countries in transition, where affordability is still a critical constraint on investments, the use of co-financing, combining loans from the International Financial Institutions and grants from the European Union (including EU Structural and Cohesions Funds being made available since 1 May 2004 for all HELCOM Member States, except Russia) and bilateral donors, has been vital. These were also pre-condition for implementation of the EU *acquis communautaire* as a part of respective accession treaties and are strictly followed with regard to relevant EU requirements.

It implies that as soon as the EU Industrial Emission Directive will be transposed into national legislation (by 07.01.2013), all the industrial sites will have to comply with respective BAT conclusions under it and hence the hot spots approach should be re-considered.

Setting up a timeline for the completion of the JCP programme with regards to deletion of the remaining 53 hotspots is necessary, having in mind that many of the remaining municipal hot spots are in the pipeline for completion and anchoring this process e.g. to the next HELCOM Ministerial Meeting. For this purpose, the list of remaining (active) JCP hot spots (cf. Annex 1A) could be included as an Annex to 2013 Ministerial meeting with a call/request to the Contracting Parties to finalise their deletion within time-limits of the Baltic Sea Action Plan. Countries could be invited to re-evaluate the situation with remediation of remaining HELCOM hot spots after the 2013 Ministerial.

The application of BAT/BEP is not necessarily a pre-requisite for obtaining pollution reduction, which can be achieved with less expensive “housekeeping” measures. However, the use of BAT/BEP should be reflected in applications for hot spot deletions, in order to provide ground for comparison of specific sites and to benchmark their performance before deleting them from the list.

In the future, applications for deletions from the list should be assessed also against information complied in annual and periodic HELCOM Pollution Load Compilations to provide an independent review of applications.
Reporting standard on necessary (minimum) information required for deletion of a hot spot needs to be elaborated in the future to provide clear ground for the assessment of applications.

Annex 1. List of JCP Hot Spots Baltic Sea in the catchment area [by June 2013]

A. Active Hot spots

Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
10		Archipelago Sea	Finland	Agriculture (2)	Agricultural Runoff
14		Lake Ladoga	Russia	Syasstroi	Industry (Pulp & Paper)
15		Lake Ladoga	Russia	Volkhov	Industry (Aluminum)
18,1	X	Gulf of Finland	Russia	St. Petersburg - Connection Sewers	Municipal & Industrial
18,11	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Kolpino WWTP	Municipal & Industrial
18,15	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Metallostroy WWTP	Municipal & Industrial
23		Gulf of Finland	Russia	St. Petersburg	Hazardous Waste
24	X	Gulf of Finland	Russia	St. Petersburg Region	Large Livestock Farms
25	X	Gulf of Finland	Estonia	Narva	Power Plants (Oil Shale)
27		Gulf of Finland	Estonia	Kehra	Industry (Pulp & Paper)
38	X	Gulf of Riga	Latvia	Sloka	Industry (Pulp & Paper)
39	X	Gulf of Riga	Latvia	Latbiofarm	Industry (Pharmaceutical)
42	X	Daugava RB	Latvia	Riga (WWTP Phase II)	Municipal & Industrial
44		Daugava RB	Latvia	RER Plant (Riga)	Industry (Metals)
45		Daugava RB	Latvia	Riga	Industry (Various)
46	X	Daugava RB	Latvia	Daugavpils	Municipal & Industrial
47		Daugava RB	Belarus	Vitebsk	Municipal & Industrial
48	X	Latvian Coast	Latvia	Liepaja (3)	Municipal & Industrial
49	X	Nemunas RB	Russia	Sovetsk	Industry (Pulp & Paper)
50	X	Nemunas RB	Russia	Neman	Industry (Pulp & Paper)
60	X	Nevezis RB	Lithuania	Agriculture / Livestock	Agricultural Runoff Programme
61		Nemunas RB	Belarus	Grodno	Municipal & Industrial

Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
66	X	Lith/Kal Coast	Lith/Russia	Kursiu Lagoon	Management Programme
67	X	Kaliningrad	Russia	Kaliningrad	Municipal & Industrial
69		Kaliningrad	Russia	Pulp & Paper No 2 (4)	Industry (Pulp & Paper)
70		Kaliningrad	Russia	Kaliningrad	Hazardous Waste
71		Kaliningrad	Russia	Oil Bunkering Station	Industry
72		Kaliningrad	Russia	Agriculture / Livestock	Agricultural Runoff Programme
73	X	Kal/Pol Coast	Russia/Pol	Vistula Lagoon	Management Programme
82		Vistula	Poland	Warsaw - Czajka WWTP	Municipal & Industrial
83,1	X	Vistula	Poland	Warsaw - Poludnie WWTP	Municipal & Industrial
84		Vistula	Poland	Warsaw - Pancerz WWTP	Municipal & Industrial
85		Vistula	Poland	Lublin - Hajdow WWTP	Municipal & Industrial
86	X	Vistula	Poland	Krakow - Plaszow WWTP	Municipal & Industrial
87,2	X	Vistula	Poland	Krakow - Tadeusz Sendzimir Works	Industry (Steel)
88,1	X	Vistula / Odra	Poland	Katowice -Bytom/ Bytom Municipal Enterprise	Municipal & Industrial
88,2	X	Vistula / Odra	Poland	Katowice -Gliwice/	Municipal & Industrial
88,3	X	Vistula / Odra	Poland	Katowice - Katowice, Myslowice,Siemianowice/ Regional Enterprise of Waterworks and Sewerage	Municipal & Industrial
88,6	X	Vistula	Poland	Katowice Area - Katowice Steel Plant in Dabrowa Gornicza	Industry (Steel plant)
88,7	X	Vistula	Poland	Katowice Area - Czechowice Refinery in Czechowice-Dziedzice	Industry (Oil refinery)
89		Vistula	Poland	Jaworzno Organika Azot Plant	Industry (Chemical)
93		Vistula	Belarus	Brest	Municipal & Industrial
94	X	Vistula	Ukraine	Lvov	Municipal & Industrial
95	X	Vistula	Poland	Agriculture / Livestock	Agricultural Runoff Programme
99,2		Oder / Odra	Poland	Poznan - Left River Bank WWTP	Municipal & Industrial
100	X	Oder / Odra	Poland	Lodz WWTP	Municipal & Industrial
103		Oder / Odra	Poland	Wroclaw WWTP	Municipal & Industrial

Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
109	X	Oder / Odra	CSFR	Ostrava	Municipal & Industrial
110	X	Oder / Odra	CSFR	Ostrava Area	Industry (Chem, P&P, etc.)
112	X	Oder / Odra	Poland	Agriculture / Livestock	Agricultural Runoff Programme
113	X	Oder / Odra	Poland/Ger	Odra Lagoon mgt	Management Programme

B. Deleted Hot spots

Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
1		Bothnian Bay	Sweden	Rönnskärsverken	Industry (Metal Smelter)
2		Bothnian Bay	Finland	Metsä-Botnia Oy Kemi	Industry (Pulp & Paper)
3		Bothnian Sea	Sweden	Husum Kraft Mill (1)	Industry (Pulp & Paper)
4		Bothnian Sea	Sweden	Östrand (1)	Industry (Pulp & Paper)
5		Bothnian Sea	Sweden	Vallvik (1)	Industry (Pulp & Paper)
7		Bothnian Sea	Finland	Outokumpu Group Harjavalta	Industry (Metal Smelter)
8		Bothnian Sea	Finland	Kemira Oy Vuorikemia	Industry (Titanium oxide)
9		Archipelago & Åland Seas	Finland	Fish Farming	Fish Farming
11		Lake Saimaa	Finland	YPT Joutseno	Industry (Pulp & Paper)
12		Lake Saimaa	Finland	Kaukas Lappeenranta	Industry (Pulp & Paper)
13		Lake Saimaa	Finland	E-G Kaukopää	Industry (Pulp & Paper)
16		Gulf of Finland	Finland	Sunila Oy – Kotka	Industry (Pulp & Paper)
17		Gulf of Finland	Finland	Helsinki Region	Municipal
18,2		Gulf of Finland	Russia	St. Petersburg – Central Aeration Station	Municipal & Industrial
18,3		Gulf of Finland	Russia	St. Petersburg – Northern Aeration Station	Municipal & Industrial
18,4		Gulf of Finland	Russia	St. Petersburg – South West Treatment Plant	Municipal & Industrial
18,5	X	Gulf of Finland	Russia	St. Petersburg (urban) – Pargolovo WWTP	Municipal & Industrial
18,6	X	Gulf of Finland	Russia	St. Petersburg (urban) – Prigorodnye WWTP	Municipal & Industrial
18,7	X	Gulf of Finland	Russia	St. Petersburg (urban) – Torfyanoye WWTP	Municipal & Industrial

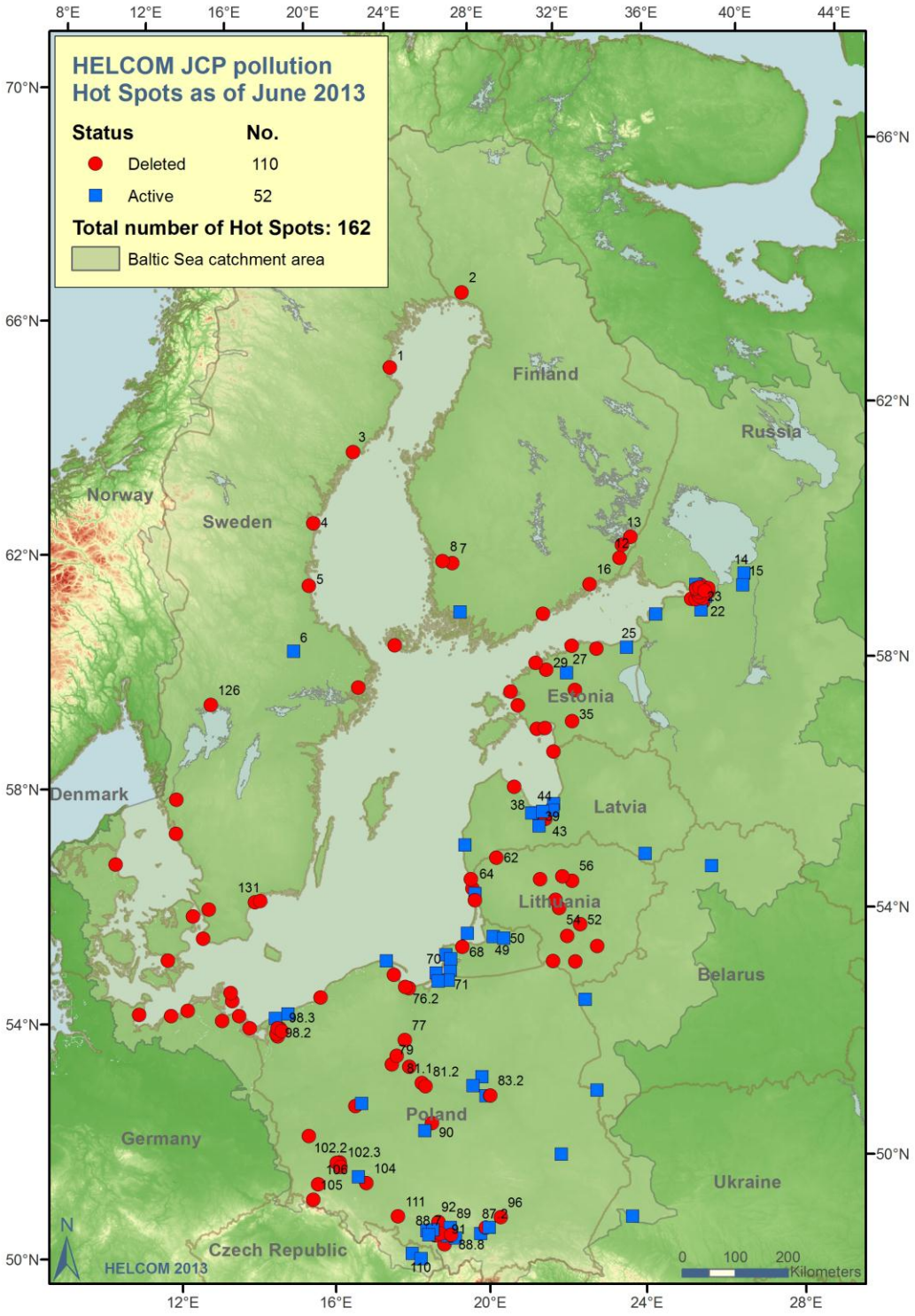
Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
18,8	X	Gulf of Finland	Russia	St. Petersburg (urban) – Zavodskiye WWTP	Municipal & Industrial
18,9	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Pushkin WWTP	Municipal & Industrial
18,10	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Petrodvorets WWTP	Municipal & Industrial
18,12	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Kronshtadt WWTP	Municipal & Industrial
18,13	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Sestroretsk WWTP	Municipal & Industrial
18,14	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Pontonny WWTP	Municipal & Industrial
18,16	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Repino WWTP	Municipal & Industrial
18,17	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Zelenogorsk WWTP	Municipal & Industrial
18,18	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Pesochny 1 WWTP	Municipal & Industrial
18,19	X	Gulf of Finland	Russia	St. Petersburg (suburban) – Pesochny 2 WWTP	Municipal & Industrial
22		Gulf of Finland	Russia	St. Petersburg	Industry (Metal Plating)
26		Gulf of Finland	Estonia	Kohtla Järve	Area Municipal & Industrial
28	X	Gulf of Finland	Estonia	Tallinn	Municipal & Industrial
29		Gulf of Finland	Estonia	Tallinn	Industry (Pulp & Paper)
30		Gulf of Finland	Estonia	Gulf of Finland	Agricultural Runoff Programme
31		Estonian Coast	Estonia	Haapsalu	Municipal & Industrial
32	X	Estonian Coast	Estonia	Matsalu Bay	Management Programme
33	X	Gulf of Riga	Estonia	Pärnu	Municipal & Industrial
34		Gulf of Riga	Estonia	Paide	Municipal & Industrial
35		Gulf of Riga	Estonia	Vohma Meat Combine	Industry
36		Gulf of Riga	Estonia	Gulf of Riga	Agricultural Runoff Programme
37	X	Gulf of Riga	Estonia/La	Gulf of Riga Mgt	Management Programme
40	X	Gulf of Riga	Latvia	Agriculture / Livestock	Agricultural Runoff Programme
41	X	Gulf of Riga	Lithuania	Siauliai	Municipal & Industrial
43		Daugava RB	Latvia	VEF Plant (Riga)	Industry (Metals)

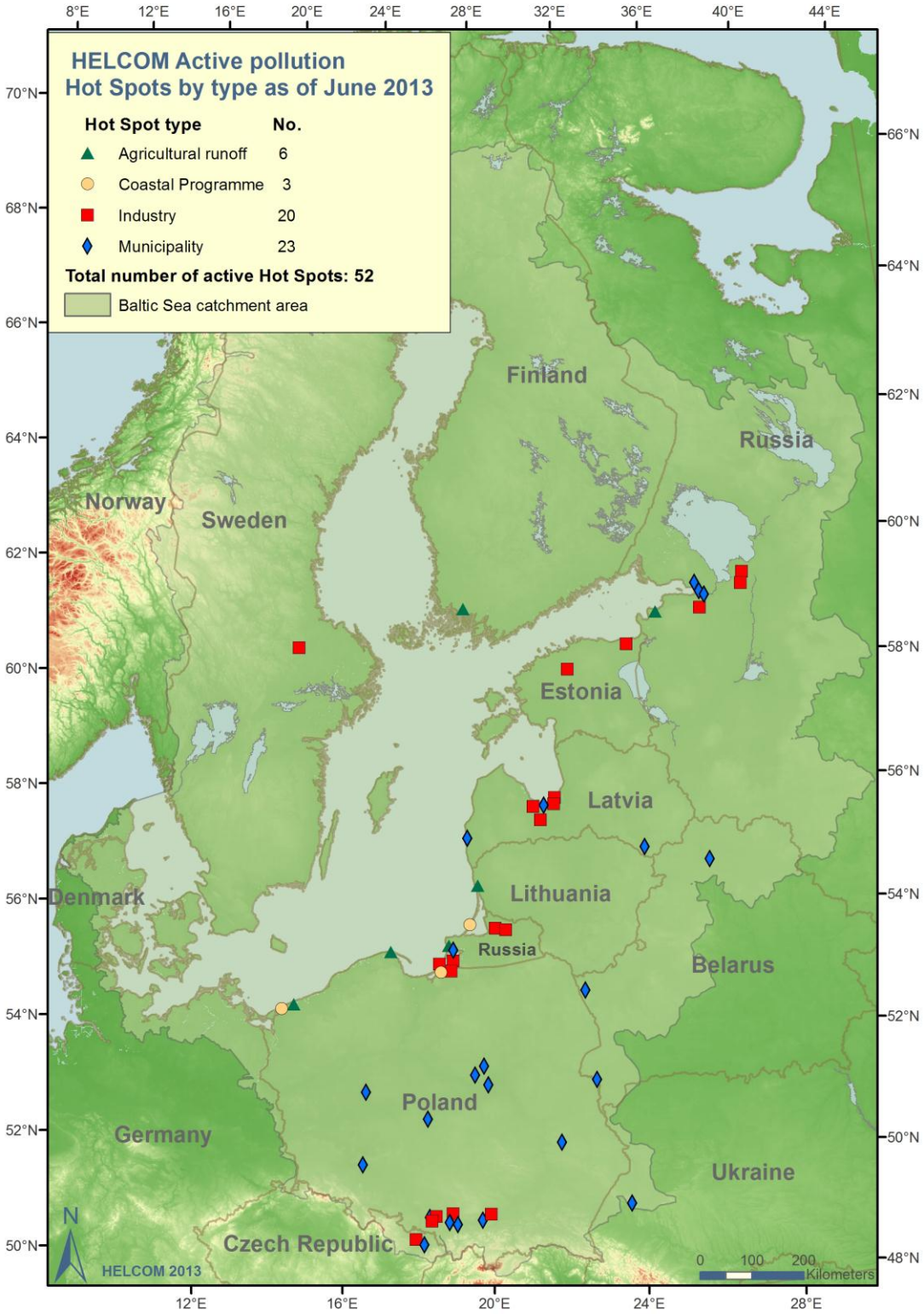
Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
51	X	Nemunas RB	Lithuania	Kaunas	Municipal & Industrial
52		Nemunas RB	Lithuania	Amalg Azotaz	Industry (Fertilizer)
53		Nemunas RB	Lithuania	Kedainiai	Municipal & Industrial
54		Nemunas RB	Lithuania	Kedainiai	Industry (Chemicals)
55		Nemunas RB	Lithuania	Panevezys	Municipal & Industrial
56		Nemunas RB	Lithuania	Panevezys	Industry (Food)
57		Nemunas RB	Lithuania	Marijampole	Municipal & Industrial
58		Nemunas RB	Lithuania	Alytus	Municipal & Industrial
59	X	Nemunas RB	Lithuania	Vilnius / Grigiskes	Municipal & Industrial
62		Lith. Coast	Lithuania	Mazeikiai	Oil Refinery / Marine Terminal
63	X	Lith. Coast	Lithuania	Klaipeda	Municipal & Industrial
64		Lith. Coast	Lithuania	Cardboard Factory	Industry (Paper)
65		Lith. Coast	Lithuania	Palanga	Municipal
68		Kaliningrad	Russia	Pulp & Paper No 1	Industry (Pulp & Paper)
74	X	Baltic Coast	Poland	Koszalin - Jamno WWTP	Municipal & Industrial
75	X	Baltic Coast	Poland	Gdynia - Debogorze WWTP	Municipal & Industrial
76,1		Baltic Coast	Poland	Gdansk – Wschod WWTP	Municipal
76,2	X	Baltic Coast	Poland	Gdansk Refinery	Industry (Oil refinery)
77	X	Vistula	Poland	Frantschach Swiecie	Industry (Pulp & Paper)
78	X	Vistula	Poland	Bydgoszcz - Fordon WWTP	Municipal & Industrial
79		Vistula	Poland	Bydgoszcz – Kapusciska WWTP	Industry (Chemical)
80	X	Vistula	Poland	Torun WWTP	Municipal & Industrial
81,1	X	Vistula	Poland	Wloclawek -Anwil Plant	Industry (Chemical)
81,2	X	Vistula	Poland	Wloclawek	Industry (Pulp & Paper)
83,2	X	Vistula	Poland	Warsaw - Siekierki Plant	Industry (Power plant)
87,1	X	Vistula	Poland	Krakow - Kujawy WWTP	Municipal & Industrial

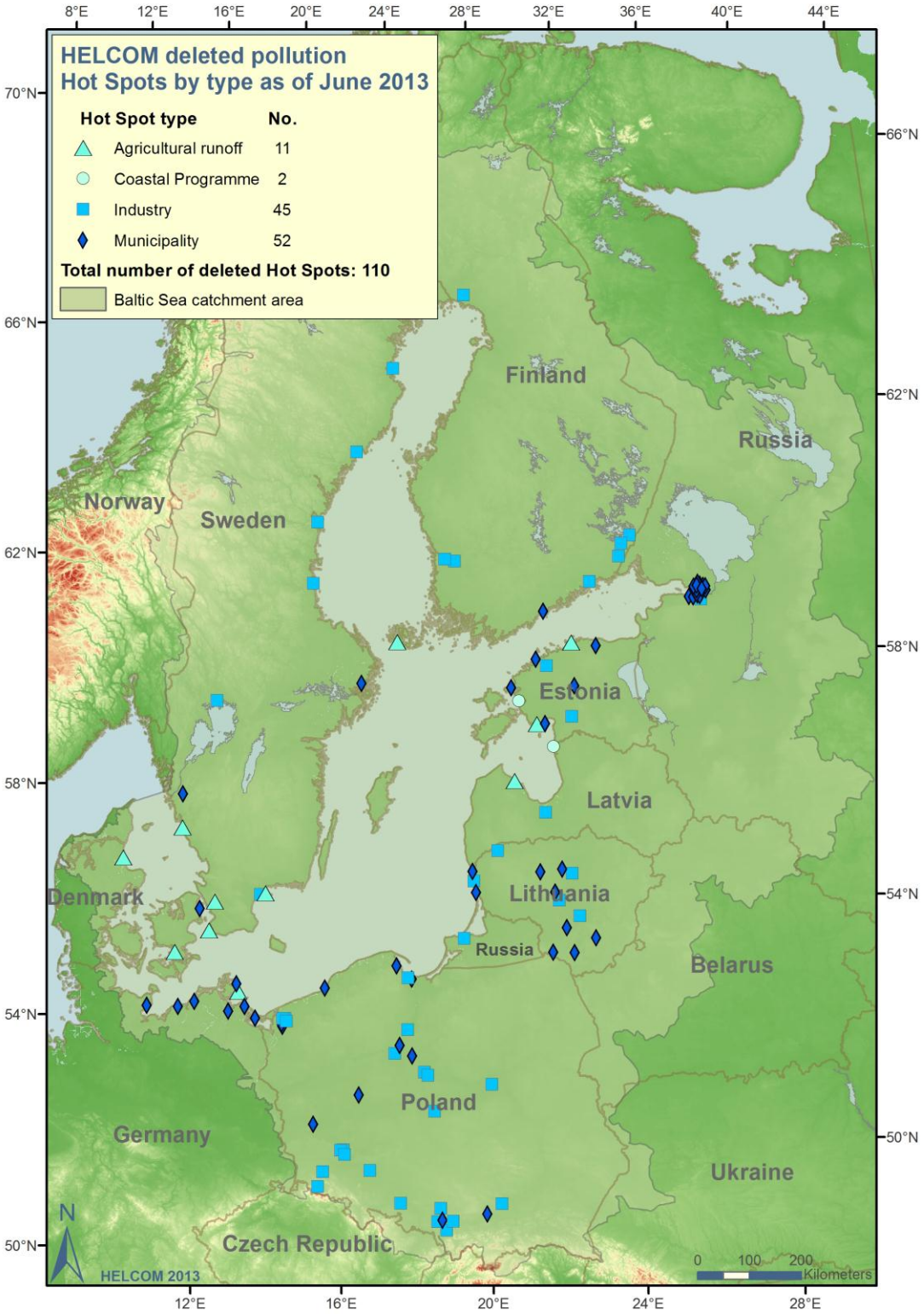
Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
88,4	X	Vistula / Odra	Poland	Katowice - Tychy/	Municipal & Industrial
88,5	X	Vistula / Odra	Poland	Katowice Area - Duo-Stal in Bytom	Industry (Metallurgical plant)
88,8	X	Vistula / Odra	Poland	Katowice Area - Przyjazn Coking Plant in Dabrowa Gornicza	Industry (Coking plant)
90		Vistula	Poland	Zgierz - Boruta Dyestuffs	Industry (Chemical)
91		Vistula	Poland	Oswiecim - Dwory Plant	Industry (Chemical)
92		Vistula	Poland	Bukowno -Boleslaw Works	Industry (Metals)
96		Vistula	Poland	Upper Basin (7)	Salt Control
97,1	X	Oder / Odra	Poland	Szczecin -Pomorzany WWTP	Municipal & Industrial
97,2	X	Baltic coast	Poland	Szczecin - Zdroje WWTP	Municipal & Industrial
98,1	X	Oder / Odra	Poland	Szczecin - Police Plant	Industry (Chemical)
98,2	X	Baltic coast	Poland	Szczecin - Skolwin Mill	Industry (Pulp & Paper)
98,3	X	Oder / Odra	Poland	Szczecin	Industry (Fish processing)
99,1		Oder / Odra	Poland	Poznan - Centralna WWTP	Municipal & Industrial
101		Oder / Odra	Poland	Zielona Gora WWTP	Municipal & Industrial
102,1	X	Oder / Odra	Poland	Prochowickie Poultry proc. plants	Industry (Food)
102,2	X	Oder / Odra	Poland	KGHM APolska Miedz@	Industry (Heavy metals)
102,3	X	Oder / Odra	Poland	Copper works ALegnica@ in Legnica	Industry (Heavy metals)
104		Oder / Odra	Poland	Wroclaw - Brzeg Dolny, Rokita Plant	Industry (Chemical)
105		Oder / Odra	Poland	Ubocz - Luban	Industry (Fertilizer)
106		Oder / Odra	Poland	Boleslawiec -Wizow Plant	Industry (Fertilizer)
111		Oder / Odra	CSFR/Poland	Upper Basin (7)	Salt Control
114		Arkona Basin	Germany	Greifswald	Municipal & Industrial
115		Arkona Basin	Germany	Neubrandenburg	Municipal & Industrial
116		Arkona Basin	Germany	Stralsund	Municipal & Industrial
117		Arkona Basin	Germany	Stavenhagen - Malchin	Municipal & Industrial

Key	*Priority*	*Location*	*Country*	*Site name*	*Site type*
118		Arkona Basin	Germany	Agriculture	Agricultural Runoff Programme
119		Belt Sea	Germany	Lübeck	Municipal & Industrial
120		Belt Sea	Germany	Wismar	Municipal & Industrial
121		Belt Sea	Germany	Rostock	Municipal & Industrial
122		Belt Sea	Denmark	Agriculture (8)	Agricultural Runoff Programme
123		The Sound	Denmark	Copenhagen	Municipal
124		The Sound	Denmark	Agriculture (8)	Agricultural Runoff Programme
125		The Sound	Sweden	Agriculture	Agricultural Runoff Programme
126		Göta älv River	Sweden	Skoghall	Industry (Pulp & Paper)
127		Kattegat	Sweden	Göteborg	Municipal
128		Kattegat	Sweden	Agriculture	Agricultural Runoff Programme
129		Kattegat	Denmark	Agriculture (8)	Agricultural Runoff Programme
130		Swedish Coast	Sweden	Stockholm	Municipal
131		Bornholm Basin	Sweden	Nymölla	Industry (Pulp & Paper)
132		Bornholm Basin	Sweden	Agriculture	Agricultural Runoff Programme

Annex 2. Maps of all, active and deleted JCP Hot Spots




HELCOM Active pollution
Hot Spots by type as of June 2013
Hot Spot type No.
Agricultural runoff 6
Coastal Programme 3
Industry 20
Municipality 23
Total number of active Hot Spots: 52
Baltic Sea catchment area
Finland
Russia
Norway
Sweden
Estonia
Latvia
Lithuania
Denmark
Russia
Belarus
Poland
Germany
Ukraine
Czech Republic
N
HELCOM 2013
0 100 200
Kilometers
8°E 12°E 16°E 20°E 24°E 28°E 32°E 36°E 40°E 44°E
70°N 68°N 66°N 64°N 62°N 60°N 58°N 56°N 54°N 52°N 50°N
66°N 64°N 62°N 60°N 58°N 56°N 54°N 52°N 50°N 48°N
12°E 16°E 20°E 24°E 28°E


HELCOM deleted pollution
Hot Spots by type as of June 2013
Hot Spot type No.
Agricultural runoff 11
Coastal Programme 2
Industry 45
Municipality 52
Total number of deleted Hot Spots: 110
Baltic Sea catchment area
Finland
Russia
Norway
Sweden
Estonia
Latvia
Lithuania
Denmark
Russia
Belarus
Poland
Germany
Ukraine
Czech Republic
HELCOM 2013
0 100 200 Kilometers
8°E 12°E 16°E 20°E 24°E 28°E 32°E 36°E 40°E 44°E
70°N 66°N 62°N 58°N 54°N 50°N

Annex 3. Pollution load reductions at deleted JCP Hot Spots, 1994-2012 (as for November 2012)

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
1	SE	Bothnian Bay	Rönnskärverken	Industry (Metal smelter)	High emissions of dust and heavy metals	2002																				143		
2	FI	Bothnian Bay	Metsä-Botnia Oy Kemi	Industry (Pulp / Paper)	High discharges of organic substances and nutrients	1994	2749	7902	-3	6	244																	11,00
3	SE	Bothnian Sea	Husum Kraft Mill	Industry (Pulp / Paper)	High discharges, particularly AOX	1994	3700	22000	-50	45	1450	-300	900															13,00
4	SE	Bothnian Sea	Östrand	Industry (Pulp / Paper)	High discharges, particularly AOX	1994	700	4700	-20	-2	1200	300	-48															5,50
5	SE	Bothnian Sea	Valvik	Industry (Pulp / Paper)	High discharges, particularly AOX	1994	-300	2300	-40	0	630	-70	100															nil
7	FI	Bothnian Bay	Outokumpu Oy Harjavalta	Industry (Metal smelter)	High emissions of dust and heavy metals	2003									5613				73	79	30			27		910		100,00
8	FI	Bothnian Sea	Kemira Oy Vuorikemia	Industry (Titanium Oxide)	High discharges of acidic waste water containing metals	1998			0,5	3,3						5804	11	42,1		0,6							19738	21,00
9	FI	Archipelago and Åland Sea	Fish farming	Fish farming	Discharges of nutrients. Eutrophication.	2002			61,8	362																		
11	FI	Lake Saimaa	YPT Joutseno	Industry (Pulp / Paper)	High discharges of organic substances	1994	348	3277	17	0	483																	1,00
12	FI	Lake Saimaa	Kaukas Lappeenranta	Industry (Pulp / Paper)	High discharges of organic substances and nutrients	1994	4598	22119	316	29	549																	34,50
13	FI	Lake Saimaa	Enso-Gutzeit Kaukopää	Industry (Pulp / Paper)	High discharges of organic substances and nutrients	1994	14060	37480	64	33	510																	30,80
16	FI	Gulf of Finland	Sunila Oy, Kotka	Industry (Pulp / Paper)	High discharges of organic substances (COD and AOX)	1997	3351	10649	-38	-3,4																		10,00

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
17	FI	Gulf of Finland	Helsinki Region	Municipal	Polluted waste water	2004																						225,00
18.2	RU	Gulf of Finland	St. Petersburg – Central Aeration Station	Municipal & Industrial	Discharges of phosphorus higher than HELCOM requirements	2010																						58,20
18.3	RU	Gulf of Finland	St. Petersburg – Northern Aeration Station	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006	15360		3734	1371																		181,00
18.4	RU	Gulf of Finland	St. Petersburg - South-West Wastewater Treatment Plant	Municipal & Industrial	P concentrations in effluent are higher than required by HELCOM	2009																						181,00
18.5	RU	Gulf of Finland	St. Petersburg (urban) – Pargolovo WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006																						
18.6	RU	Gulf of Finland	St. Petersburg (urban) – Prigorodnye WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006																						
18.7	RU	Gulf of Finland	St. Petersburg (urban) – Torfyanoye WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006																						
18.8	RU	Gulf of Finland	St. Petersburg (urban) – Zavodskiye WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006																						
18.9	RU	Gulf of Finland	St. Petersburg (suburban) – Pushkin WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006	1252		104	352																		

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
18.10	RU	Gulf of Finland	St. Petersburg (suburban) – Petrodvorets WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2012			76,2	12,4																		43,10
18.12	RU	Gulf of Finland	St. Petersburg (suburban) – Kronshtadt WWTP	Municipal & Industrial	N and P in discharged waste water are higher than required by HELCOM	2009																						0,24
18.13	RU	Gulf of Finland	St. Petersburg (suburban) – Sestroretsk WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006																						
18.14	RU	Gulf of Finland	St. Petersburg (suburban) – Pontonny WWTP	Municipal & Industrial	N and P in discharged waste water are higher than required by HELCOM	2009																						0,17
18.16	RU	Gulf of Finland	St. Petersburg (suburban) – Repino WWTP	Municipal & Industrial	N and P in discharged waste water are higher than required by HELCOM	2009																						7,00
18.17	RU	Gulf of Finland	St. Petersburg (suburban) – Zelenogorsk WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2006																						
18.18	RU	Gulf of Finland	St. Petersburg (suburban) – Pesochny 1 WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2012																						
18.19	RU	Gulf of Finland	St. Petersburg (suburban) – Pesochny 2 WWTP	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2012																						
22	RU	Gulf of Finland	St.Petersburg	Industry (Metal Plating)	excessive heavy metals discharge in wastewater	2008																						
26	EE	Gulf of Finland	Kohtla-Järve, municipal and industrial area	Municipal & Industrial	Inefficient waste water treatment, High concentrations of BOD, COD, N, P	2012	5450	329	455,7	12,2																		

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
28	EE	Gulf of Finland	Tallinn	Municipal & Industrial	Polluted waste water	2006	948		829	171																		30,30
29	EE	Gulf of Finland	Tallinn	Industry (Pulp / Paper)	Discharges of organic substances	1997																						
30	EE	Gulf of Finland	Gulf of Finland	Agricultural Runoff Programme	Nutrient pollution	2001																						4,00
31	EE	Estonian Coast	Haapsalu municipal and industrial area	Municipal & Industrial	Polluted waste water	2012	623,1		102,3	19,7																		
32	EE	Estonian Coast	Matsalu Bay	Management Programme	Nutrient pollution	2012																						27,60
33	EE	Gulf of Riga	Pärnu	Municipal & Industrial	Polluted waste water	2006	382		25	8,2																		2,00
34	EE	Gulf of Riga	Paide	Municipal & Industrial	Polluted waste water	2006	24,2		18	2,8																		0,75
35	EE	Gulf of Riga	Vohma Meat Combine	Industry (Food processing)	Discharges of nutrients	1997	140		15	4		5,7			127													
36	EE	Gulf of Riga	Gulf of Riga	Agricultural Runoff Programme	Nutrient pollution	2001																						
37	EE/LV	Gulf of Riga	Gulf of Riga Mgt	Management Programme	accelerating eutrophication and high heavy metal loads	2000	35398		4847	321																		87,00
40	LV	Gulf of Riga	Agriculture/Live stock	Agricultural Runoff Programme	Nutrient pollution	2002			18895	831																		
41	LT	Gulf of Riga	Siauliai	Municipal & Industrial	High concentrations of BOD7, COD, N, P	2006	3300		1150	85																		28,00
43	LV	Daugava River Basin	VEF Plant (Riga)	Industry (Metals)	Heavy metals in industrial waste water	2001										1776		0,02	0,5		0							
51	LT	Nemunas River Basin	Kaunas WWTP	Municipal & Industrial	Absence of wastewater treatment	2011	9400		1300	285																		100,00

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
52	LT	Nemunas River Basin	Amalg Azotaz	Industry (Fertilizer)	Emissions to atmosphere	2006																						9,10
53	LT	Nemunas River Basin	Kedainiai WWTP	Municipal & Industrial	High concentrations of total nitrogen and phosphorus in wastewater	2011	5		21	7																		5,67
54	LT	Nemunas River Basin	Kedainiai, Lifosa	Industry (Chemicals)	waste water discharges	2013	14		8	7																		37,40
55	LT	Nemunas River Basin	Panevezys WWTP	Municipal & Industrial	High concentrations of BOD7 COD, N, P in wastewater	2009	70		585	105																		25,00
56	LT	Nemunas River Basin	Panevezys	Industry (Food)	Polluted wastewater and emissions to atmosphere	2006																						
57	LT	Nemunas River Basin	Marijampole	Municipal & Industrial	High concentrations of BOD7, COD, N, P in waste water	2005																						0,68
58	LT	Nemunas River Basin	Alytus	Municipal & Industrial	High concentrations of BOD7, COD, N, P in waste water	2005																						7,05
59	LT	Nemunas River Basin	Vilnius / Grigiskes	Municipal & Industrial	High concentrations of BOD7, COD, N, P in waste water	2005																						10,24
62	LT	Lithuanian Coast	Orlen Lietuva (formerly Mažeikiai Oil Refinery)	Oil Refinery /Terminal	High discharges of oil, tot P and tot N	2011	118,5	637	372,7	14,5																		8,70
63	LT	Lithuanian Coast	Klaipeda	Municipal & Industrial	High concentrations of BOD7, COD, N, P	2006	2850		800	105																		2,50
64	LT	Lithuanian Coast	Cardboard Factory	Industry (Paper)	Polluted wastewater	2006	212	1293						187														27,58
65	LT	Lithuanian Coast	Palanga WWTP	Municipal & Industrial	High concentrations of BOD, total nitrogen and phosphorus in wastewater	2011	300		60	10																		1,70

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
68	RU	Kaliningrad	Pulp & Paper No. 1	Industry (Pulp / Paper)	High discharges of organic substances	1998	5700		0,2	0		115			1651													
74	PL	Baltic Coast	Koszalin - Jamno WWTP	Municipal & Industrial	discharges of BOD, COD, N and P	2003																						2,25
75	PL	Baltic Coast	Gdynia – Debogorze WWTP	Municipal & Industrial	Discharges of BOD, COD, nitrogen and phosphorus	2002	4778	11355	757	113																		22,60
77	PL	Vistula	Frantschach Swiecie	Industry (Pulp / Paper)	High discharges of BOD, nutrients and organic substances	2002	4482	16076				1608			1302													59,00
76.1	PL	Baltic Coast	Gdansk-Wschod WWTP	Municipal	Discharges of BOD, COD, nitrogen and phosphorus	2001	2790	4318	199	365																		69,70
76.2	PL	Vistula	Gdansk Refinery	Industry (Oil refinery)	Discharges of BOD, COD, nitrogen and phosphorus	2002	2790	4318	199	365																		69,70
78	PL	Vistula	Bydgoszcz - Fordon WWTP	Municipal & Industrial	Discharges of BOD, COD, nitrogen and phosphorus	2002	2550	5405																				18,00
79	PL	Vistula	Bydgoszcz - Kapusciska WWTP	Industry (Chemical)		2002	3906	7602	502	45																		43,50
80	PL	Vistula	Torun WWTP	Municipal & Industrial	Discharges of BOD, COD, nitrogen and phosphorus	2001	5111	9416																				26,50
81.1	PL	Vistula	Wloclawek - Anwil Plant	Industry (Chemical)		2002	275	2841	185	49		-457			241													10,00
81.2	PL	Vistula	Wloclawek	Industry (Pulp / Paper)	High discharges of BOD, COD, SS, SOx, NOx	1996	757	1680				297		451	1287													
83.2	PL	Vistula	Warsaw - Siekierki Plant	Industry (Heat & Power Plant)	Air pollution	2002						2500			-400											17900		
87.1	PL	Vistula	Krakow - Kujawy WWTP	Municipal & Industrial	Polluted waste water	2003	3683	9490	588	132																		38,21

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																				Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
88.4	PL	Vistula / Odra	Katowice - Tychy Regional Centre of Water and Wastewater Management	Municipal & Industrial	High concentrations of BOD7, COD, N, P	2007																					7,50
88.5	PL	Vistula / Odra	Katowice Area - Duo-Stal in Bytom	Industry (Metallurgical plant)	excessive gaseous and PM emissions to atmosphere	2006																					
88.8	PL	Vistula / Odra	Katowice Area - Przyjazn Coking Plant in Dabrowa Gornicza	Industry (Coking plant)	excessive gaseous and PM emissions to atmosphere	2006																					2,50
90	PL	Vistula	Zgierz –Boruta Dyestuffs	Industry (Chemical)	High emissions of hazardous organic substances	2002		1110				287			303												22,00
91	PL	Vistula	Oswiecim – Dwory Plant	Industry (Chemical)	High emissions of Hg sludge, organic compounds, HCH and AOX	2002	142	3167	1	-7,5		636			3686										6867	14163		60,00
92	PL	Vistula	Bukowno – Boleslaw Works	Industry (Metals)	Heavy air pollution and metal emissions to water	2002	563	491						5910	4539			8995		129		60				100	139	13,00
96	PL	Vistula	Upper Basin (7)	Salt Control	High discharges of saline water from coal mines containing heavy metals	2002																					
97.1	PL	Oder / Odra	Szczecin - Pomorzany WWTP	Municipal & Industrial	Polluted waste water	2012	7023		1452	182																	190,00
97.2	PL	Oder / Odra	Szczecin -Zdroje WWTP	Municipal & Industrial	Polluted waste water	2012	2465		470	64,5																	
98.1	PL	Oder/Odra	Szczecin - Police Plant	Industry (Chemical)		2002																					

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																				Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
98.2	PL	Baltic Coast	Szczecin - Skolwin Mill	Industry (Pulp & Paper)	discharges connected with paper and cellulose production and emission	2009																					
98.3	PL	Oder/Odra	Szczecin -	Industry (Fish processing)	High discharges of BOD, COD, tot-N, tot-P	1996	80	112	1,3	24,4																		
99.1	PL	Oder/Odra	Poznan – Centralna WWTP	Municipal & Industrial	Discharges of BOD, COD, nitrogen and phosphorus	2002																					102,00
101	PL	Oder/Odra	Zielona Gora WWTP	Municipal & Industrial	Discharges of BOD, COD, nitrogen and phosphorus	2002	1485	3172	621	73																	
102.1	PL	Oder/Odra	Prochowickie Poultry processing plants	Industry (Food processing)		2002																					
102.2	PL	Oder/Odra	KGHM APolska Miedz@Copper works AGlogow@ in Zukowice	Industry (Metals)	High emissions of dust and heavy metals	2002													124	97		0	5			1892		125,00
102.3	PL	Oder/Odra	KGHM APolska Miedz@Copper works ALegnica@ in Legnica	Industry (Metals)	High emissions of dust and heavy metals	2002													32	18		0	5			6062		
104	PL	Oder/Odra	Wroclaw - Brzeg Dolny, Rokita Plant	Industry (Chemical)	Discharges of pollution in wastewater	2003																					18,10
105	PL	Oder/Odra	Ubocz-Luban	Industry (Fertilizer)	BOD, nutrients and heavy metals	2001	0,3	3																			
106	PL	Oder/Odra	Boleslawiec - Wizow Plant	Industry (Fertilizer)	High discharges of phosphorus, fluorides, SS, dust etc.	2002				409																	
111	CZ/PL	Oder/Odra	Upper Basin (7)	Salt Control	High discharges of saline water from coal mines containing heavy metals	2002																					

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																					Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
114	DE	Arkona Basin	Greifswald	Municipal & Industrial	High discharges of nutrients	1995	971	2190	285	41																		20,00
115	DE	Arkona Basin	Neubrandenburg	Municipal & Industrial	Polluted waste water	2002	330	1368	369	39																		26,40
116	DE	Arkona Basin	Stralsund	Municipal & Industrial	High discharges of nutrients	1995	1959	3041	365	95,5																		37,50
117	DE	Arkona Basin	Stavenhagen-Malchin	Municipal & Industrial	Polluted waste water	2002	41	98	1	13,4																		27,00
118	DE	Arkona Basin	Agriculture	Agricultural Runoff Programme	Intensive livestock farming	2001																						
119	DE	Belt Sea	Lübeck	Municipal & Industrial	high nutrient (N) concentration in the effluent	2004			841																			45,40
120	DE	Belt Sea	Wismar	Municipal & Industrial	Polluted waste water	2002	258	530	268	30,5																		31,60
121	DE	Belt Sea	Rostock	Municipal & Industrial	High discharges of waste water	1997	7966	9984	1351	292																		85,00
122	DK	Belt Sea	Agriculture (8)	Agricultural Runoff Programme	excessive run off of nutrients	2012																						73,00
123	DK	The Sound	Copenhagen - Lynetten	Municipal	Discharges of BOD, COD, nitrogen and phosphorus	2000	1153	3235	1284	230																		
124	DK	The Sound	Agriculture (8)	Agricultural Runoff Programme	excessive run off of nutrients	2012																						73,00
125	SE	The Sound	Agriculture (8)	Agricultural Runoff Programme	excessive run off of nutrients	2012																						
126	SE	Göta Älv River	Skoghall	Industry (Pulp / Paper)	High discharges of mainly AOX	1994	1200	6000	320	6	800	-110	170															9,50

#	Country	Location	Name	Type	Reason for being HS	Year of deletion	Load reduction, t																				Investments Million EUR
							BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
127	SE	Kattegat	Sweden	Göteborg	Municipal	2012			2000	24																		75,50
128	SE	Kattegat	Agriculture (8)	Agricultural Runoff Programme	excessive run off of nutrients	2012																						
129	DK	Kattegat	Agriculture (8)	Agricultural Runoff Programme	excessive run off of nutrients	2012																						73,00
130	SE	Swedish Coast	Stockholm	Municipal	Discharges of BOD, COD, nitrogen and phosphorus	2002	975		2583	22,5																		110,00
131	SE	Bornholm Basin	Nymölla	Industry (Pulp / Paper)	High discharges of COD and nutrients	1996	4821	17981	244	23		47	320															18,00
132	SE	Bornholm Basin	Agriculture (8)	Agricultural Runoff Programme	excessive run off of nutrients	2012																						
TOTAL LOAD REDUCTION ACHIEVED, TONNES							173307	237669	48593	6828	5866	4858	1442	6548	18349	7580	11	9037	230	323	30	60	10	27	6867	41170	19877	2942

Period \ Parameter		Load reduction, t																				Investments Million EUR
		BOD	COD	TotN	TotP	AOX	NOx	S	SS	SOx	Fe	Cr	Zn	Cu	Pb	Ni	Cd	As	Hg	Cl^-	dust	H_2SO_4	
1994-2003	Agriculture/Fish-farming: 4 Industry: 37 Municipal & Industrial: 16 Management programme: 1 TOTAL: 58	123510	235410	34189	3990	5866	4858	1442	6361	18349	7580	11	9037	230	323	30	60	10	27	6867	41170	19877	1382
2004-2013	Agriculture/Fish-farming: 6 Industry: 9 Municipal & Industrial: 36 Managemen t programme: 1 TOTAL: 52	49797	2259	14404	2839	0	0	0	187	0	0	0	0	0	0	0	0	0	0	0	0	0	1560
1994-2013	Agriculture/Fish-farming: 10 Industry: 46 Municipal & Industrial: 52 Management programme: 2 TOTAL: 110	173307	237669	48593	6828	5866	4858	1442	6548	18349	7580	11	9037	230	323	30	60	10	27	6867	41170	19877	2942

Annex 4. Pollution reductions per receiving area (t/year)

1994-2003	Load reduction, t																				Investments Million EUR
Sub-basin/sub-catchment	**BOD**	**COD**	**TotN**	**TotP**	**AOX**	**NOx**	**S**	**SS**	**SOx**	**Fe**	**Cr**	**Zn**	**Cu**	**Pb**	**Ni**	**Cd**	**As**	**Hg**	**Cl^-**	**dust**	**H_2SO_4**	
Baltic Proper - Arkona Basin (5)	3301	6697	1020	189																		111
Baltic Proper - Poland (3)	7568	15673	956	478																		95
Baltic Proper - Sweden (1)	975		2583	23																		110
Baltic Proper - Bornholm Basin (1)	4821	17981	244	23		47	320															18
Baltic Proper - Oder/Odra (11)	1565	3287	622	506																7954		245
Baltic Proper - Vistula (14)	29959	61596	1475	584		4986		6361	12609			8995		129		60			6867	32163	139	360
Bothnian Bay (3)	2749	7902	-3	6	244				5613				73	79	30			27		1053		111
Bothnian Sea (4)	4100	29000	-110	46	3280	-70	952			5804	11	42		1							19738	40
Archipelago and Åland Sea (1)			62	362																		0
Gulf of Riga (5)	35538		23757	1156		6			127	1776		0	1									87
Gulf of Finland (6)	22357	73525	359	59	1542																	80
Kattegat (1)	1200	6000	320	6	800	-110	170															10
Belt Sea (2)	8224	10514	1619	323																		117
The Sound (1)	1153	3235	1284	230																		0
58 hot spots	**123510**	**235410**	**34189**	**3990**	**5866**	**4858**	**1442**	**6361**	**18349**	**7580**	**11**	**9037**	**74**	**209**	**30**	**60**		**27**	**6867**	**41170**	**19877**	**1382**

2004-2012	Load reduction, t																					Investments Million EUR
Sub-basin/sub-catchment	**BOD**	**COD**	**TotN**	**TotP**	**AOX**	**NOx**	**S**	**SS**	**SOx**	**Fe**	**Cr**	**Zn**	**Cu**	**Pb**	**Ni**	**Cd**	**As**	**Hg**	**Cl^-**	**dust**	**H_2SO_4**	
Baltic Proper - Poland (1)																						
Baltic Proper - Bornholm Basin (1)																						
Baltic Proper - Estonia (2)	623		102	20																		28
Baltic Proper - Lithuanian Coast (4)	3480,5	1930	1232,7	130				187														41
Baltic Proper - Nemunas River (9)	9489		1914	404																		195
Baltic Proper - Oder / Odra (2)	9488		1922	247																		190
Baltic Proper - Vistula (3)																						10
Gulf of Finland (20)	23010	329	5199	1919																		726
Gulf of Riga (3)	3706		1193	96																		31
Kattegat (3)			2000	24																		149
Belt Sea (2)			841																			118
The Sound (2)																						73
51 hot spots	49797	2259	14404	2839				187														1560