

*GEF BALTIC SEA REGIONAL PROJECT
PHASE 1: 2003 – 2005*

BSRP/HELCOM COASTAL FISH MONITORING WORKSHOP

Report of the Second Meeting

**Helsinki, Finland,
31 January - 3 February 2005**



BSRP Large Marine Ecosystem Component implemented by:
International Council for the Exploration of the Sea

BSRP/HELCOM Coastal Fish Monitoring Workshop
Second Meeting
Helsinki, Finland, 31 January - 3 February 2005

**MINUTES OF THE SECOND MEETING OF
BSRP/HELCOM COASTAL FISH MONITORING WORKSHOP**

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**MINUTES OF THE SECOND MEETING OF
BSRP/HELCOM COASTAL FISH MONITORING WORKSHOP
(HELCOM COASTAL FISH MONITORING WORKSHOP)**

INTRODUCTION

0.1 With reference to the Baltic Sea Regional Project's Networking Meeting in Tallinn, Estonia (December 2004) and to Seventh Meeting of HELCOM MONAS (October 2004), the Second BSRP/HELCOM Coastal Fish Monitoring Workshop was held in Helsinki, Finland, from 31 January to 3 February 2005.

0.2 The Workshop was co-chaired by Mr. Magnus Appelberg, Sweden, and Mr. Henn Ojaveer, Estonia. Mr. Juha-Markku Leppänen, Professional Secretary, acted as the Secretary assisted by Ms. Minna Pyhälä.

0.3 The Meeting was attended by all Contracting Parties except for Denmark and Russia. The List of Participants is contained in **Annex 1**.

Agenda Item 1 Adoption of Agenda

Documents: 1/1

1.1 The Meeting adopted the Agenda as contained in **Annex 2**.

1.2 The Meeting decided to establish drafting groups to develop the HELCOM thematic assessment on coastal fish, to consider EcoQOs and supporting indicators, to outline the coastal fish monitoring programme, and to revise the list of threatened and declining fish species.

Agenda Item 2 Thematic Assessment Report on coastal fish

Documents: 2/1, 2/1/Rev.1, 2/2, 2/2/Rev.1

2.1 The Meeting discussed the finalization of the HELCOM thematic assessment on coastal fish in the Baltic Sea (document 2/2/Rev.1) and was of the opinion that the coastal fish monitoring should give a strong input to the HELCOM assessment process.

2.2 Concerning the timetable to finalize the thematic report, the Meeting decided to:

- add information on threatened and declining fish species,
- add information on non-indigenous species,
- add some of the indicators as contained in Annex 3,
- add information on accidental catch of visitors from the North Sea (= advected species),
- add distribution maps for key species,
- consider including some case studies on eco-physiological/biological effect monitoring,
- consider adding information on the effects of temperature and salinity change, and
- consider adding information on predation by cormorants and seals.

2.3 The Meeting welcomed the offer of Mr. Kaj Ådjers to coordinate the finalization of the HELCOM thematic assessment report on coastal fish and decided to continue as follows:

- Mr. Kaj Ådjers will finalize the development of new indicators and the draft report **by 1 March 2005** and submit it to the national experts for amendments;
- Amendments are to be submitted to Mr. Kaj Ådjers **by 1 April 2005** after which he will send out the amended draft **by 1 May 2005** for final expert approval within a few days;
- Mr. Kaj Ådjers to submit the draft to ICES SG on Baltic Fish and Fisheries Issues for comments **by 1 June 2005**;
- Secretariat will re-edit the report **by September 2005**;

3.4 The Meeting considered the eco-physiological indicators and was of the opinion that they are outside of the competence of the present group. However, the Meeting emphasized that different monitoring programmes could be better linked in order to create synergies.

3.5 The Meeting agreed on the list of potential indicators as contained in Annex 3 for further testing and developing.

Agenda Item 4 Future fish monitoring

Documents: None

4.1 The Meeting was of the opinion that:

- a. Coastal fish communities have a central role in coastal marine ecosystems. They are sensitive indicators of the ecological status of the ecosystem, which is affected by changes in environmental conditions caused by multiple anthropogenic pressures such as fishing, pollution, and habitat alteration.
- b. The coastal fish communities have important economic, social, cultural, and recreational values. In addition, coastal fish are an essential component of the Baltic Sea ecosystem which are well known and of concern for general public.
- c. The majority of the fish species live periodically or permanently in coastal waters, thus representing the core of Baltic fish biodiversity.
- d. The main objective of the HELCOM coastal fish monitoring and assessment programme is to provide reliable data on long-term changes and regional diversity of commercial and non-commercial coastal fish communities for assessing the ecological status of the Baltic Sea, including biodiversity aspects.
- e. The HELCOM coastal fish monitoring expert network will produce annually updated Indicator Fact Sheets as well as thematic assessments to be used in HELCOM holistic assessments.
- f. The HELCOM coastal fish monitoring and assessment programme coordinates several national monitoring programmes to produce sub-regional and Baltic-wide topical assessments which will provide a regional component for pan-European assessment products.
- g. The HELCOM coastal fish monitoring and assessment programme is in line with the requirements of the EU Habitats and Water Framework Directives.
- h. The HELCOM coastal fish monitoring programme covers several trophic levels, integrates over time and space, and provides the basis for robust and easily understandable indicators of the ecological status of the Baltic Sea.
- i. The HELCOM coastal fish monitoring and assessment programme brings added value to ICES monitoring and assessment by assessing coastal fish species and populations as well as non-commercial species and fish communities.

4.2 The Meeting recalled the outcome of HELCOM MONAS Coastal Fish Monitoring Workshop 1/2004 (paragraph 5.5) and that a combination of various methods could be used to produce EcoQO/Indicator-based assessments.

4.3 The Meeting took note that monitoring of coldwater species is being carried out in almost all countries to some extent with fairly similar methods (gillnetting, trawling). The Meeting was of the opinion that all available data should be incorporated into the COBRA database. The Meeting welcomed the offer by Mr. Kaj Ådjers to carry out an exercise to check how this data will fit into COBRA.

4.4 The Meeting considered methods complementary to gillnet sampling to improve future fish monitoring, taking into account that small-sized fish and coldwater species are insufficiently covered at present.

ANNEX 1 LIST OF PARTICIPANTS

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ANNEX 2 AGENDA

1 Adoption of the Agenda

2 Thematic assessment report on coastal fish

- to finalize the HELCOM thematic assessment report on coastal fish
- to evaluate the value of the present datasets for continuation.

3 EcoQOs for coastal fish

- to consider and recommend EcoQOs for coastal fish;
- to develop indicators based on data in COBRA database.

4 Future fish monitoring

- to consider and recommend methods complementary to gillnet sampling to improve future fish monitoring taking into account that small-sized fish species and coldwater species are insufficiently covered at present;
- to consider, together with Sweden, the value of the Nordic method for the Baltic-wide use;
- to consider and recommend how to improve comparability of data at national and international levels to harmonize fish monitoring programmes at all levels taking also into account the fish monitoring for the EU Water Framework Directive.

5 Data exchange

- to consider developing a standardized electronic data reporting format of the COBRA database for inclusion of existing coastal fish monitoring data into the joint system.

6 Metadata

- to update status of and identify gaps in compiling meta-databases of coastal fish:
 - for commercial sampling by country, region, species, years, parameters measured and calculated indices,
 - for experimental sampling by country, region, purpose of the study, species, years, parameters measured and calculated indices.

7 Coastal fish dynamics

- to update existing knowledge on environmental processes affecting dynamics of coastal fish species;
- to summarize and identify gaps in knowledge of stock and population structure of non-assessed commercial stocks.

8 Future work

9 Other business

10 Outcome of the Meeting

ANNEX 3 STRATEGY FOR COASTAL FISH MONITORING AND ASSESSMENT IN THE BALTIC SEA

Monitoring Revision Procedure – MON-PRO: Biodiversity/Coastal Fish

Background

The Seventh Meeting of the Monitoring and Assessment Group (MONAS 7/2004) requested that the final outcome of MON-PRO should be a complete, integrated and harmonized monitoring and assessment programme consisting of different monitoring modules as follows:

- Hazardous substances, including radioactive anthropogenic nuclides
- Eutrophication
- Biodiversity, including fish and habitats
- Shipping, including illegal oil spills, and
- QA covering all modules

Module analysis “Coastal Fish Monitoring and Assessment”

Coastal fish communities provide important economic, cultural, social and recreational values. They are also a main component of the Baltic Sea ecosystem that is well known and of concern for general public. Coastal fish communities are a sensitive indicator of the ecological status of the ecosystem, which is affected by changes in environmental conditions caused by multiple anthropogenic pressures such as fishing, pollution and habitat destruction.

The main objective of the Baltic Sea coastal fish monitoring is to provide reliable data on long-term changes and regional diversity of commercial and non-commercial coastal fish communities for assessing ecological status of the Baltic Sea including biodiversity aspects. The HELCOM coastal fish monitoring and assessment programme coordinates several national monitoring programmes to produce sub-regional and Baltic-wide topical assessments, which will provide a regional component for the pan-European assessment products.

The HELCOM coastal fish monitoring and assessment programme is in line with the requirements of the EU Water Frame Work Directive and will include species and habitats listed by the Habitats Directive, thereby supporting monitoring of Natura 2000 areas (Table 1). Increased attention to the ecosystem approach calls for additional information on the Baltic Sea fish community. Coastal fish monitoring in the Baltic Sea will therefore provide substantial added value to stock assessment of commercial species performed within the framework of ICES.

Coastal fish monitoring covers several trophic levels, it integrates over time and space (temporal and spatial) and provides the basis for robust and easily understandable indicators of the ecological status of the Baltic Sea.

Table 1 Responsibility of EU-directives, ICES and HELCOM for fish monitoring in different habitats for different species

	Habitat covered	Fish component assessed	Frequency
WFD	Transitional waters	Fish communities, indicator species	Every 3 rd year?
Habitats directive	Natura 2000 areas	Listed threatened habitats and species	Every 6:th year
ICES	Marine	Internat. assessed commercial species	Annually
HELCOM	All coastal habitats	Fish communities, indicator species	Annually

Present programme

Coastal fish monitoring has been carried out within the framework of HELCOM for nearly a decade. Monitoring is based on national programmes and carried out annually in a network of areas along the coasts of the Baltic Sea, covering Gulf of Bothnia, Archipelago Sea, Gulf of Finland, Gulf of Riga, eastern and western coasts of Central Baltic Proper. At present 14 areas are monitored (Fig. 1). Monitoring is coordinated by the "Co-ordination Organ for Baltic Reference Areas" (COBRA), with a secretariat at the Provincial Government of Åland Islands. The Swedish National Board of Fisheries presently acts as data-host.

Collected information is used to reveal trends in coastal fish stocks, and to provide background data for large-scale environmental biodiversity assessments, for fisheries investigations and studies of local pollution. Time series cover 11–22 years of annual monitoring. Four new monitoring areas were added to the network in 2004. The collected data has been published in the Baltic Marine Environment 1999-2002 (HELCOM BSEP 87, 2003). A HELCOM thematic assessment report on the changes in coastal fish is under finalization for HELCOM MONAS 8/2005.

Sampling within the present COBRA-programme has been focused on the near-coastal fish community, mainly comprising freshwater fish species and species with high temperature optima. Monitoring is carried out in August using multi mesh gillnets or gillnet series according to HELCOM COMBINE Guidelines. Additional data on demersal deep-water fish communities are presently being included in the programme from some regions. A revision of sampling methods was initiated in 2001 and an alternative type of sampling strategy is being developed (Appelberg et al. 2003).

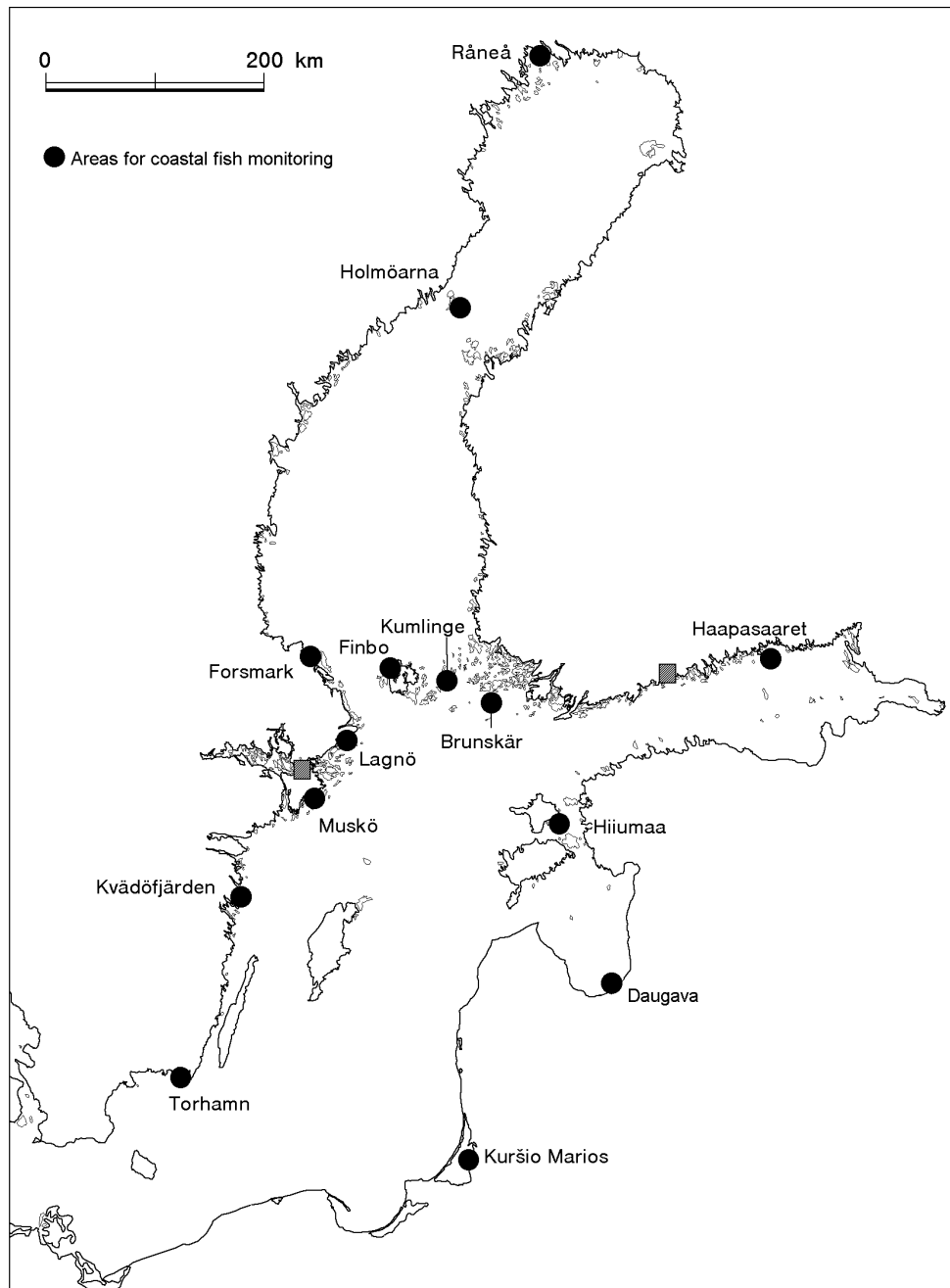


Fig. 1. Present sampling localities for coastal fish

EcoQOs

New perspectives on marine ecosystem management and conservation, including ecosystem approach in coastal zone management, as well as new EU Directives such as WFD and Habitats Directive, address the need for revised objectives in monitoring practices. From being focused mainly on detecting effects of local pollutants such as toxic substances and eutrophication, coastal fish monitoring should instead provide the basis for estimating the ecological status of the coastal fish compartment. It is suggested that the following Ecological Quality Objectives should be covered:

- Restore and maintain structure and functioning of coastal fish communities
- Restore and maintain species and genetic diversity of coastal fish including commercial species

In addition, coastal fish monitoring provides necessary basic data for fulfilling the EcoQO.

- Restore and maintain healthy fish (individuals) causing no harm neither to marine biota nor human population and ensure healthy fish populations

The EcoQOs are to be assessed on both a Baltic-wide scale, as well as a sub-regional scale. In order to meet the requirements, the programme must be able to separate between natural variation and variation related to environmental disturbance of the coastal fish community, as well as separate between natural variation and variation related to environmental disturbance of selected coastal fish species. It should also produce robust and easily understandable indicators for each of the EcoQOs listed which are assessable at regional-wide scale, and indicators which allow assessment with an acceptable statistical power. It is also necessary to produce indicators that are harmonized within sub-regions and that allow Baltic-wide assessments. Products for dissemination of the coastal fish monitoring should include both Indicator Fact Sheets as well as thematic assessments providing information for holistic assessments on the environmental status of the Baltic Sea.

Indicators

For each of the aforementioned EcoQOs, a number of appropriate indicators should be used to describe status and trends (Table 2a-c). This list of indicators should provide relevant, robust, and easily accessible measures of the major characteristics of the Baltic Sea coastal fish communities.

Table 2a Indicators proposed to meet requirements of EcoQO 1: Restore and maintain structure and functioning of coastal fish communities (healthy communities).

Indicator	Extractable from present COBRA database	Need for additional efforts	Concern Issue	Focal species
Community level				
No of specimens – total abundance	Yes		Productivity	Only relative abundance (CPUE)
Total biomass	Yes	Length distribution transformed to weight	Productivity	all species caught by gill nets
Size structure of community	Yes		Fisheries, environmental conditions	
Slope of the size spectrum of communities	All species caught by gill nets		Fisheries, predation	
Ratio between functional groups			Fisheries, eutrophication, community function	
– Cyprinid/percids	Yes			perch and roach
– Proportion of piscivorous fish	Yes			
– Benthic/pelagic species		Data on pelagic species		
– Average trophic level of the catch?	Yes			

Species level				
Species abundance	Yes		Productivity	Only relative abundance (CPUE) indicator species
Species biomass	Yes	Length distribution transformed to weight	Productivity	Only relative abundance (CPUE) indicator species
Recruitment: no of juvenile fish	-	Maturity determination needed	Habitats, spawning stock, health, climate	all common species caught by gill nets
Recruitment: - ichthyoplankton studies - YOY occurrence		Additional sampling needed		
Mortality	Yes, for perch	Age determinations	Exploitation, predation, health status	perch, (roach, pikeperch, flounder)
Year class strength	Yes, for perch	Age determinations	Habitats, spawning stock, health, climate	perch, (roach, pikeperch, flounder)
Size and age structure of population	Yes, for perch	Age determinations	Fisheries, recruitment success/failure	perch, (roach, pikeperch, flounder)
Average maximum individual length	all common species caught by gill nets		Fisheries, environmental conditions	
Growth rate	Yes, for perch	Age determinations	Feeding conditions (long-term), competition, climate/temperature, salinity	perch, (roach, pikeperch, flounder)
Age and size at first maturity		Age determination and data on maturation, additional sampling	Fisheries, climate, environmental conditions	perch, (roach, pikeperch, flounder)
Sex ratio	Yes, for perch	Additional sexing	Fisheries, hormone disruptions	perch, (roach, pikeperch)

Table 2b. Indicators to meet requirements of EcoQO 2: Restore and maintain species and genetic diversity of coastal fish including commercial species

Indicator	Extractable from present COBRA database	Need for additional efforts	Concern Issue	Focal species
Community level				
No. of species by category			Biodiversity, fisheries, environmental conditions, habitat loss	
- No. of threatened native species	species caught by method used	Different sampling methods preferable	According to the HELCOM list of threatened species	
- No. of alien species	species caught by method used	Different sampling methods preferable		
- No. of advected species	species caught by method used	Different sampling methods preferable		
Abundance				
- threatened species	species caught by method used	Different sampling methods preferable	Fisheries, habitat quality, predation and competition, recovery actions	Only relative abundance (CPUE)
- sentinel species	species caught by method used	Different sampling methods preferable		
- larval studies		Additional sampling needed		
Species diversity	species caught by method used	Different sampling methods preferable	Changes in fish fauna	
Population level				
Population structure of threatened species		Additional sampling methods needed	Loss of biodiversity (Habitats Directive, Natura 2000)	
Genetic diversity		Genetic analyses needed	Aquaculture, loss of biodiversity, fishery	

Table 2c. Indicators to meet requirements of EcoQO 3: Restore and maintain healthy fish (individuals) causing no harm neither to marine biota nor human population and ensure healthy fish populations

Indicator	Extractable from present COBRA database	Need for additional efforts	Concern Issue	Focal species
Individual level				
Liver somatic index		Additional sampling	Exposure to contaminants	perch, flounder, roach, ...
Gonad somatic index		Additional sampling (spring)	Exposure to contaminants, climate	perch, flounder, roach, ...
Fecundity		Additional sampling (late autumn of spring)	Exposure to contaminants, climate	perch, flounder, roach, ...
Prevalence of parasites,		Additional sampling	Health/stress	perch, flounder, roach, ...
Abnormalities and diseases	Yes		Health/stress	perch, flounder, roach, ...
Condition factor	perch	Additional sampling	Feeding conditions (short-term)	perch, (roach, pikeperch, ...)
Fat content		Additional sampling	Environmental conditions, feeding conditions	perch, flounder, roach
EROD activity ¹⁾		Additional sampling	Exposure for contaminants	perch, flounder, roach, ...
Concentration of toxic compounds ¹⁾		Additional sampling	Exposure for contaminants	perch, flounder, roach, ...

1) Need for assistance from eco-physiologists

Future monitoring

There is an urgent need to revise the present COMBINE Guidelines in order to fulfil the requirements according to the new objectives for coastal fish monitoring and assessment. It is also necessary to revise the guidelines in order to provide a Baltic-wide coverage, including southern and western Baltic coasts, as well as the Kattegat area. Additionally, the revision has to cover all Baltic coastal fish communities, including the whole demersal fish community and the near-shore small-sized fish species community.

In future coastal fish monitoring, the following concerns need to be addressed:

- definition of fish communities that should be covered by the monitoring programme,
- evaluation of an appropriate set of sampling gears and procedures in order to fulfil the requirements of each specific region/habitat and describe sampling strategy for each method,
- linking of external data from e.g. pelagic ecosystem, adjacent habitats and monitoring programmes,
- evaluation of indicators and indicator performance,
- consideration of the monitoring requirements of EU Directives,
- additional monitoring of threatened and declining species,
- harmonization of methods,
- harmonization of data and data exchange,
- harmonization and improvement of common regional and Baltic-wide assessments,
- production of Indicator Fact Sheets for relevant indicators.

Future perspective

It is reasonable to believe that the importance of coastal fish monitoring will increase in the future due to a number of reasons.

From an economic aspect:

- the use of aquatic resources calls for sustainable management
- the increased use of coastal areas causes habitat alteration and destruction
- commercial and recreational fisheries are expected to increase
- shipping and accidents/oil spills are expected to increase.

Coastal fish communities will also call for increased attention from a biodiversity aspect:

- increased need for nature protection according to e.g. BSPAs and Natura 2000 sites
- large-scale environmental changes, e.g. climatic changes will pose an increasing threat to the coastal zone,
- new chemical substances may appear in nature and pose a threat to coastal ecosystems,
- introduction of alien species, both fish and invertebrates, will increase as a result of human activities.

Lastly, in most countries around the Baltic Sea there are important cultural and social aspects connected to the coastal habitat and use of coastal fish.

ANNEX 4 COASTAL FISH METADATABASE

1. Experimental surveys on warm-water fish

Country	Sub-region, location, site	Period (years)	Fishing gear/method	Sampling time	Species	Purpose of the study	Parameters measured	Stomach analysis	Indices calculated
Estonia	Gulf of Riga, Kihnu Island	1997-	gillnet mesh-sizes: 17, 21, 25, 30, 33, 38 mm	July	All	coastal fish monitoring	Length, weight, sex (selected species: weight and gonad stage)	Perch, whitefish	CPUE, year-class strength, no. of species, heterogeneity, mortality
Estonia	Väinameri region, Vilsandi	1993-	gillnet mesh sizes: 17, 21, 25, 30, 33, 38, 42, 45, 50, 55, 60 mm	July	All	coastal fish monitoring	Length, weight, sex (selected species: weight and gonad stage)	Perch, whitefish	CPUE, year-class strength, no. of species, heterogeneity, mortality
Estonia	Väinameri region, Matsalu	1993-	gillnet mesh-sizes: 17, 21, 25, 30, 33, 38 mm	July-August	All	coastal fish monitoring	Length, weight, sex (selected species: weight and gonad stage)	Perch, whitefish	CPUE, year-class strength, no. of species, heterogeneity, mortality
Estonia	Väinameri region, Saarnaki	1991-	gillnet mesh-sizes: 17, 21, 25, 30, 33, 38 mm	August	All	coastal fish monitoring	Length, weight, sex (selected species: weight and gonad stage)	Perch, whitefish	CPUE, year-class strength, no. of species, heterogeneity, mortality
Estonia	Gulf of Finland, Käsmu	1997-	gillnet mesh sizes: 17, 21, 25, 30, 33, 38, 42, 45, 50, 55, 60 mm	August	All	coastal fish monitoring	Length, weight, sex (selected species: weight and gonad stage)	Perch, whitefish	CPUE, year-class strength, no. of species, heterogeneity, mortality
Estonia	Gulf of Finland, Vaindloo	1997-	gillnet mesh sizes: 17, 21, 25, 30, 33, 38, 42, 45, 50, 55, 60 mm	August	All	coastal fish monitoring	Length, weight, sex (selected species: weight and gonad stage)	Perch, whitefish	CPUE, year-class strength, no. of species, heterogeneity, mortality
Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 12mm)	spring	several species (pikeperch, perch, vimba)	coastal fish monitoring	length, weight, sex, gonad maturation stage, age	non-systematically pikeperch	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 8 mm)	autumn	several species (pikeperch, perch, vimba)	coastal fish monitoring	length, weight, sex, gonad maturation stage, age	non-systematically pikeperch	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 16 (18) mm)	spring	several species (pikeperch, perch, vimba)	coastal fish monitoring	length, weight, sex, gonad maturation stage, age	non-systematically pikeperch, perch	mean weight at age, mean length at age, age structure

Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 20-25 mm)	May-June	Pikeperch	pikeperch monitoring	length, weight, sex, gonad maturation stage, age	non-systematically	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay, 7-12 sites	1999-	gillnets: 16, 25, 30, 38, 45, 48, 50, 60	Oct-Nov	All	gillnet monitoring	length, weight, sex, gonad maturation stage, age (not for all species)	non-systematically (pikeperch, perch, vimba)	CPUE (weight and abundance) by gears and species, mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay, 3 sites	2001-	gillnets: 16, 25, 30, 38, 45, 48, 50, 60	May-June	All	gillnet monitoring	length, weight, sex, gonad maturation stage, age (not for all species)	non-systematically (pikeperch, perch, vimba)	CPUE (weight and abundance) by gears and species, mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga	1974-1986, 1994-1998	bottom trawl	May-November	All	fish community monitoring	abundance/biomass by species (length, weight, sex, gonad maturation stage, age for selected species)	pikeperch, sticklebacks, cyprinids for 1990s	CPUE, annual abundance index (model estimate)
Finland	Southern Bothnian Sea, Finbo	1976-1986	Different nets, methods changed during the period	Ice-free period	Perch, fish community	Monitoring	Length distribution of all species, age distribution of perch	No	CPUE, year-class strength of perch, catch-per-unit-effort
Finland	Southern Bothnian Sea, Finbo	1987-	Coastal survey nets	August	Perch, fish community	Monitoring	Length distribution of all species, age distribution of perch	No	CPUE, year-class strength of perch, catch-per-unit-effort
Finland	Southern Bothnian Sea, Finbo	2002 -	Nordic survey nets	August	Perch, fish community	Monitoring	Length distribution of all species, age distribution of perch	No	CPUE, year-class strength of perch, catch-per-unit-effort
Finland	Archipelago Sea, Kumlinge	2003 -	Nordic survey nets	August	Perch, fish community	Monitoring	Length distribution of all species, age distribution of perch	No	CPUE, year-class strength of perch, catch-per-unit-effort
Finland	Archipelago Sea, Lumparn	1999 -	Net series	October	Pikeperch, fish community	Monitoring, pikeperch stock management	Length distribution of all species, age distribution of pikeperch	No	CPUE, year-class strength of pikeperch, catch-per-unit-effort
Finland	Southern Bothnian Sea, Ivarskärsfjärden	1999 -	Net series	October	Pikeperch, fish community	Monitoring, pikeperch stock management	Length distribution of all species, age distribution of pikeperch	No	CPUE, year-class strength of pikeperch, catch-per-unit-effort
Finland	Southern Bothnian Sea, Emskär	1996-2003	Fyke nets	October	Viviparous blenny	Monitoring, reproduction	Reproduction success of blenny	No	Catch-per-unit-effort of blenny
Finland	Archipelago Sea, Brunskär	1991-	Multimesh gillnet	week 31	All	Environmental monitoring	Catch, age structure of perch	No	CPUE
Finland	Gulf of Finland, Tvärminne	1998	Multimesh gillnet	July-August (60 gill net nights)	All	Case study	Catch, length distribution	No	CPUE
Finland	Gulf of Finland, Helsinki	1998	Multimesh gillnet	July-August (60 gill net nights)	All	Case study	Catch, length distribution	No	CPUE

Finland	Gulf of Finland, Kotka	1998	Multimesh gillnet	July-August (60 gill net nights)	All	Case study	Catch, length distribution	No	CPUE
Finland	Gulf of Finland, inner bays of Helsinki	1997	Multimesh gillnet	July-August (39 gill net nights)	All	Case study	Catch, length distribution	No	CPUE
Finland	Gulf of Finland, Tvärminne	1997	Multimesh gillnet	May- October (72 gill net nights)	All	Case study	Catch, length distribution, growth of perch and roach	Perch and roach	CPUE
Latvia	Southern Gulf of Riga, Daugavgrīva	1992-2004	Gillnets	August	Perch, pikeperch, vimba	Fish monitoring	Length, weight, sex, maturity, age	No	CPUE
Latvia	Open Baltic, Jūrkalne	1998-2004	Gillnets	July	Perch, pikeperch, vimba	Fish monitoring	Length, weight, sex, maturity, age	No	CPUE
Latvia	Southern Gulf of Riga, Lapmežciems	1999, 2000, 2002-2004	Gillnets	June- August	Perch	Coastal fish survey	Length, weight, sex, maturity, age	No	CPUE, % ecol. groups
Latvia	Western Gulf of Riga, Irbe strait, Kolka	1986-2004	Beach seine	July	All	Coastal fish survey, flounder juveniles	Length, weight	Yes	CPUE, fish abundance, ecol. groups
Latvia	Open Baltic, Southern part, Pape	1998-2004	Beach seine/Gillnets	July	All	Coastal fish survey, flounder juveniles	Length, weight	Yes (for beach seine catches)	CPUE, fish abundance, ecol. groups
Latvia	Northern Gulf of Riga, various sites	1994, 1995, 2000, 2003, 2004	Gillnets	June-July	All	Coastal fish survey	Length, weight (perch: sex, maturity, age)	No	CPUE, % ecol. groups
Latvia	Southern Gulf of Riga, various sites	1994-1996, 1998-2000, 2002, 2004	Gillnets	June- August	All	Coastal fish survey	Length, weight (perch: sex, maturity, age)	No	CPUE, % ecol. groups
Latvia	Western Gulf of Riga, Irbe strait, various sites	1994-1996, 1998-1999, 2002, 2004	Gillnets	June- August	All	Coastal fish survey	Length, weight	No	CPUE, % ecol. groups
Latvia	Open Baltic, Northern part, various sites	1996, 1998, 2002, 2003	Gillnets	June- August	All	Coastal fish survey	Length, weight (perch: sex, maturity, age)	No	CPUE, % ecol. groups
Latvia	Open Baltic, Southern part, various sites	1998-2004	Gillnets	June- August	All	Coastal fish survey	Length, weight (perch: sex, maturity, age)	No	CPUE, % ecol. groups
Lithuania	Curonian Lagoon, central part, Atmata (2-6 stations)	1992-	Multi-meshsize gill nets	July-August	Perch, roach, silver bream, bream, pikeperch, vimba and etc. (23 species)	Coastal monitoring, data are used for state monitoring and for international monitoring (COBRA)	Length, weight, age	For different fish species, but not every year	CPUE, gonad weight
Lithuania	Curonian Lagoon, northern part, Dreverna (2-6 stations)	1992-	Multi-meshsize gill nets	July-August	Perch, roach, silver bream, bream, pikeperch, vimba and etc. (23 species)	Coastal monitoring, data are used for state monitoring and for international monitoring (COBRA)	Length, weight, age	For different fish species, but not every year	CPUE, gonad weight

Lithuania	Curonian Lagoon, central part, Preila (2 stations)	2004	Multi-meshsize gill nets	July-August	Perch, roach, silver bream, bream, pikeperch, vimba and etc. (23 species)	Coastal monitoring, data are used for state monitoring and for international monitoring (COBRA)	Length, weight, age	For different fish species, but not every year	CPUE, gonad weight
Lithuania	Curonian Lagoon, different stations	1993-	Beach seine	April-November	Perch, roach, silver bream, bream, pikeperch, vimba and etc. (about 30 species)	Coastal monitoring, fish stock assessment	Length, weight	For different fish species, but not every year	Shannons species diversity
Lithuania	Curonian Lagoon, different stations	1993-	Gill nets	March-December	Bream, pikeperch, perch, roach and etc. (about 25 species)	Fish biology, fish stock assessment	Length, weight, age	For different fish species, but not every year	CPUE, gonad weight
Lithuania	Baltic Sea, northern part, Monciskes (2-3 stations)	1993-	Multi-meshsize gill nets	August	Vimba, Baltic herring, river flounder, cod, turbot, perch, pikeperch etc. (about 30 species)	Coastal monitoring, data are used for state monitoring	Length, weight, age	For different fish species, but not every year	CPUE, gonad weight
Lithuania	Baltic Sea, northern part, Monciskes (2-3 stations)	1993-	Gill nets	February-December	Herring, river flounder, cod, turbot, vimba, perch, pikeperch etc. (about 30 species)	Fish biology, fish stock assessment	Length, weight, age	For different fish species, but not every year	CPUE, gonad weight
Lithuania	Baltic Sea, northern part, Monciskes	1993-	Beach seine	May-October	Smelt, river flounder, Baltic herring, sprat, vimba and etc. (about 20 species)	Coastal monitoring, fish stock assessment	Length, weight	For different fish species, but not every year	CPUE
Lithuania	Baltic Sea, northern part, Butinge	2000-	Beach seine	May-October	Smelt, river flounder, Baltic herring, sprat, vimba and etc. (about 20 species)	Butinge Oil terminal monitoring	Length, weight	For different fish species, but not every year	CPUE
Poland	Along Polish coast 1-14 stations annually	1996-	Bottom trawl	January-April	Pikeperch, perch, stickleback, ruffe, pike	Experimental survey	Weight (for some years and species length)	No	None
Poland	Four stations at Chlopy, Dabki, Jaroslawiec, Rowy	1997	Bottom trawl	August	Pikeperch, vimba, ide, perch, ruffe	Experimental survey	Length	No	None
Poland	One station 5426N 1915E	1998	Pelagic trawl	October	Stickleback	Hydro-acoustic survey	Weight	No	None
Poland	Along Polish coast 2-8 stations annually	1998-2000, 2002-2003	Pelagic trawl	October	Stickleback	Hydro-acoustic survey	Weight	No	None
Poland	Along Polish coast 2-6 stations annually	2001-2003	Bottom trawl	October-November	Stickleback, pikeperch, ruffe	Experimental survey	Weight (length for pikeperch)	No	None

Poland	Open coast, Reda mouth	1998	Gillnet	May-June	Bream, pikeperch, roach, silver bream, perch, tench	Experimental survey	Length, weight, age, sex, gonad maturity	No	None
Poland	Rowy, Jaroslawiec	1998	Beach trawl	June-September	Flounder, turbot, sandeel, greater sandeel, smelt, herring, sprat, bream, perch, pikeperch	Experimental survey	Length	No	None
Sweden	ICES SD 27, Aspöja Lat5824, Long1658	1999 -	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, pike, roach, silver-bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 28, Gotska Sandön Lat5822, Long1910	2000	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	September	Flounder, perch etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 25, Hasslö Lat5608, Long1525	1995	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 28, Herrvik Lat5726, Long1856	1994	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Flounder, perch etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, Kvädöfjärden Lat5800, Long1644	1962 -	Multi mesh-size nets of various combinations, standardized test-fishing	August	Perch, pike, roach, silver-bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, rectangle 4963, Muskö Lat5900 Long1809	1991 -	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, pike, roach, silver-bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, Mönsterås Lat5703, Long1635	1995 -	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, pike, roach, silver-bream etc	Industrial site	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, Simpevarp Lat5725, Long1642	1962 -	Multi mesh-size nets of various combinations, standardized test-fishing	August	Perch, pike, roach, silver-bream etc	Industrial site	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 25, Torhamn Lat5605, Long1545	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, pike, roach, silver-bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)

Sweden	ICES SD 27, Vinö Lat5730, Long1642	1995 -	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Reference area	Number and size per species	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 28, NE Gotland Lat5743, Long1849	2000	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Flounder, perch etc	Inventory	Number and size per species, age (perch)	No	Rel abundance
Sweden	ICES SD 25, Hasslö Lat5608, Long1525	2001	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 28, Herrvik Lat5726, Long1856	2000	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Flounder, perch etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, Södra Kalmarsund Lat5939, Long1618	1998	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 27, Oskarshamn Lat5711, Long1629	1998	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 25, Skillinge Lat5526, Long1415	1994	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Flounder, turbot etc.	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 27, Skäggenäs, Öland Lat5646, Long1625	1998	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 27, Torsås Lat5620, Long1605	1998	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 27, NE Öland Lat5658, Long1653	1998	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, pike, roach, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 29, rectangle 4963, Biotestsjön, Forsmark Lat6025,69 Long1811,82	1987 -	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	October	Perch, roach, silver- bream, ruffe, rudd etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 29, rectangle 4963, Biotestsjön, Forsmark Lat6025,69 Long1811,82	2004	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	June- December	Perch, roach, silver- bream, ruffe, rudd etc	Inventory	Number and size per species	No	Rel abundance

Sweden	ICES SD 29, rectangle 4963, Biotestsjön, Forsmark Lat6026,03 Long1809,73	2001 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, ruffe, silver-bream etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 29, rectangle 4963, Biotestsjön, Forsmark Lat6026,03 Long1809,73	2004	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, herring, silver-bream etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 29, rectangle 4963, Biotestsjön, Forsmark Lat6026,03 Long1809,73	1983 -	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, silver-bream, ruffe, sander, herring etc	Inventory	Number and size per species, age (perch)	No	Rel abundance
Sweden	ICES SD 29, rectangle 4963, Galtfjärden Lat6010,43 Long1835,75	1996	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	September	Perch, roach, silver-bream, ruffe, sander, herring etc	Industrial site	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 30, rectangle 5463, Gaviksfjärden Lat6251,80 Long1816,55	2004	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 31, rectangle 5665, Holmön Lat6340,89 Long2052,52	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, herring, ruffe, three-spined stickleback etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 31, rectangle 5665, Holmön Lat6340,89 Long2052,52	1989-1994	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe, herring, whitefish etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 31, rectangle 5665, Holmön Lat6340,89 Long2052,52	1995 -	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe, herring, whitefish etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 31, rectangle 5665, Holmön Lat6340,89 Long2052,52	2001-2002	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe, herring, whitefish etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)

Sweden	ICES SD 30, rectangle 5664, Husum Lat6318,88 Long1908,98	1994 -	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe, herring, whitefish etc	Industrial site	Number and size per species	No	Rel abundance
Sweden	ICES SD 30, rectangle 5262, Iggesund Lat6137,72 Long1709,17	1996	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August-September	Perch, roach, ruffe, herring etc	Industrial site	Number and size per species	No	Rel abundance
Sweden	ICES SD 31, rectangle 5966, Kinnbäcksfjärden Lat6502,80 Long2131,10	2004	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, ruffe, three-spined stickleback etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, rectangle 4863, Lagnö Lat5933,94 Long1850,38	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, ruffe, herring, smelt etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 30, rectangle 5162, Långvindsfjärden Lat6127,37 Long1709,94	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, ruffe, herring, etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, rectangle 4663, Muskö Lat5858,01 Long1806,74	1991-1994	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, roach, ruffe, herring, silver-bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 27, rectangle 4663, Muskö Lat5858,01 Long1806,74	1995 -	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, roach, ruffe, herring, silver-bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 29, rectangle 4764, Nassa skärgård Lat5926,44 Long1912,60	1997	Mesh-sizes 17, 22, 25, 30 mm, standardized test-fishing	August	Perch, herring, sculpin etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 31, rectangle 5664, Norrbyn Lat6332,02 Long1950,05	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, ruffe, herring, smelt, whitefish, dace etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 30, rectangle 5062, Norrsundet Lat6058,72 Long1711,38	1998	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe, herring etc	Industrial site	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)

Sweden	ICES SD 31, rectangle 5665, Obbola Lat6339,80 Long2014,78	1994	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	July	Perch, roach, ruffe etc	Industrial site	Number and size per species	No	Rel abundance
Sweden	ICES SD 27, rectangle 4763, Ornö Lat5900,39 Long1826,06	2000	Mesh-sizes 17, 22, 25, 30 mm, standardized test- fishing	August	Perch, roach, herring, flounder etc	Inventory	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 31, rectangle 6067, Råneå Lat6549,97 Long2225,57	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	August	Perch, roach, ruffe, bream, etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 31, rectangle 6067, Råneå Lat6549,97 Long2225,57	1994 -	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe, bream etc	Reference area	Number and size per species, age (perch)	No	Rel abundance, size at age (perch), year class strength (perch)
Sweden	ICES SD 30, rectangle 5563, Örnsköldsvik Lat6314,21 Long1854,46	1995	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test-fishing	August	Perch, roach, ruffe etc	Industrial site	Number and size per species	No	Rel abundance

2. Experimental surveys on cold-water fish

Country	Sub-region, location, site	Period (years)	Fishing gear/method	Sampling time	Species	Purpose of the study	Parameters measured	Stomach analysis	Indices calculated
Estonia	Väinameri region, Küdema	1992-97, 2000-	gillnet mesh size: 21, 30, 38, 50, 60mm	October-November	All	coastal fish monitoring	Length, weight, sex (selected species: weight and developmental stage of gonads)	Whitefish	CPUE, year class strength, no. of species, heterogeneity, mortality
Estonia	Gulf of Riga	1961-1997	trawl	spring-autumn	smelt	smelt stock	length, weight, age	Non-systematically	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 12mm)	spring	smelt	coastal fish monitoring	length, weight (sex, gonad maturation stage & age when applicable))	No	mean length and weight of 0-group
Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 8 mm)	autumn	smelt	coastal fish monitoring	length, weight (sex, gonad maturation stage & age when applicable))	No	mean length and weight of 0-group
Estonia	Gulf of Riga, Pärnu Bay, 1 site	1999-	trapnet (cod-end mesh size 16 (18) mm)	spring	smelt	coastal fish monitoring	length, weight (sex, gonad maturation stage & age when applicable))	No	mean length and weight of 0-group
Estonia	Gulf of Riga, Pärnu Bay, 1 site	2001-	trapnet (cod-end mesh size 32 mm)	winter	smelt	smelt stock	length, weight, age, sex, gonad maturation stage	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga 5-7 stations	1974-1986, 1994-1998	bottom trawl	May-November	All	fish community monitoring	abundance/biomass by species (length, weight, sex, gonad maturation stage, age for selected species)	eelpout, smelt, herring for the 1990s	CPUE, annual abundance index (model estimate)
Finland	Archipelago Sea, Seglinge	1989-1997	Coastal survey nets	October	Cod, fish community	Monitoring of cod	CPUE, length distribution of all species, age distribution of cod	No	year-class strength of cod, catch-per-unit-effort
Latvia	Western Gulf of Riga, Irbe strait, Kolka	1986-2004	Beach seine	May	All	Coastal fish survey, juvenile flounder	Length, weight	Yes	CPUE, fish abundance, ecol. groups
Latvia	Open Baltic, Southern part, Pape	1998-2004	Beach seine/gillnets	May	All	Coastal fish survey, juvenile flounder	Length, weight	Beach seine catches	CPUE, fish abundance, ecol. groups
Latvia	Gulf of Riga, Irbe strait	1970s-	Bottom trawl	May, October	Herring, sprat, eelpout	Fish survey	Catch composition	Eelpout	CPUE, fish abundance

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ANNEX 4

Lithuania	Baltic Sea, northern part, Butinge (4 stations)	2000-	Multi-meshsize gill nets	August	Herring, river flounder, vimba, cod, turbot, perch, pikeperch etc. (about 25 species)	Butinge Oil terminal monitoring	Length, weight, age	No	CPUE, gonad weight
Poland	8 stations	1996	Bottom trawl	January-February	Eelpout, smelt, lumpsucker, sculpin, bullhead, whiting	Young fish survey	Weight	No	CPUE
Poland	13-36 stations annually	1996-	Bottom trawl	January-April	Smelt, sculpin, four-bearded rockling, lumpsucker, whiting, bullhead, eelpout	Fish community monitoring	Length and weight (at least one of them measured)	No	CPUE
Poland	4 stations at: Chlopy, Dabki, Jaroslawiec, Rowy	1997	Beach trawl	August	Smelt	Fish community monitoring	Length	No	CPUE
Poland	2-17 stations annually	1997-	Pelagic trawl	October	Sculpin, smelt, whiting, lumpsucker, eelpout, four-breaded rockling	Hydro-acoustic survey	Weight	No	CPUE
Poland	5 stations	1998	Pelagic trawl	February	Smelt, whiting	Hydro-acoustic survey	Weight	No	CPUE
Poland	10-17 stations annually	2002-2003	Bottom trawl	November	Smelt, eelpout, sculpin, four-breaded rockling, whiting, bullhead, seasnail	Fish community monitoring	Length and weight (at least one of them measured per species)	No	CPUE
Sweden	ICES SD 27, Kvädöfjärden Lat5800, Long1644	1962 -	Mesh sizes 22, 30, 38, 50, 60 mm, standardized test-fishing	October	White-fish, cod, flounder, sculpins, perch etc	Reference area	Number and size per species, age (flounder)	No	Rel abundance, size at age (flounder)
Sweden	ICES SD 27, Muskö Lat5956, Long1803	1994 -	Mesh sizes 22, 30, 38, 50, 60 mm, standardized test-fishing	October	White-fish, cod, flounder, sculpins, perch etc	Reference area	Number and size per species, age (flounder)	No	Rel abundance, size at age (flounder)
Sweden	ICES SD 28, Herrvik Lat5726, Long1856	1994	Mesh sizes 22, 30, 38, 50, 60 mm, standardized test-fishing	October	Cod, flounder, sculpins etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 25, Hasslö Lat5608, Long1525	1994	Mesh sizes 22, 30, 38, 50, 60 mm, standardized test-fishing	October	Cod, flounder, sculpins etc	Inventory	Number and size per species	No	Rel abundance
Sweden	ICES SD 25, Skillinge Lat5526, Long1415	1994	Mesh sizes 22, 30, 38, 50, 60 mm, standardized test-fishing	October	Cod, flounder, sculpins etc	Inventory	Number and size per species	No	Rel abundance

Sweden	ICES SD 28, Gotska Sandön Lat5822, Long1910	1999- 2003	Mesh sizes 22, 30, 38, 50, 60 mm, standardized test- fishing	October- December	Cod, flounder, sculpins etc	Reference area (pilot study)	Number and size per species	No	Rel abundance
Sweden	ICES SD 28, Gotska Sandön Lat5822, Long1910	2000- 2003	Mesh sizes 85, 100, 110, 120	September- October	Turbot	Reference area (pilot study)	Number and size per species, age (turbot)	No	Rel abundance, size at age (turbot)
Sweden	ICES SD 28, Gotska Sandön Lat5822, Long1910	2003 -	Mesh sizes 25 - 120 mm	June	Cod, flounder, sculpins, turbot etc	Reference area (pilot study)	Number and size per species, age (flounder, turbot)	No	Rel abundance, size at age (flounder, turbot)
Sweden	ICES SD 29, rectangle 4963, Forsmark Lat6026,03 Long1809,73	1989- 2002	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test- fishing	October	Whitefish, zander, herring, perch, roach, ruffe	Inventory	Number and size per species	No	Rel abundance, size at age (whitefish)
Sweden	ICES SD 29, rectangle 4963, Galtfjärden Lat6010,43 Long1835,75	1993- 1998	Mesh sizes 25, 30, 38, 50, 60 mm	October	Zander, perch, roach, sculpin, smelt	Inventory	Number and size per species	No	Rel abundance, size at age (zander)
Sweden	ICES SD 29, rectangle 4963, Galtfjärden Lat6010,43 Long1835,75	1999 -	Mesh sizes 25, 30, 38, 45, 50, 60 mm, standardized test- fishing	October	Zander, perch, roach, sculpin, smelt	Inventory	Number and size per species	No	Rel abundance, size at age (zander)
Sweden	ICES SD 29, rectangle 4963, Galtfjärden Lat6010,43 Long1835,75	2002 -	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	October	Zander, perch, roach, ruffe, silver bream	Inventory	Number and size per species	No	Rel abundance, size at age (zander)
Sweden	ICES SD 29, rectangle 4963, Gräsö Lat6024,51 Long1838,63	1989- 2001	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test- fishing	October	Whitefish, herring, sprat, smelt, sculpin, perch, roach	Inventory	Number and size per species	No	Rel abundance, size at age (whitefish)
Sweden	ICES SD 29, rectangle 4963, Gräsö Lat6024,51 Long1838,63	2001	Multi mesh-size nets, Coastal Nordics, mesh sizes 10, 12, 15, 19, 24, 30, 38, 47, 60 mm	October	Whitefish, herring, sprat, smelt	Inventory	Number and size per species	No	Rel abundance, size at age (whitefish)
Sweden	ICES SD 27, rectangle 4963, Muskö Lat5858,01 Long1806,74	1994- 2004	Mesh sizes 21, 30, 38, 50, 60 mm, standardized test- fishing	October	Flounder, herring, perch, roach, sculpin	Reference area	Number and size per species, age (flounder)	No	Rel abundance, size at age (flounder)
Sweden	ICES SD 31, rectangle 5664, Norrbyn Lat6332,02 Long1950,05	1990- 1999	Multi mesh-size nets, mesh sizes 17, 22, 25, 33, 50 mm, standardized test- fishing	October	Whitefish, herring, smelt, sculpin, perch, ruffe	Inventory	Number and size per species	No	Rel abundance, size at age (whitefish)

3. Sampling from commercial catch

Country	Sub-region, location, site	Period (years)	Fishing gear/practice	Sampling time	Species	Purpose of the study	Parameters measured	Stomach analysis	Indices calculated
Estonia	Gulf of Riga, Pärnu Bay	1993-	gillnet	winter	pikeperch	pikeperch stock	length, weight, age	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1997-1999, 2002-	gillnet	autumn	pikeperch	pikeperch stock	length, weight, age	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1998, 2000, 2001	gillnet	autumn	vimba	vimba stock	length, weight	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1992-1999, 2003-	trapnet	spring	pikeperch	pikeperch stock	length, weight, age (sex non-systematically)	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1998-1999, 2002, 2003	trapnet	autumn	pikeperch	pikeperch stock	length, weight, age	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1998-	trapnet	spring	vimba	vimba stock	length, weight	No	
Estonia	Gulf of Riga, Pärnu Bay	1998-2001, 2003-	trapnet	autumn	vimba	vimba stock	length, weight	No	
Estonia	Gulf of Riga, Pärnu Bay	1997, 1999-	gillnet	winter	perch	perch stock	length, weight, age (sex non-systematically)	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1998, 2000-	gillnet	autumn	perch	perch stock	length, weight, age (sex non-systematically)	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1994-	trapnet	spring	perch	perch stock	length, weight, age, sex	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga, Pärnu Bay	1998-	trapnet	autumn	perch	perch stock	length, weight, age	No	mean weight at age, mean length at age, age structure

Estonia	Gulf of Riga	1957-	trapnet, gillnet, trawl	December-May	smelt	smelt stock	length, weight, age, sex, gonad maturation stage	No	mean weight at age, mean length at age, age structure
Estonia	Gulf of Riga	1963-1998	trapnet, gillnet, trawl	December-May	smelt	smelt stock	length, weight, age, sex, gonad maturation stage	No	mean weight at age, mean length at age, age structure
Estonia	Väinamari region, Matsalu	2001-2003	commercial trapnet	April-October	especially pike	monitoring	catch per species (weight), length of pike	Pike	CPUE, year-class strength, no. of species, heterogeneity, mortality
Finland	ICES Sub-divisions 29-32	1998-	gill nets, trap nets	Q1-Q4	pikeperch, perch, European whitefish, sea trout	IBSSP, EU data collection	catch composition	No	Recruitment, growth, year class strength
Finland	ICES Sub-divisions 29-30,32	1975-	gill nets, trawl, trap-nets	Q2-Q4	flounder	Stock assessment, IBSSP, EU data collection	catch composition	No	Recruitment, growth, year class strength
Finland	ICES Sub-division 30	1998-2001			smelt	IBSSP	catch composition	No	
Finland	ICES Sub-division 29	1980-99,2001-03	gill nets, lures	Q1-Q4	pike		catch composition	No	Recruitment, growth, year class strength
Latvia	Southern Gulf of Riga, Daugavgrīva	1974-2004	Fykenets	Monthly	Vimba	Size composition	Length, weight, maturity, age	No	Length at age
Latvia	Southern Gulf of Riga, Daugavgrīva	1992-2004	Fykenets	Monthly	Pikeperch	Size composition	Length, weight, maturity, age	No	Length at age
Latvia	Southern Gulf of Riga, Daugavgrīva	1982-2004	Fykenets	Monthly	Salmon	Size composition	Length, weight, maturity, age	No	Length at age
Latvia	Southern Gulf of Riga, Daugavgrīva	2000-2004	Fykenets	Monthly	Perch	Size composition	Length, weight, maturity, age	No	Length at age
Latvia	Gulf of Riga, various sites	1976-2004	Fykenets	Monthly	Eelpout	Size composition	Length, weight, maturity, age	No	Length at age
Latvia	Open Baltic, western part, various sites	2002-2004	Gillnets	Monthly	Cod	Size composition	Length, weight, maturity, age	No	Length at age
Lithuania	Curonian Lagoon, different stations	1993-	Gill nets, trap nets, drift nets	March-December	Bream, pikeperch, perch, roach and etc. (about 25 species)	Fish biology, fish stock assessment	Length, weight, age	No	CPUE

Poland	Vistula Lagoon, Tolkmicko	1993-2003	Driftnet/Fykenet	January-November different fish sampled in various months	Bream, pikeperch, vimba, stickleback, sichel, ruffe, crucian carp, gudgeon, silver bream, brook lamprey, perch, roach, herring, flounder, smelt, bleak, eel, rudd, burbot, asp, lumpfish, ide, twaite shad, carp, tench, sprat	Monitoring of commercial fish	Length for all species; weight, sex, gonad maturity stage and age selectively for species and years	No	Length/weight, age/sex, age/length, age/weight ratio and stomach fullness calculated for selected species and years
Poland	Gulf of Gdansk, Puck Bay	1995	Driftnet/gillnet	May-October	Roach, bream	Monitoring of commercial fish	Length, age, sex	No	None
Poland	Gulf of Gdansk, Sopot	1995	Driftnet	May-September	Pikeperch	Monitoring of commercial fish	Length, age, sex	No	None
Poland	Vistula Lagoon, Suchacz	1995	Fykenet	June-August	Perch	Monitoring of commercial fish	Length, age, sex	No	None
Poland	Gulf of Gdansk, Puck Bay	1996	Gillnet, longlines	May-June	Garfish	Monitoring of commercial fish	Length, age, sex	No	None
Poland	Gulf of Gdansk, Puck Bay	1996-1997	Gillnet	March-November	Perch, roach, pikeperch	Monitoring of commercial fish	Length, age (weight)	No	None
Poland	Gulf of Gdansk, Puck Bay	1996-1997	Fykenet	April-September	Eel	Monitoring of commercial fish	Length, weight (age)	No	None
Poland	Gulf of Gdansk, Puck Bay	1997-1998	Gillnet, hooks, pelagic trawl, pelagic pair trawl	May-June	Garfish	Tagging	Length for all surveys; weight, age and sex selectively	No	None
Poland	Gulf of Gdansk, Sopot	1997	Gillnet	April-May	Pikeperch	Monitoring of commercial fish	Length, weight, age	No	None
Poland	Open coast at Trzebież	1999, 2001, 2002	Fykenet/driftnet	March-October	Pikeperch, perch, roach, bream	Monitoring of commercial fish	Length, weight, age for all catches, gonad maturity, gonad weight and stomach fullness for selected species/catches	No	Age/length, length/weight ratio and gonad index for selected species/catches and years
Poland	Szczecin Lagoon, Lubina	2002	Fykenet	March-October	Pikeperch, perch, bream, roach	Monitoring of commercial fish	Length, weight, age, sex, gonad maturity, stomach fullness	No	None
Poland	Szczecin Lagoon, Lubina	2003	Fykenet/driftnet	April-November	Pikeperch, bream, perch, roach, ruffe	Monitoring of commercial fish	Length, weight, age, sex	No	None
Sweden	ICES SD 27, Aspöja Lat5824, Long1658	1997 -	Poundnet	April-December	Pike	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength

Sweden	ICES SD 27, Marsö Lat5728, Long1645	1997 -	Poundnet	April-May	Pike	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength
Sweden	ICES SD 27, Aspöja Lat5824, Long1658	1999 -	Gillnet, poundnet	April- September	Perch	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength
Sweden	ICES SD 27, Aspöja Lat5824, Long1658	2002 -	Gillnet, poundnet	April- September	White-fish	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength
Sweden	ICES SD 27, Marsö Lat5728, Long1645	2002 -	Poundnet	October- November	White-fish	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength
Sweden	ICES SD 28, NE Gotland Lat5732, Long1857	1998 -	Gillnet	April- September	Turbot	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength
Sweden	ICES SD 27, Kväddöfjärden Lat5800, Long1644	1996 -	Fykenet	April- September	Yellow eel	Stock assessment	Length, weight, sex, age	No	rel abundance, growth, mortality
Sweden	ICES SD 27, Marsö Lat5728, Long1645	1999 -	Fykenet	April- September	Yellow eel	Stock assessment	Length, weight, sex, age	No	rel abundance, growth, mortality
Sweden	ICES SD 25, Karlskrona arch. East Lat5605, Long1545	1999 -	Fykenet	April- September	Yellow eel	Stock assessment	Length, weight, sex, age	No	rel abundance, growth, mortality
Sweden	ICES SD 25, Valjeviken Lat5602, Long1432	1996 -	Fykenet	April- September	Yellow eel	Stock assessment	Length, weight, sex, age	No	rel abundance, growth, mortality
Sweden	ICES SD 27, Kväddöfjärden Lat5800, Long1644	2002 -	Gillnet	July-September	Flounder	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength
Sweden	ICES SD 27, NE Öland Lat5700, Long1704	2002 -	Gillnet	July-September	Flounder	Stock assessment	Length, weight, sex, age	No	stock size, growth, mortality year-class strength

ANNEX 5 UPDATING OF EXISTING KNOWLEDGE ON ENVIRONMENTAL PROCESSES AFFECTING DYNAMICS OF COASTAL FISH SPECIES

Baltic-wide coastal fish monitoring is performed in 14 monitoring areas in various parts of the Baltic Sea, incl. various parts in the Baltic Proper, Gulf of Finland, Botnian Bay and Gulf of Bothnian. The time-series cover 11-22 years of annual monitoring data obtained by means of multimesh gill nets or gillnet series in shallow water (2-5 m depth) in August (Thoresson 1993). The obtained data are currently being analysed by involvement of participants from all countries involved in the joint monitoring programme. Amongst others, the analysis include: patterns in spatial distribution and relative abundance of species/ecological groups (incl. also threatened and alien species), trends in the catch per unit effort of fish species/groups over the time in various areas and in relation to the measured abiotic variables as temperature and Secchi depth. The findings will be discussed in the context of environmental parameters/processes of both natural and anthropogenic origin that essentially affect the structure and functioning of the Baltic Sea ecosystems. Results of the analysis will be ready later in 2005.

The spatial distribution pattern of smelt larvae and juveniles was studied in the Polish part of the Vistula Lagoon at 15 stations during four subsequent cruises with different distribution patterns. It was found that their distribution is mainly influenced by the direction and velocity of winds and by the movement of large water masses. During calm weather (low wind velocity and variable wind direction) smelt gathered in the central part of the investigated area. Gentle winds blowing in a stable direction several days prior to sampling pushed smelt larvae to the opposite site of the lagoon. Strong winds especially caused juvenile fish to seek calm and shallow waters at the side from which the wind was blowing. The movement of large water masses along the lagoon significantly affected the horizontal distribution of smelt juveniles by dragging or pushing them from one site to another (Margonski 2000).

Using data from 1950-2000, the high amplitude of inter-annual variability of spawning timing of herring in the Vistula Lagoon was shown within a wide range of environmental conditions and stock characteristics. The principal factors which have a prevalent effect on spawning timing included the time of ice breakup and clearing from the lagoon, which is related to the severity of the preceding winter, further warming processes and water salinity values. In spite of the inter-annual diversity of spawning time, abiotic conditions, stock size etc., a noticeable constancy was observed in the spawning run (changes in CPUE, age composition, mean weight-at-age of herring during the spawning period). The trend towards milder winters and the early occurrence of spring should be mentioned, and the distinct shift of herring spawning in the Vistula Lagoon towards an earlier time and at lower temperatures was observed in spite of the positive trend of mean water temperature in spring (Krasovskaya 2001).

Results of major coastal fish sampling in the Vistula Lagoon with fyke nets indicate that the main abiotic parameter determining fish assemblages (dominated by ruffe *Gymnocephalus cernuus*) in the central-eastern part of the basin was salinity whereas temperature was the most important factor in the western part of the basin. Cyprinids dominated in the southern part of the lagoon and dynamics of fish assemblages was mostly influenced by the organic pollution index (chemical oxygen demand, COD) (Psuty-Lipska and Borowski 2003).

Preliminary results of analysis of fish monitoring data in Daugavgriva (near Riga) indicate that proportion of roach *Rutilus rutilus* and pikeperch *Zander lucioperca* have decreased and that of ruffe, white bream *Blicca bjoerkna* and perch *Perca fluviatilis* increased in the coastal fish community. The reasons behind are complex and include: (1) significant decrease of the number of large industries as well as the total area of the land used for agriculture, (2) the change to a better agriculture practices (i.e. less use of fertilisers and pesticides), (3) significant increase of the wastewater treatment resulted in less nutrient loads and (4) increase of overall quality of underwater environment in the research area. The data collected by Institute of Hydrobiology, Latvian University on macrozoobenthos biomass in the

Daugavgriva region show a collapse and gradual recovery of the macrozoobenthos communities in the Gulf of Riga in the late 1980 – 1990s that is another support of this theory. That could explain the decrease in the total proportion of omnivorous and opportunistic species like roach and increase of more specialised benthivorous species like white bream *Abramis brama* and ruffe. In the same time, the decrease of pikeperch is associated mainly with over-fishing. Substantial increase of abundance of perch is thought to be the result of perch taking the top predator role in fish communities in the Gulf of Riga (A. Minde, unpubl. data).

Data on abundance of juvenile freshwater species during the ten last years revealed that most of the outer archipelago areas along the coast of the Baltic Proper had low or no recruitment of perch. The most affected areas in the Baltic Proper was the Kalmar sound, Stockholm Archipelago and coastal areas of Gotland. In the Bothnian Sea and the inner archipelagos of the Baltic Proper the recruitment was normal. The situation was similar for pike *Esox lucius* and other freshwater species except sticklebacks. In the most severely affected areas, the juvenile fish community was dominated by sticklebacks. The geographical pattern of the problem indicates that the reason for the declined coastal fish stocks should be sought in the offshore areas of the Baltic Proper. It was found that the problem appears during the larval and early juvenile stages. No correlation was found between recruitment failure (of perch and pike) and vegetation community composition or vegetation coverage, neither was there any correlation between recruitment failure and abundance of filamentous algae. There was clear relationship between abundance of adult sticklebacks in spring and recruitment failure. Further analysis indicates that high abundance of sticklebacks does not necessarily mean negative impact to recruitment of perch and pike. However, there was a strong correlation between the larval food (zooplankton) at the time of onset of feeding and recruitment success of perch. Common for all stations with recruitment problems was significantly lower abundance of zooplankton compared to reference areas. Therefore it was suggested that the recruitment of coastal species might be affected by large-scale changes in the pelagic ecosystem of the Baltic Sea (Ljunggren et al. 2005).

Correlation between stocks of migratory fish species and pollutants (BOD₇ and nitrogen emissions) was studied in the Curonian Lagoon. The reliable correlation was registered between the commercial catches of vimba with BOD₇ and nitrogen emissions from the Lagoon to Baltic Sea. The similar correlation between experimental catches of twaite shad with BOD₇ and nitrogen emissions was registered (Repecka 2003, Kesminas and Repecka, 2003). Increase of experimental gillnet catches of freshwater and diadromous fish species, such as pikeperch *Zander lucioperca*, perch *Perca fluviatilis*, vimba *Vimba vimba* and twaite shad *Alosa fallax* was registered recently. This increase could be attributed to more intensive freshening and warming of water in the coastal zone in the process of deepening of the Klaipeda Strait (R. Repecka and L. Lozys, unpubl. data). In addition, increased catches of diadromous fish can be a result of improvement of the recruitment conditions as a result of decreased pollution in the River Nemunas basin. For instance, nitrogen and phosphorus levels of the River Nemunas are currently several times lower than ca 10 years ago (Stankevicius 1998). Deepening of the Klaipeda port also had a positive effect on the diadromous fish species. After the deepening of the port the water balance between the Curonian Lagoon and the Baltic Sea increased in 20-25% (Gailiusis et al. 2001) and diadromous fish species migrate to Curonian Lagoon and River Nemunas basin more intensively. In addition, more intensive migration of freshwater fish species (e.g., perch, pikeperch and roach) from the Curonian Lagoon to coastal zone in recent years were noted (R. Repecka and L. Lozys, unpubl. data).

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Some gaps in knowledge that should be considered when planning/designing future research activities:

- Rates and patterns of impact of fish and invertebrate invasions on native coastal fish species/communities
- Predation of coastal fish by marine mammals and fish-eating birds
- Coastal-open sea trophic interactions
- Food-web interactions in coastal areas
- Factors affecting formation of recruitment of coastal fish species

ANNEX 6 PRELIMINARY INFORMATION ON ONGOING STOCK ASSESSMENTS OF COASTAL FISH

Country	Species	Latin name	Basin	Years	Method	
Denmark	Information not available					
Estonia	None					
Finland	None					
Germany	Flounder	<i>Platichthys flesus</i>	ICES SD 24	1990s	VPA	
Latvia	None					
Lithuania	None					
Poland	Pikeperch	<i>Zander luciperca</i>	ICES SD 24, Szczecin lagoon	1993-	VPA	
	Bream	<i>Abramis brama</i>	ICES SD 24, Szczecin lagoon	1993-	VPA	
	Perch	<i>Perca fluviatilis</i>	ICES SD 24, Szczecin lagoon	1993-	VPA	
	Roach	<i>Rutilus rutilus</i>	ICES SD24, Szczecin lagoon	1993-	VPA	
	Pikeperch	<i>Zander luciperca</i>	ICES SD 26, Vistula lagoon	1993-	VPA	
	Flounder	<i>Platichthys flesus</i>	ICES SD 24, 25, 26	1987-	VPA	
	Bream	<i>Abramis brama</i>	ICES SD 26, Vistula lagoon	1993-	VPA	
	Russia	Pikeperch	<i>Zander luciperca</i>	ICES SD 26, Vistula lagoon	1993-	VPA
		Bream	<i>Abramis brama</i>	ICES SD 26, Vistula lagoon	1993-	VPA
		Pikeperch	<i>Zander luciperca</i>	ICES SD 26, Curonian lagoon	1993-	VPA
Sweden	Bream	<i>Abramis brama</i>	ICES SD 26, Curonian lagoon	1993-	VPA	
	Vendace	<i>Coregonus albula</i>	ICES SD 31, Bothnian Bay	1993-	VPA	
	Turbot	<i>Psetta maxima</i>	ICES SD 28, Gotland	2004-	VPA	

LIST OF DOCUMENTS

COASTAL FISH MONITORING WORKSHOP 2/2005	Date dd.mm.yy	Title	Submitted by
1/1	31.01.05	Provisional Agenda	Secretariat
2/1	31.01.05	Red List of Baltic Sea fishes	Germany
2/1/Rev.1	02.02.05	List of threatened and declining Baltic Sea fish species	Germany
2/2	31.01.05	Assessment of coastal fish in the Baltic Sea	Finland, Sweden
2/2/Rev.1	02.02.05	Assessment of coastal fish in the Baltic Sea	Finland, Sweden
10/1	04.02.05	Outcome of the BSRP/HELCOM Coastal Fish Monitoring Workshop	Secretariat