Stakeholder workshop:
"Stakeholders as important actors in Marine Strategy Framework Directive implementation: From decision makers to general public"

15-16 November 2012
Tallinn, Estonia

Is the development of fisheries in the Baltic Sea in line with the MSFD?

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Principles for the Baltic Sea fish stocks and fisheries management

1. **United Nations Convention on the Law of the Sea (UN, 1982 (known as UNCLOS), a call for a maximum sustainable yield (MSY) approach to managing fisheries;**

2. **United Nations Conference on Environment and Development (UN, 1992a (known as UNCED), highlights a precautionary approach;**

3. **United Nations Straddling Fish Stocks Agreement of 1995 (UN, 1995 (known as the UN Fish Stocks Agreement or UNFSA)) and the FAO Code of Conduct for Responsible Fisheries (FAO, 1995), both of which call for a precautionary approach;**

4. **Convention on Biological Diversity (UN, 1992b (known as CBD)), which calls for conservation of biological diversity through an ecosystem approach**

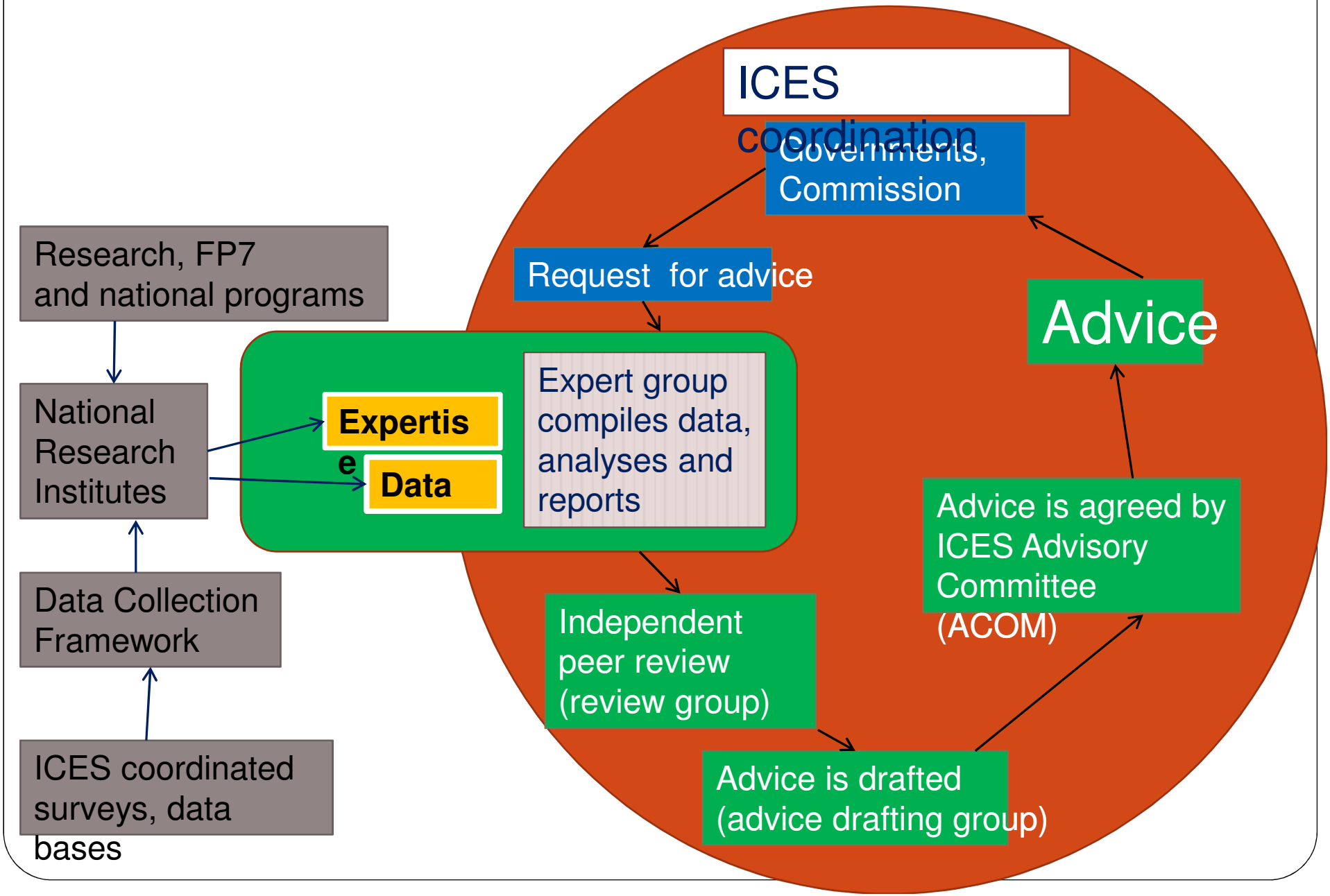
Principles for the Baltic Sea fish stocks and fisheries management

5. **Johannesburg Declaration (UN, 2002 (known as WSSD), which calls for an ecosystem approach and rebuilding fisheries to maximum sustainable yield**
6. **The Common Fisheries Policy of the European Union (EC, 2002)(under reform)**
7. **Communication from the European Commission on Implementing Sustainability in EU Fisheries through Maximum Sustainable Yield (EC, 2006)**
8. **The Marine Strategy Framework Directive (EC, 2008) and GES requirements**
9. **Russian Federal Law on Fisheries and conservation of biological resources in the waters. N 166-P3 20/12/2004 (Anon., 2004)**

CFP- national policies - Commissions, governments

1. **Council of Ministers to decide annually for international resources**
2. **Bilateral consultation between Russia and EU**

Scientific advice in the backgroud



Management principles

An ecosystem approach to management of the marine environment

- An ecosystem approach is intended to contribute to sustainable development. Sustainable development is defined in the Brundtland Report (WCED, 1987) as development that
- **“meets the needs of the present without compromising the ability of future generations to meet their own needs.”**

- An ecosystem approach has been defined in various ways. The 1992 UN Convention on Biological Diversity (UN, 1992b) defines an ecosystem approach as
- **“ecosystem and natural habitats management” to “meet human requirements to use natural resources, whilst maintaining the biological richness and ecological processes necessary to sustain the composition, structure and function of the habitats or ecosystems concerned.”**

Management principles

An ecosystem approach to management of the marine environment

- The Reykjavik Declaration (FAO, 2001) forms the basis for using an ecosystem approach in the management of the marine environment:
- **"… in an effort to reinforce responsible and sustainable fisheries in the marine ecosystem, we will individually and collectively work on incorporating ecosystem considerations into that management to that aim."**

- **..an ecosystem approach is expected to contribute to achieving long-term sustainability for the use of marine resources, including the fisheries sector. An ecosystem approach serves multiple objectives, involves strong stakeholder participation, and focuses on human behaviour as the central management dimension**

Management principles

A precautionary approach in fisheries management

1. **A precautionary approach (PA) is described in the UN Fish Stocks Agreement (UN, 1995) as follows: "States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures."**

2. **Guidelines for applying a precautionary approach within an MSY framework say that "The fishing mortality rate which generates maximum sustainable yield should be regarded as a minimum standard for limit reference points".**

3. **Precautionary reference points should be used to guide management. Target reference points are intended to achieve management objectives. Precautionary reference points should take account of reproductive capacity, the resilience of each stock, and the characteristics of fisheries exploiting the stock, as well as other sources of mortality and major sources of uncertainty;**

Management principles

A precautionary approach in fisheries management

4. Fishery management strategies shall
   a) ensure that the risk of exceeding limit reference points is very low,
   b) initiate actions to facilitate stock recovery for stocks below precautionary reference points, and
   c) ensure that target reference points are not exceeded on average; and
5. It is most useful to recognize that MSY and a precautionary approach are complementary (this is the spirit in which ICES applies these concepts).
6. Populations need to be maintained within safe biological limits according to a precautionary approach to make MSY possible.
7. Within safe biological limits, an MSY approach is necessary to achieve MSY. Lack of scientific information should not be an excuse for postponing management to maintain populations within safe biological limits and/or to delay implementing a strategy to attain MSY.
8. A precautionary approach (PA) is a necessary, but not a sufficient condition for MSY

Management principles

The maximum sustainable yield concept

1. **The United Nations Convention on the Law of the Sea (UN, 1982) notes that "…State(s) must set an allowable catch, based on scientific information, which is designed to maintain or restore species to levels supporting a maximum sustainable yield (MSY)."**
2. **This policy was reaffirmed by WSSD (UN, 2002) which called on States to "Maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015".**
3. **Maximum sustainable yield is a broad conceptual objective aimed at achieving the highest possible yield over the long term (an infinitely long period of time).**
4. **The MSY concept can be applied to an entire ecosystem, an entire fish community, or a single fish stock. The choice of the biological unit to which the MSY concept is applied influences both the sustainable yield that can be achieved and the associated management options.**

Management principles

The maximum sustainable yield concept

In practice, MSY depends on:

a) **The production of the unit, which describes the relation between productivity and the size of the unit (e.g., population biomass), which in turn depends on the growth rates, natural mortality rates, and reproductive rates of the members of the production unit;**
b) **Interactions of members within the production unit and interactions with other production units (intra- and inter-specific interactions);**
c) **Environmental conditions (e.g., climate, environmental quality), which affect production, and intra- and inter-specific interactions; and**
d) **Fishing practices and fishery selectivity that determine the size and age composition of the catch (both the landings and the discards).**

5. **The models (mathematical and conceptual) used to estimate MSY and associated parameters typically assume that all of the factors not explicitly included in the models remain constant. Thus, MSY estimates are generally conditional on current conditions and assumptions.**

Present advice background:

1998 – ICES PA approach ->

Avoid recruitment impairment

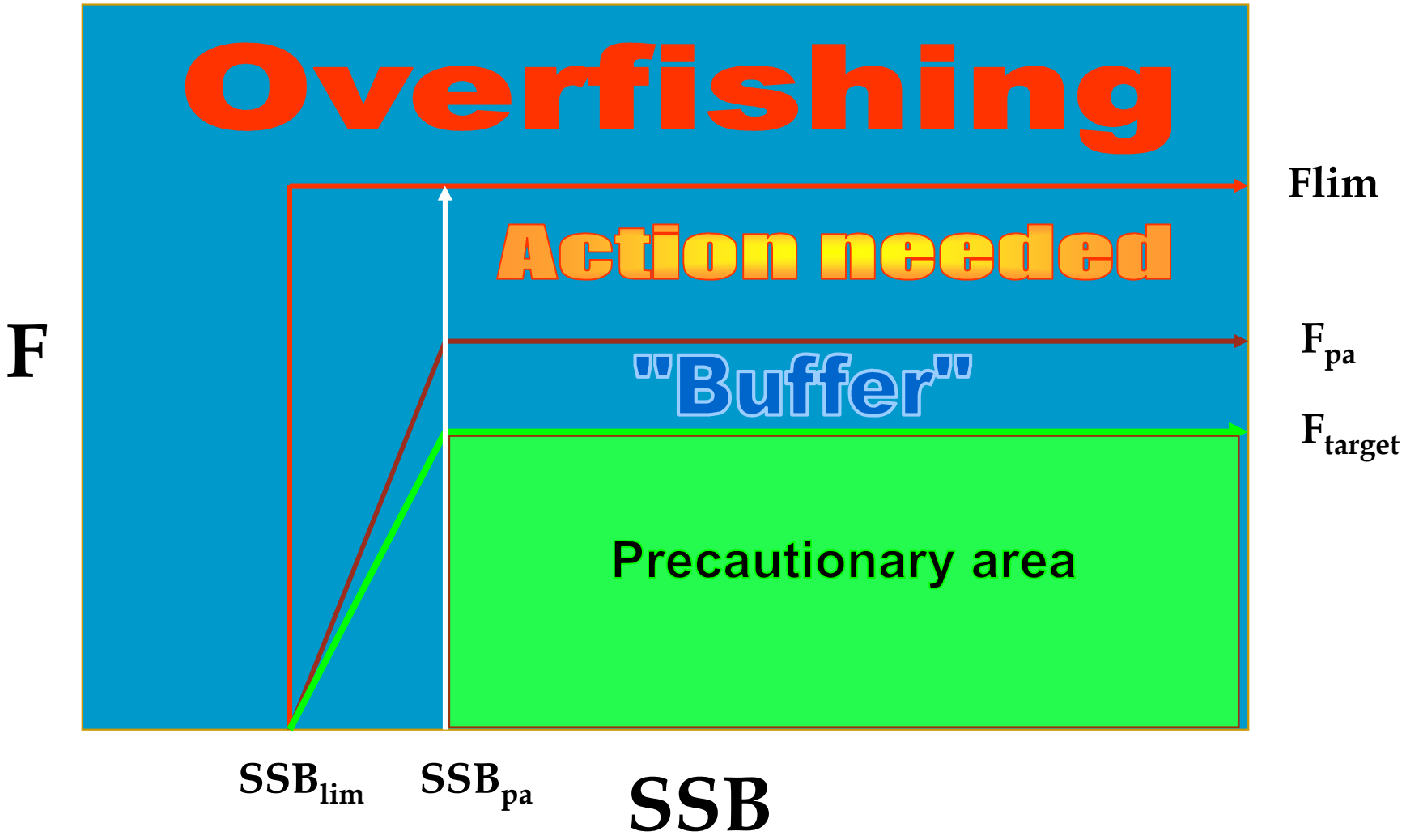
2009 – ICES MSY framework ->

Getting most out of the stocks

MSY sufficient for PA

PA necessary but not suffient for MSY

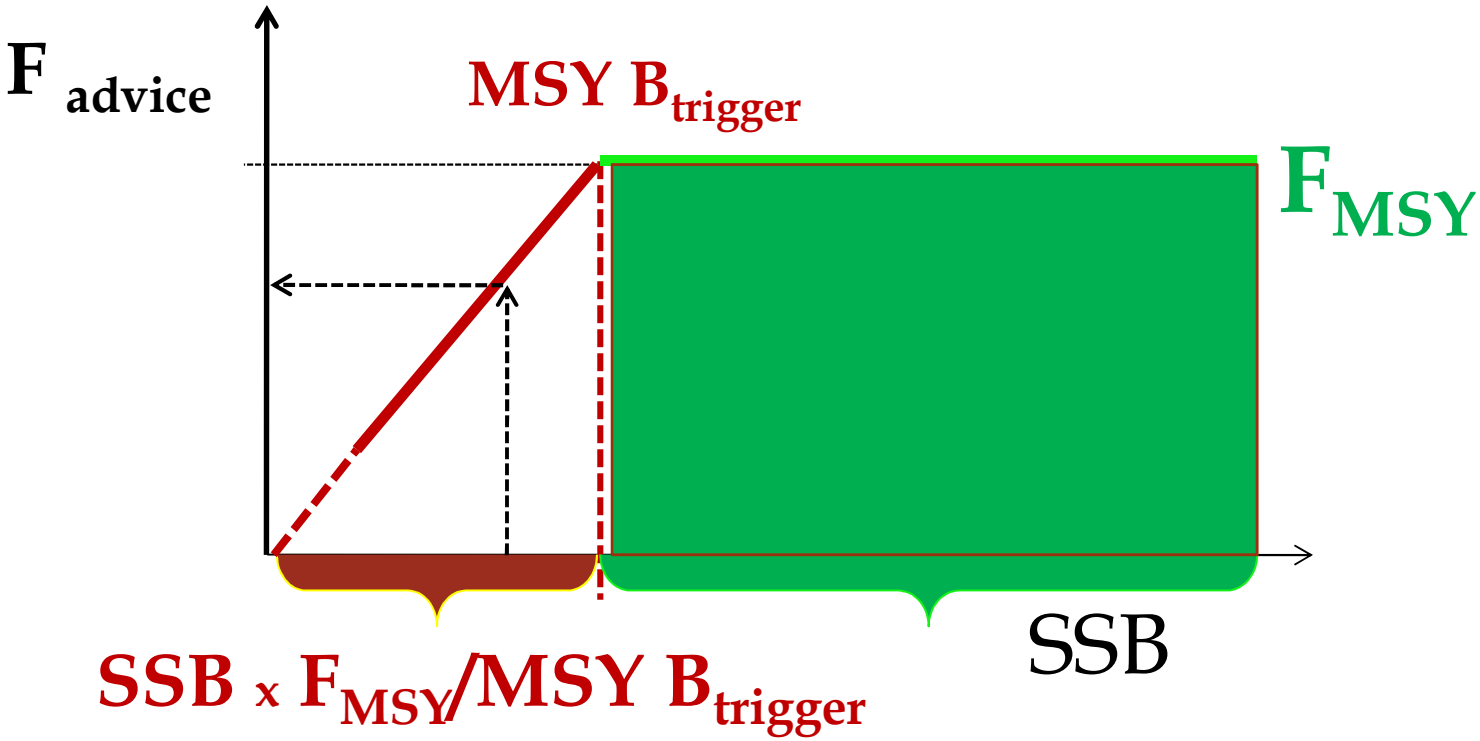
Harvesting rules of the sea:
Towards precautionary approach 1998 ->

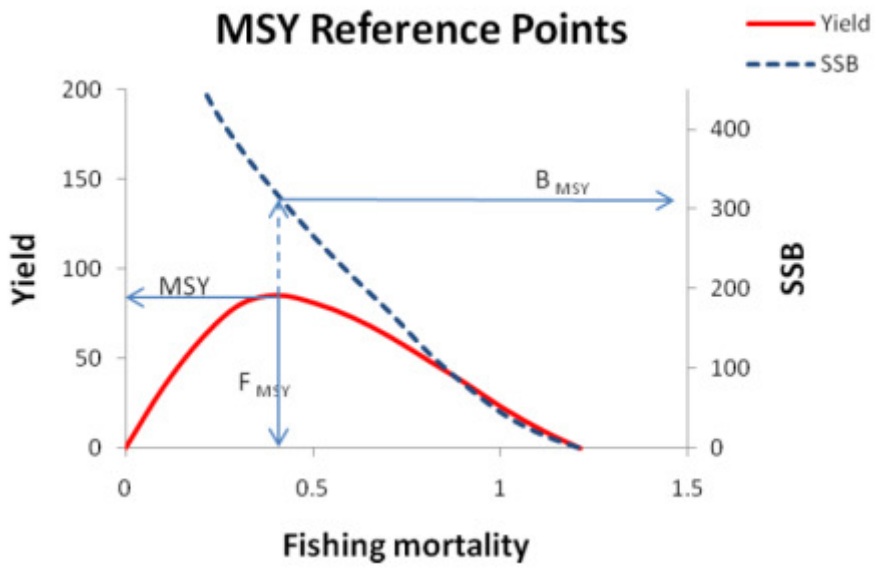


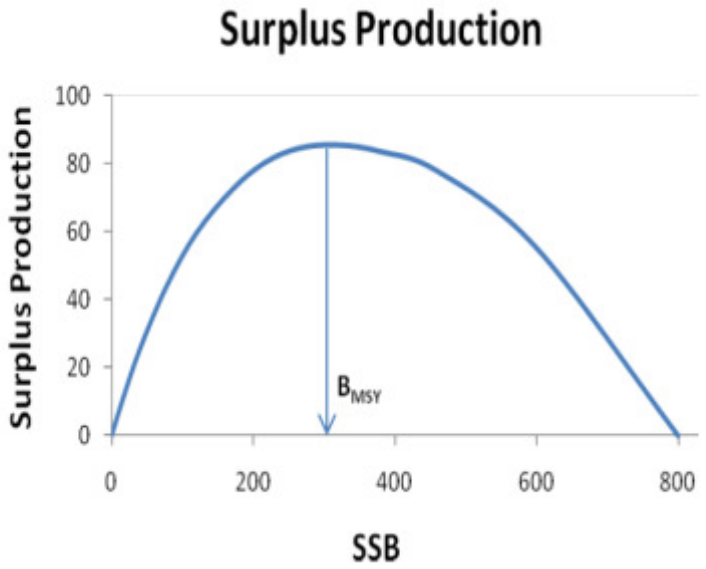
MSY Harvest Control Rule (HCR) (2009) ->

Set F_{MSY} and MSY $B_{trigger}$ Ref. Points

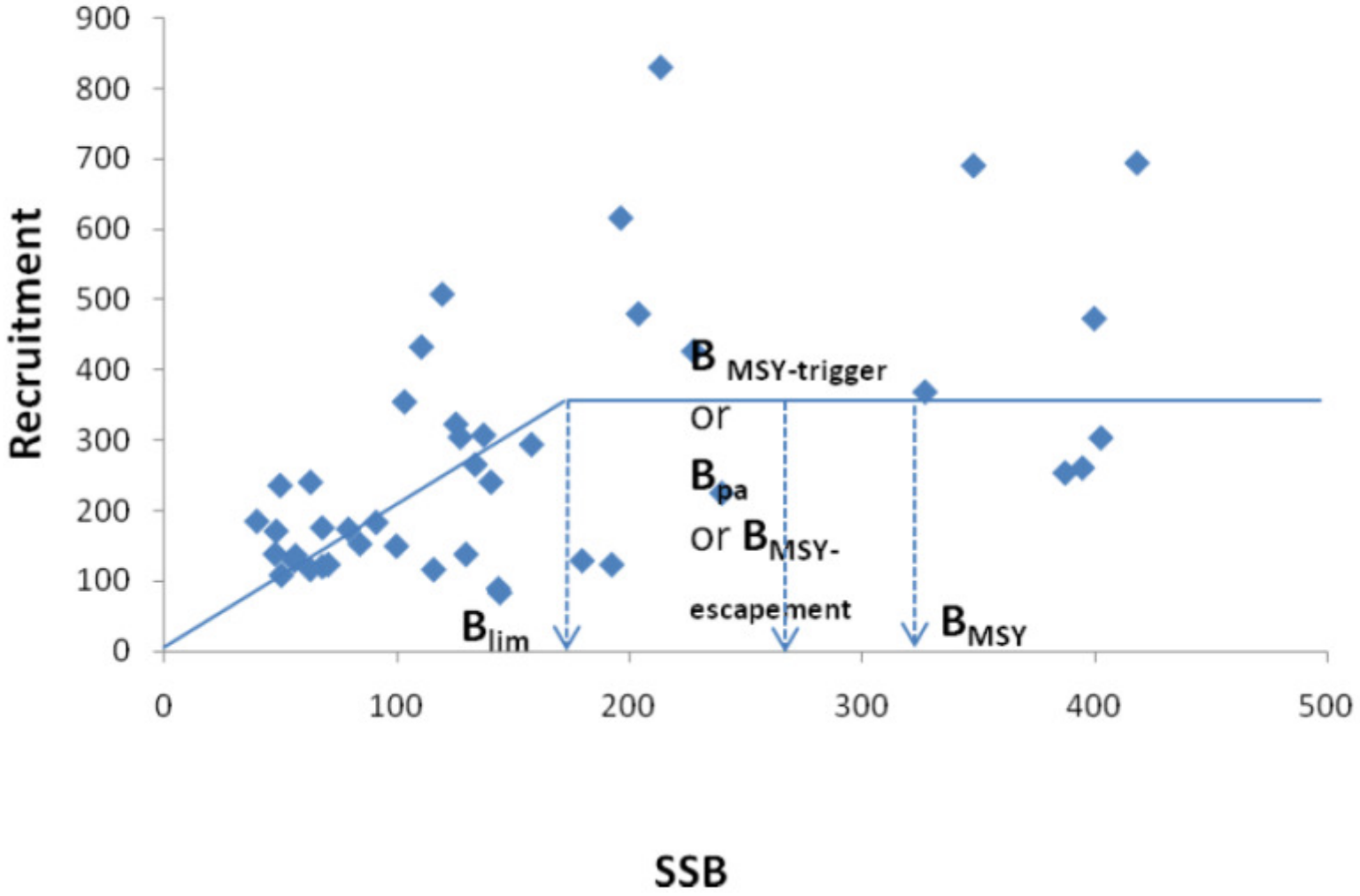
Assess current SSB in relation to MSY $B_{trigger}$

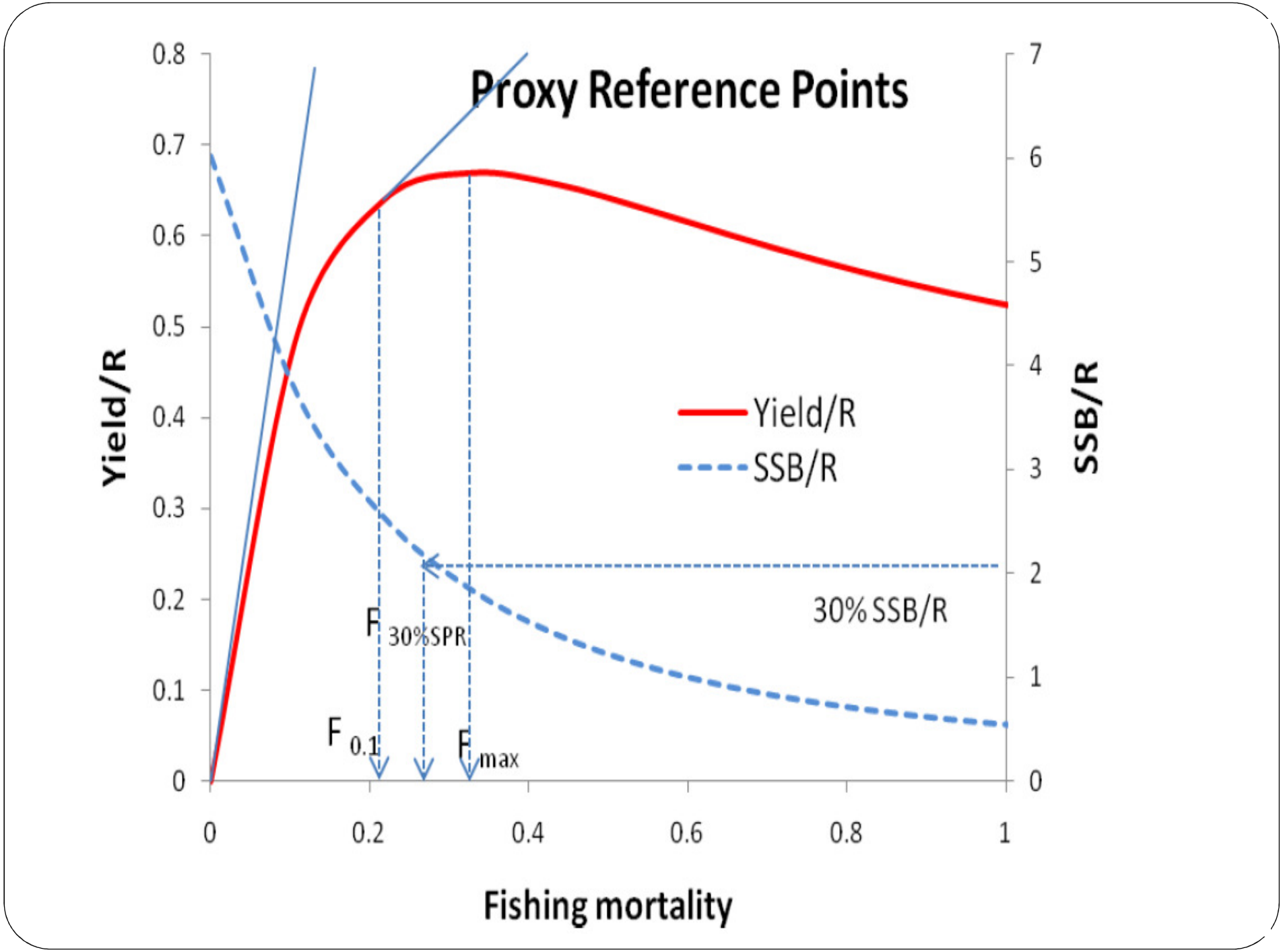



MSY Reference Points
Yield
SSB
200
150
100
50
0
400
300
200
100
0
B MSY
MSY
F MSY
0
0.5
1
1.5
Yield
SSB
Fishing mortality


Surplus Production
100
80
60
40
20
0
BMSY
0
200
400
600
800
Surplus Production
SSB

Biomass Reference Points



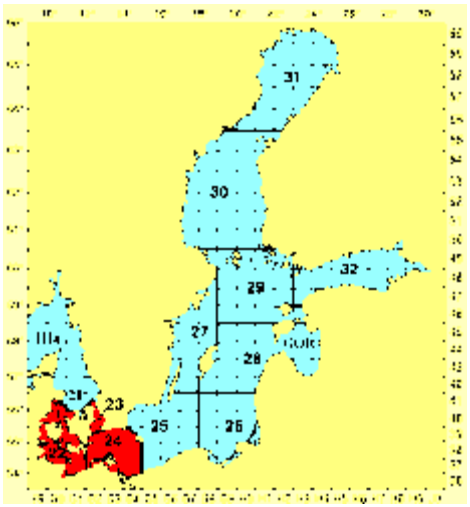

Proxy Reference Points
Yield/R
SSB/R
Yield/R
SSB/R
30% SSB/R
F 30%SPR
F 0.1
F max
Fishing mortality
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
1
2
3
4
5
6
7
0
0.2
0.4
0.6
0.8
1

Symbols used to inform on stock status and predictions

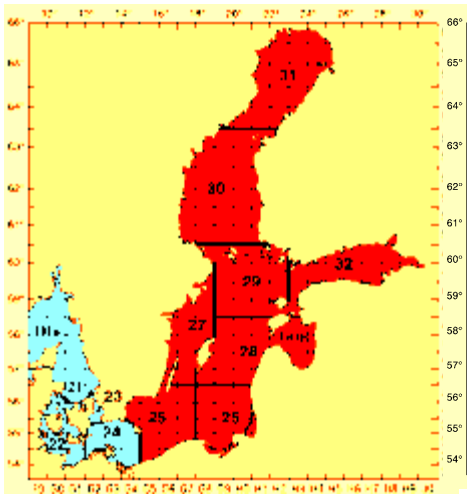
Status relative to refpoints	Qualitative evaluation	
		Desirable situation e.g. F is below the relevant reference point or SSB is above the relevant reference point
		Status lies between the precautionary (pa) and limit (lim) reference points
		Undesirable situation e.g. F is above the relevant reference point or SSB is below the relevant reference point
		Status of the stock is either unknown because there is no quantitative assessment, or undefined when there is an analytical assessment but reference points are not defined
		Absolute level unknown, but increasing
		Absolute level unknown, but unchanged
		Absolute level unknown, but decreasing

Prediction :

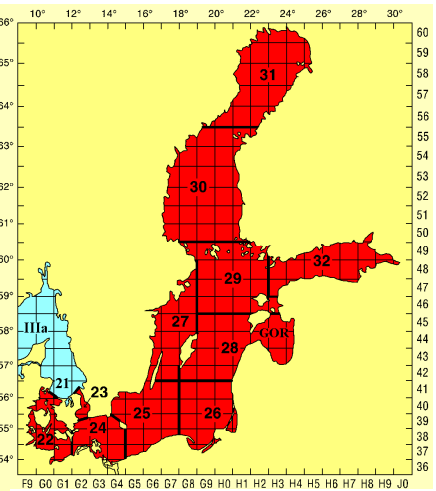
Stock assessment units: Cod, sprat and Baltic herring



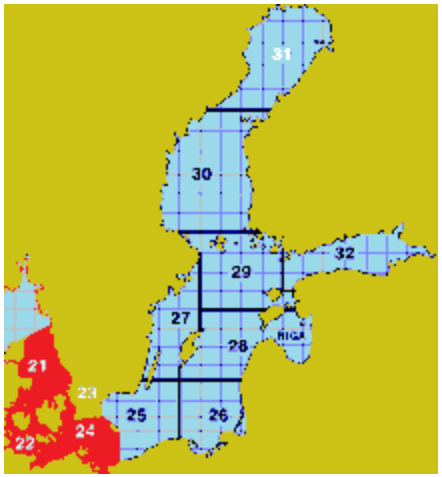
WESTERN BALTIC COD (SD 22-24)



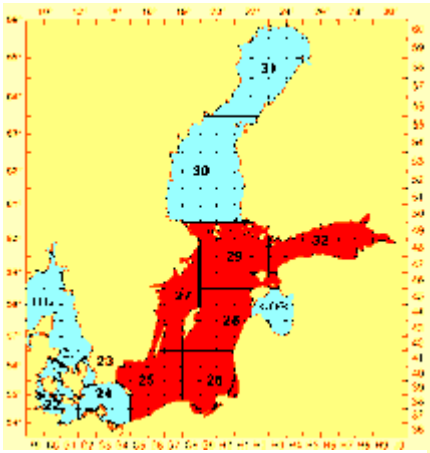
EASTERN BALTIC COD (SD 25-32)



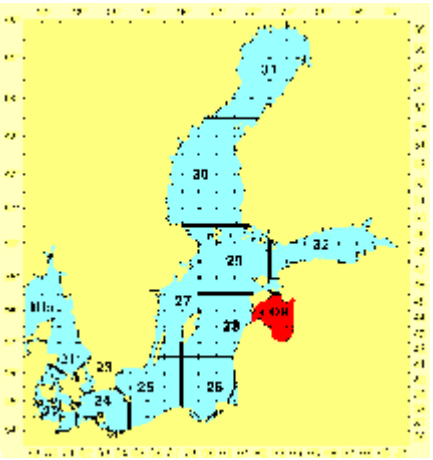
BALTIC SPRAT (SD 22-32)



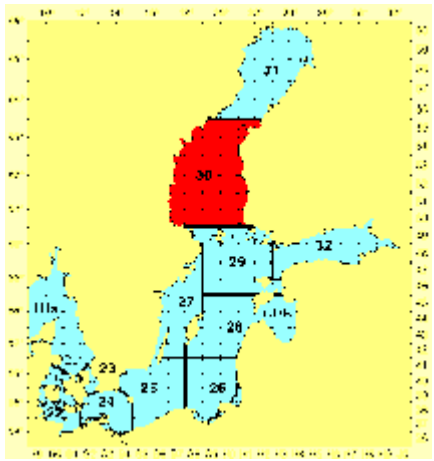
WESTERN BALTIC HERRING (SD 22-24 and IIIa)



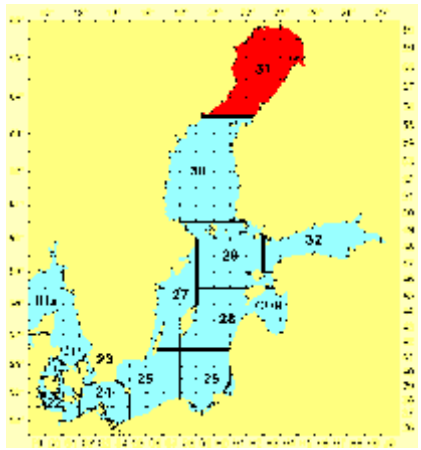
CENTRAL BALTIC HERRING (SD 25-29+32 excl. Gulf of Riga)



GULF OF RIGA HERRING (SD 28 E)



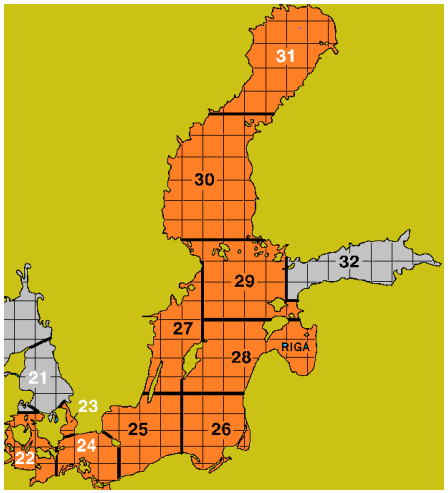
BOTHNIAN SEA HERRING (SD 30)



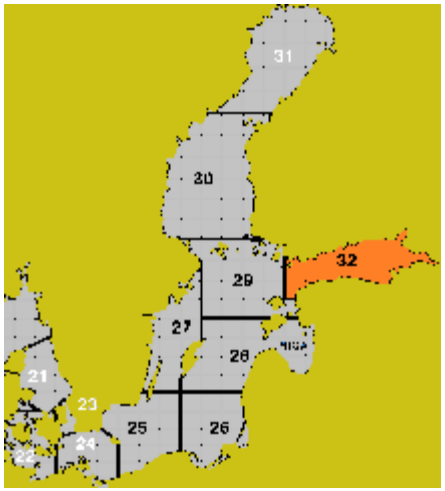
BOTHNIAN BAY HERRING (SD 31)

Stock assessment units: Baltic salmon and flatfishes

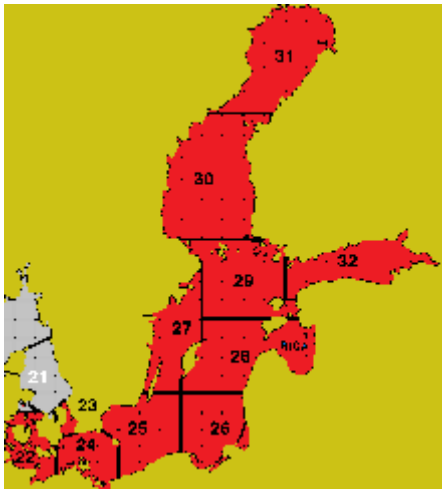
Baltic salmon Main Basin and Gulf of Bothnia SD 22-31



Baltic salmon Gulf of Finland SD 32



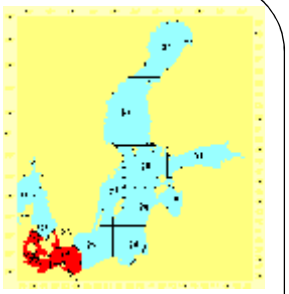
Flatfishes in the Baltic (plaice, flounder, dab, brill and turbot) SD 22-32



Cooperation and interest to assess stocks

Species	Stock	ICES SD	(A=assessed) (NA=not assessed)	DK	EST	FIN	GER	LIT	LAT	POL	SWE
Cod	Western Baltic	22 - 24	A(all) D3								
Cod	Eastern Baltic	25 - 32	A(all) D3								
Baltic herring	Western Baltic, spring	22 - 24	A (all) D3								
Baltic herring	Baltic Main Basin	25 - 29 & 32 excluding GoR	A (all) D3								
Baltic herring	Gulf of Riga	28.1	A (all) D3								
Baltic herring	Bothnian Sea	30	A (all) D3								
Baltic herring	Bothnian Bay	31	A (all) D3								
Sprat	Whole Baltic	22 - 32	A (all) D3								
European flounder	Whole Baltic	22-32	A (all) (D3)								
Salmon	Baltic Main Basin and	22 - 31	A, all (D3)								
Salmon	Gulf of Finland	32	A, all (D3)								
Sea trout	Whole Baltic	22-32	NA, all (D3)								
European plaice	Western Baltic	22-24	NA , D3, DEN, GER,SWE,POL								
Common dab	Western Baltic	22-24	NA (DEN, GER, SWE) D3								
Whiting	Western Baltic	22-24	A (GER), D3								
Vendace	Bothnian Bay	31	A (FIN, SWE), D3								
Pike-perch	Northern Baltic	28, 29,32	A (FIN, SWE, EST, LAT) D3								
Turbot	Whole Baltic	22-32	NA (DEN, SWE, GER, POL) D3								
European whitefish	Northern Baltic		A (FIN, SWE), D3								

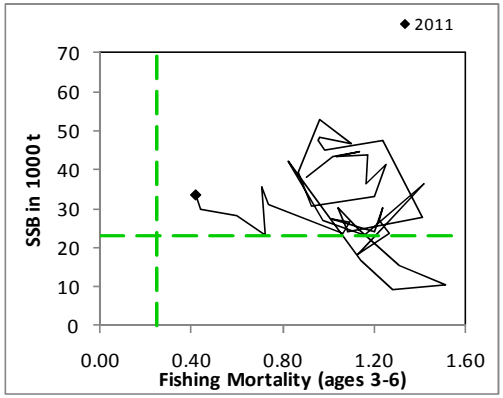
Western Baltic cod (new assessment model SAM used)

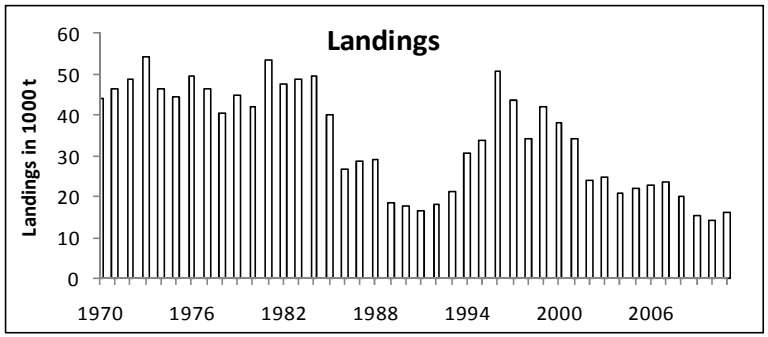


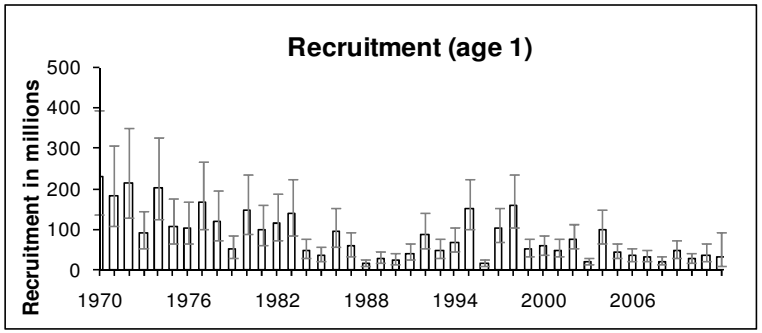
Stock status

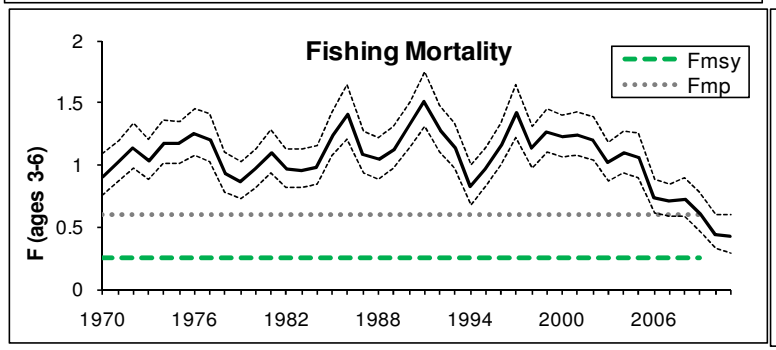
F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
Management plan (F_{MGT})	✗	✓	✓	Below target

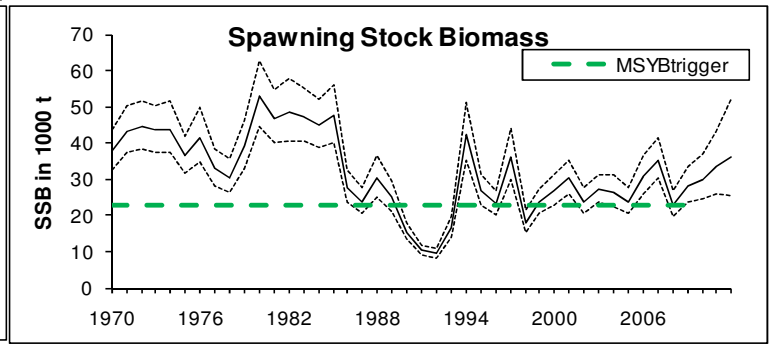
SSB (Spawning Stock Biomass)	2010	2011	2012	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity
Management plan (SSB_{MGT})	?	?	?	Undefined



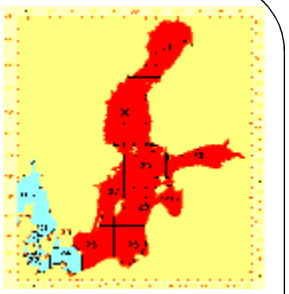






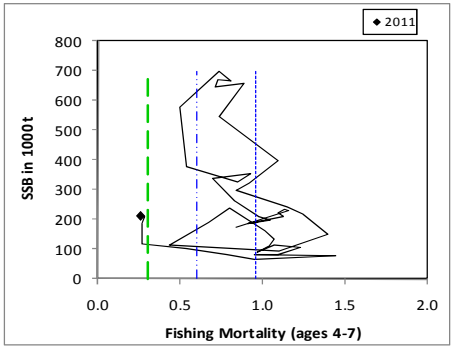


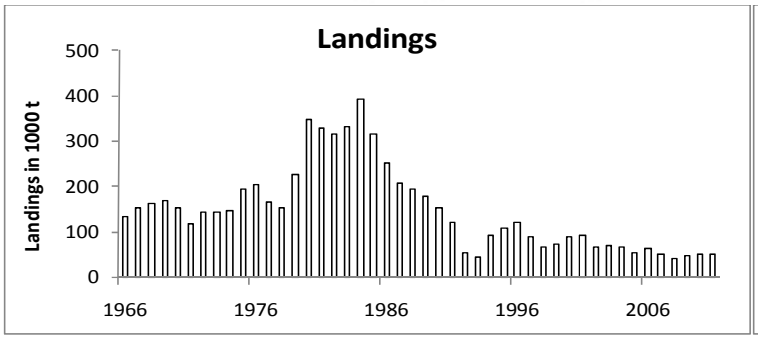
Eastern Baltic cod

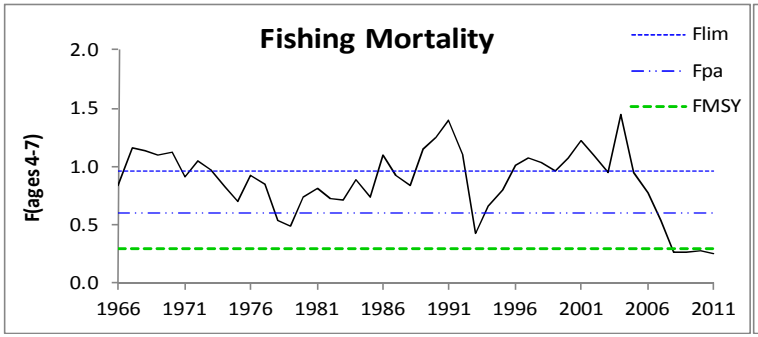


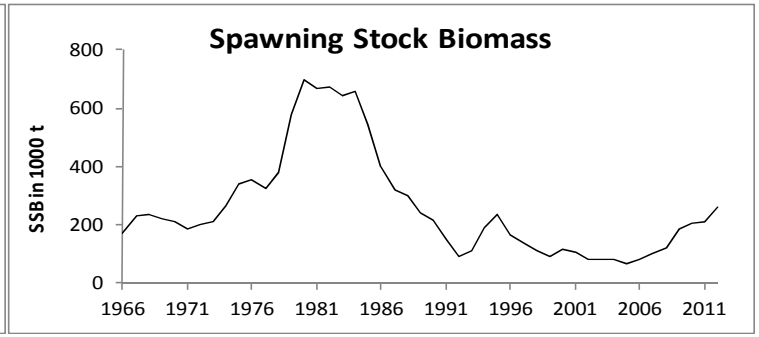
Stock status

F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvested sustainably
Management plan (F_{MGT})	✓	✓	✓	Below target
SSB (Spawning-Stock Biomass)	**2010**	**2011**	**2012**	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined
Qualitative evaluation	↗	↗	✓	Above poss. reference points







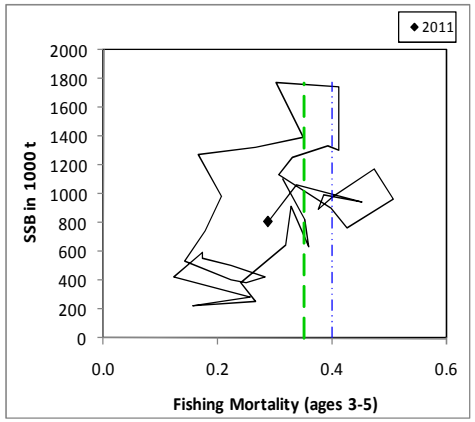


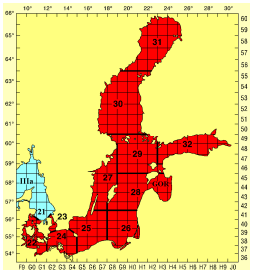
Baltic sprat

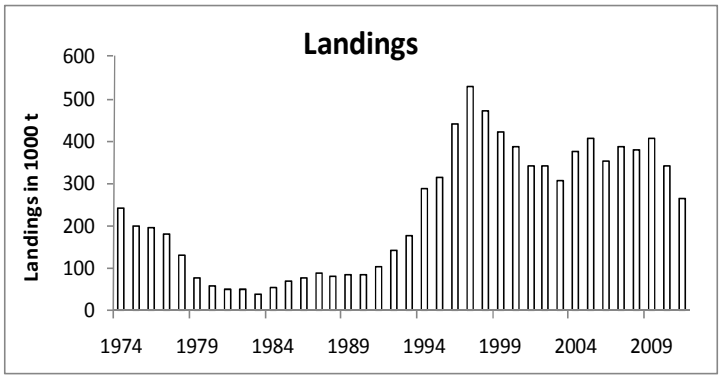
Stock status

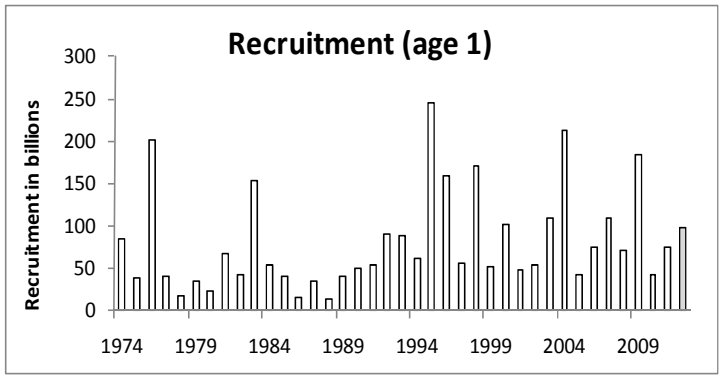
F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✗	✓	✓	Below target
Precautionary approach (F_{pa})	✗	✓	✓	Harvested sustainably

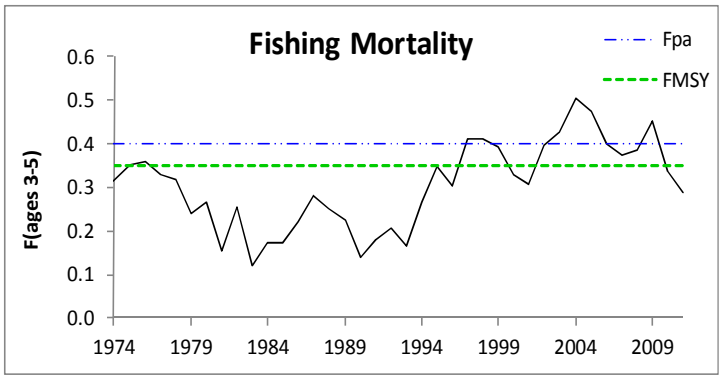
SSB (Spawning-Stock Biomass)	2010	2011	2012	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined
Qualitative evaluation	↘	→	→	Stable at average level

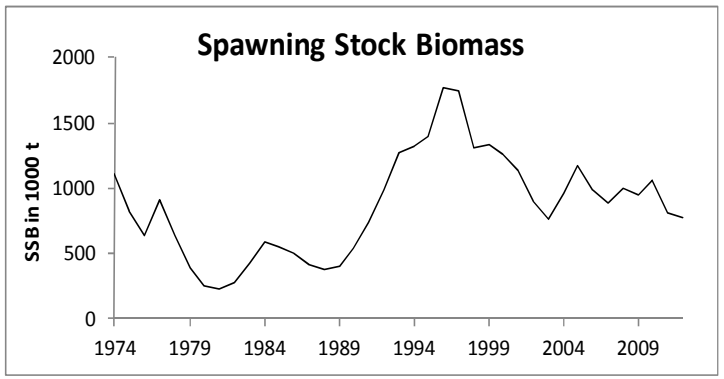




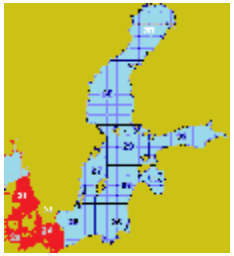








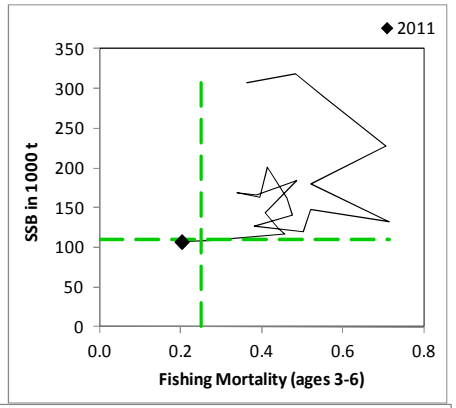
Western Baltic herring

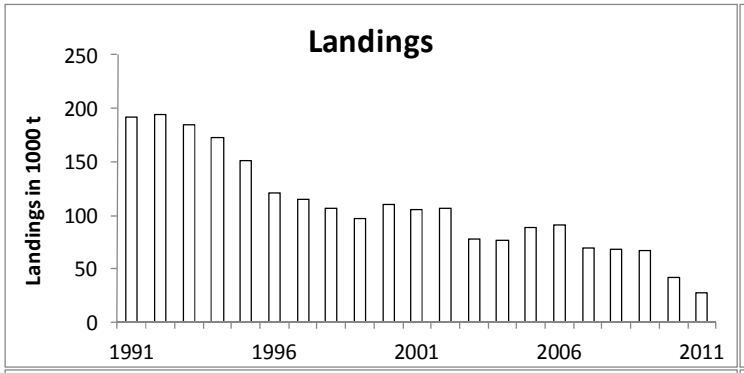


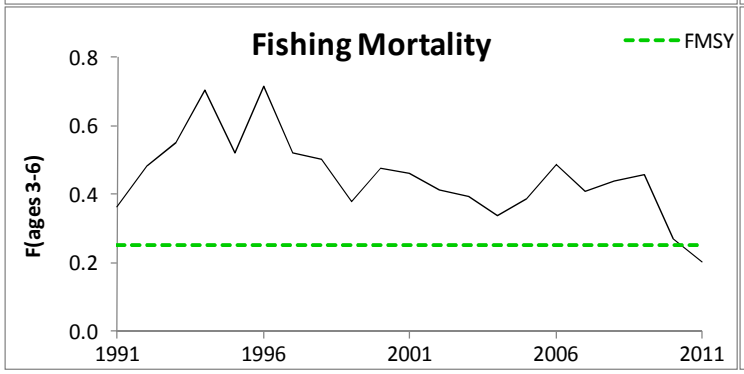
Stock status

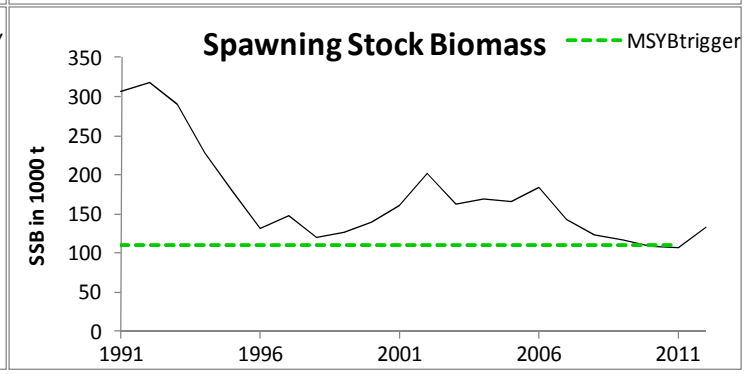
F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✗	✗	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

SSB (Spawning-Stock Biomass)	2010	2011	2012	
MSY ($B_{trigger}$)	✗	✗	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

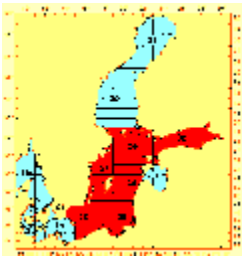






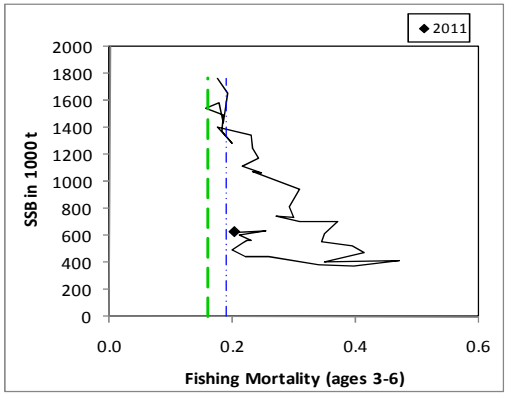


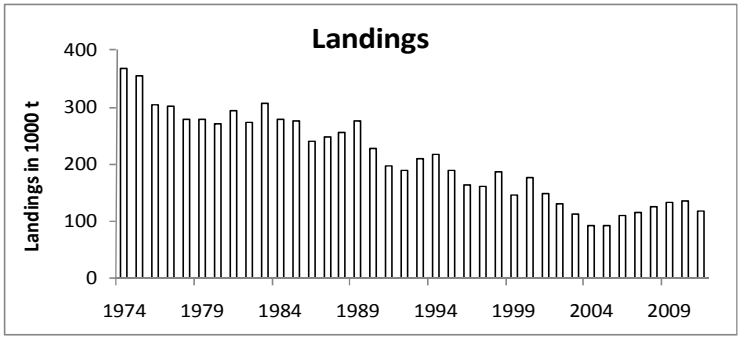
Central Baltic herring

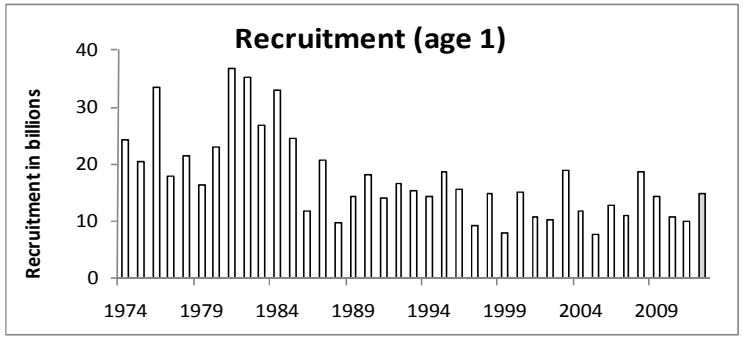


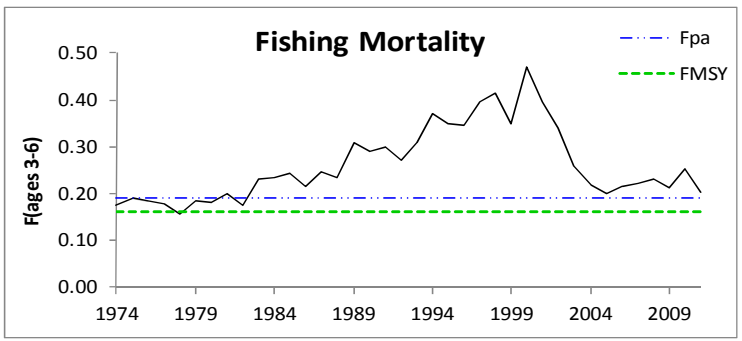
Stock status

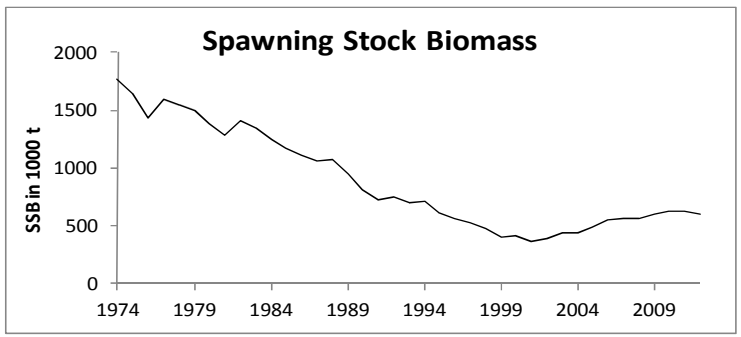
F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✗	✗	✗	Harvested unsustainably
SSB (Spawning-Stock Biomass)	**2010**	**2011**	**2012**	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined
Qualitative evaluation	→	→	→	Stable but low biomass









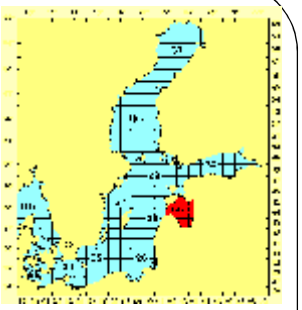


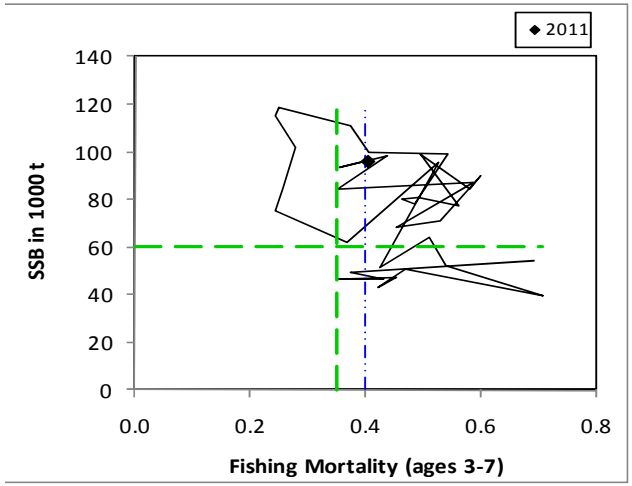
Gulf of Riga herring

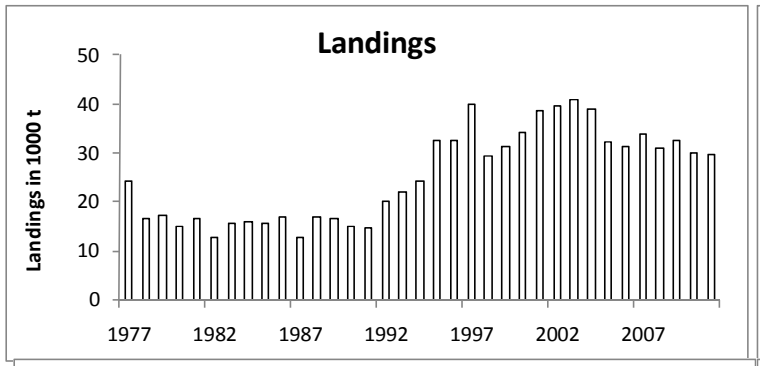
Stock status

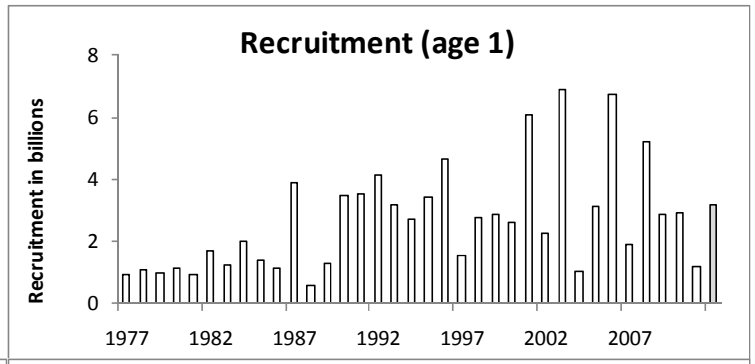
F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✗	✓	✓	Harvested sustainably

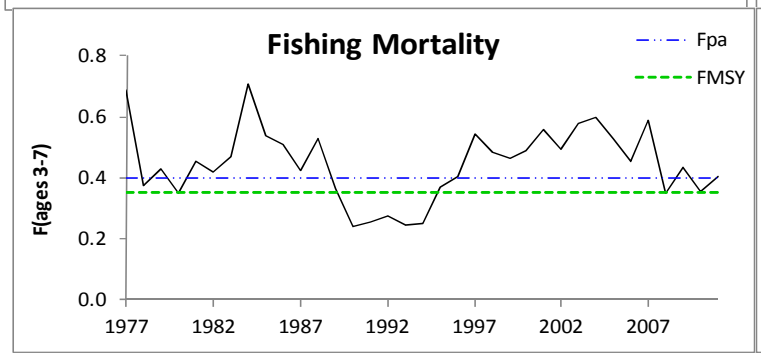
SSB (Spawning-Stock Biomass)	2010	2011	2012	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

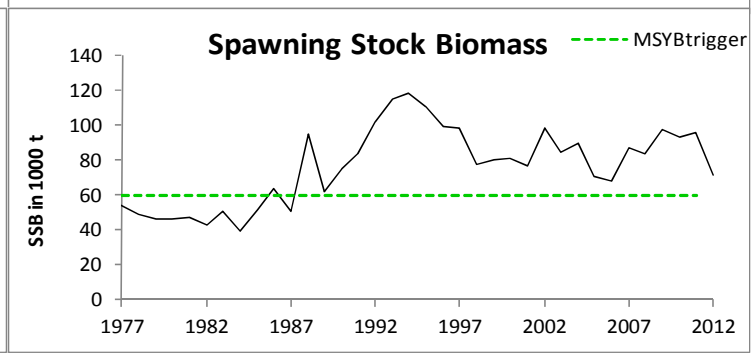




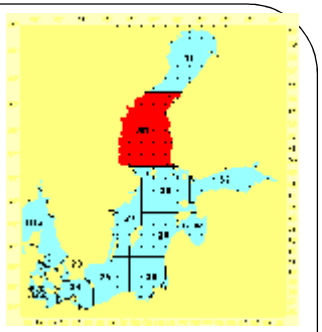








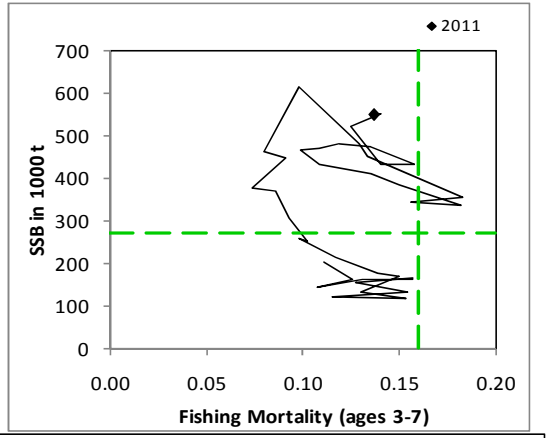
Bothnian Sea herring

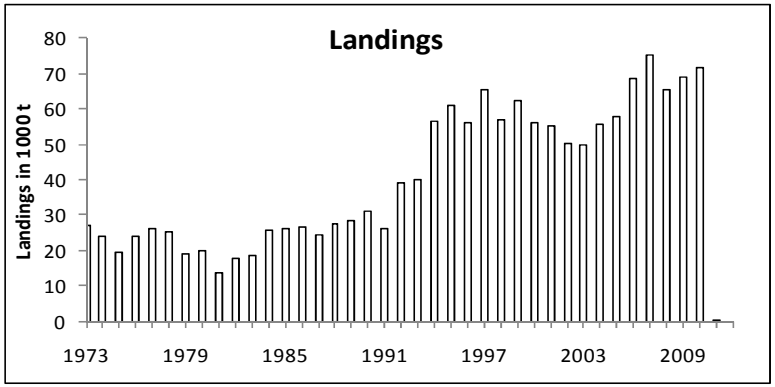


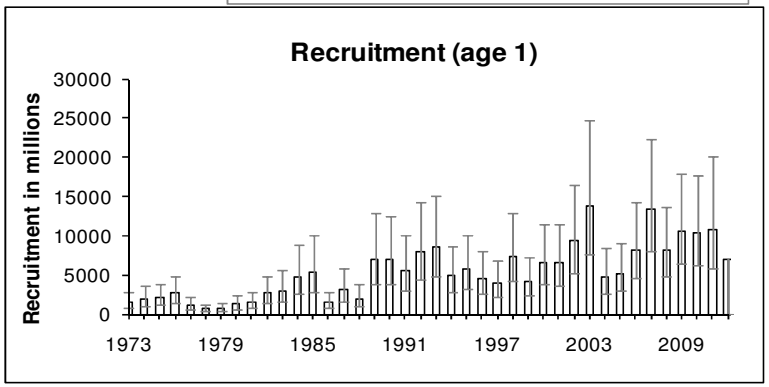
Stock status

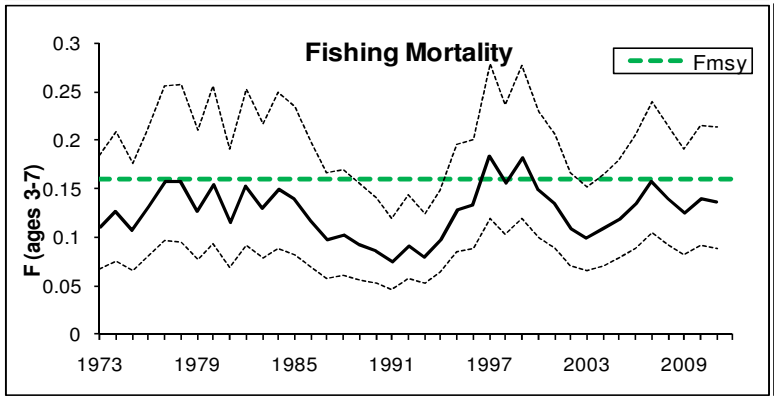
F (Fishing Mortality)	2009	2010	2011
MSY (F_{MSY})	✓	✓	✓ Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	? Undefined

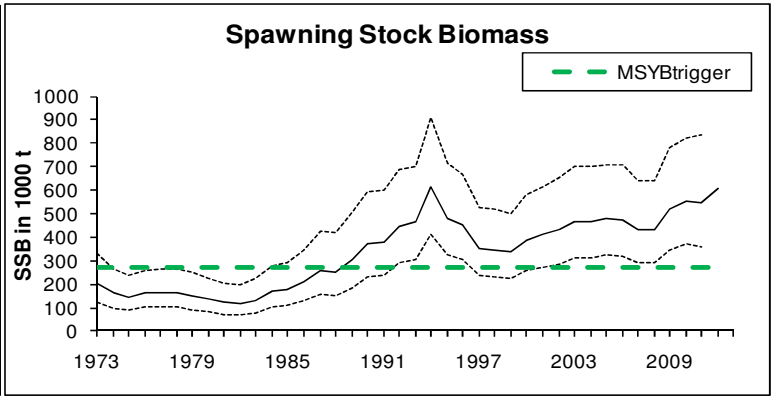
SSB (Spawning Stock Biomass)	2010	2011	2012
MSY ($B_{trigger}$)	✓	✓	✓ Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	? Undefined









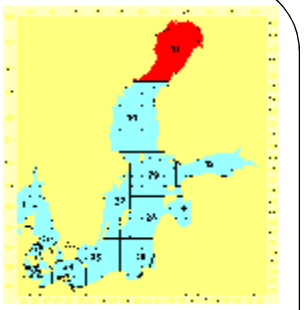


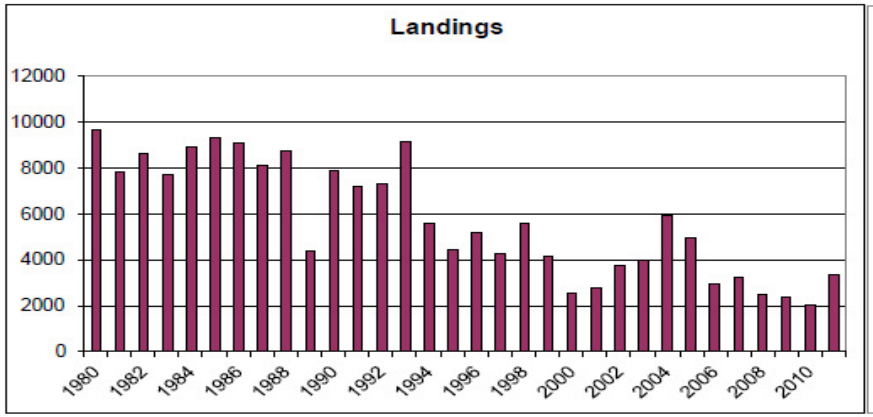
Bothnian Bay herring

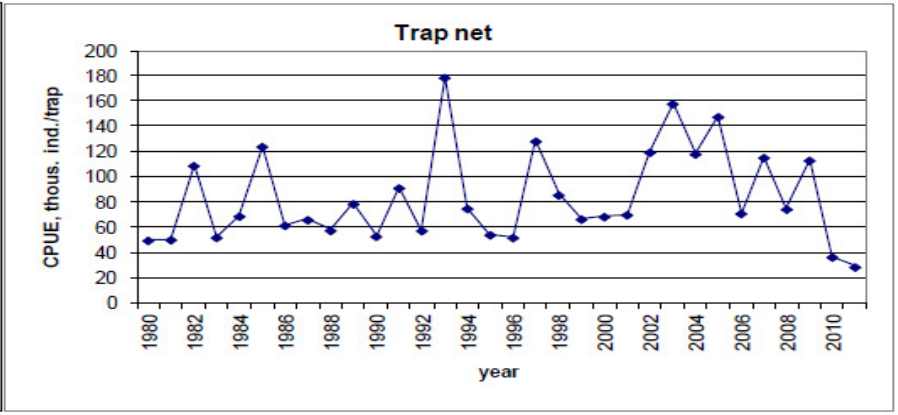
Stock status

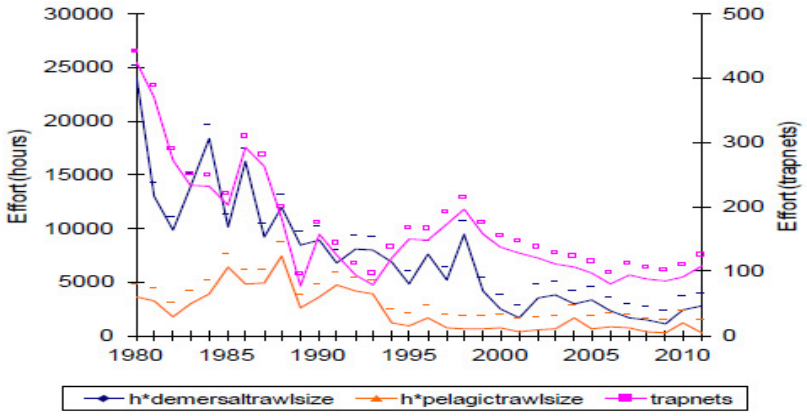
F (Fishing Mortality)		2000–2011
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	✓	Low to moderate

SSB (Spawning-Stock Biomass)		2007–2011
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	↘	Decreasing stock abundance

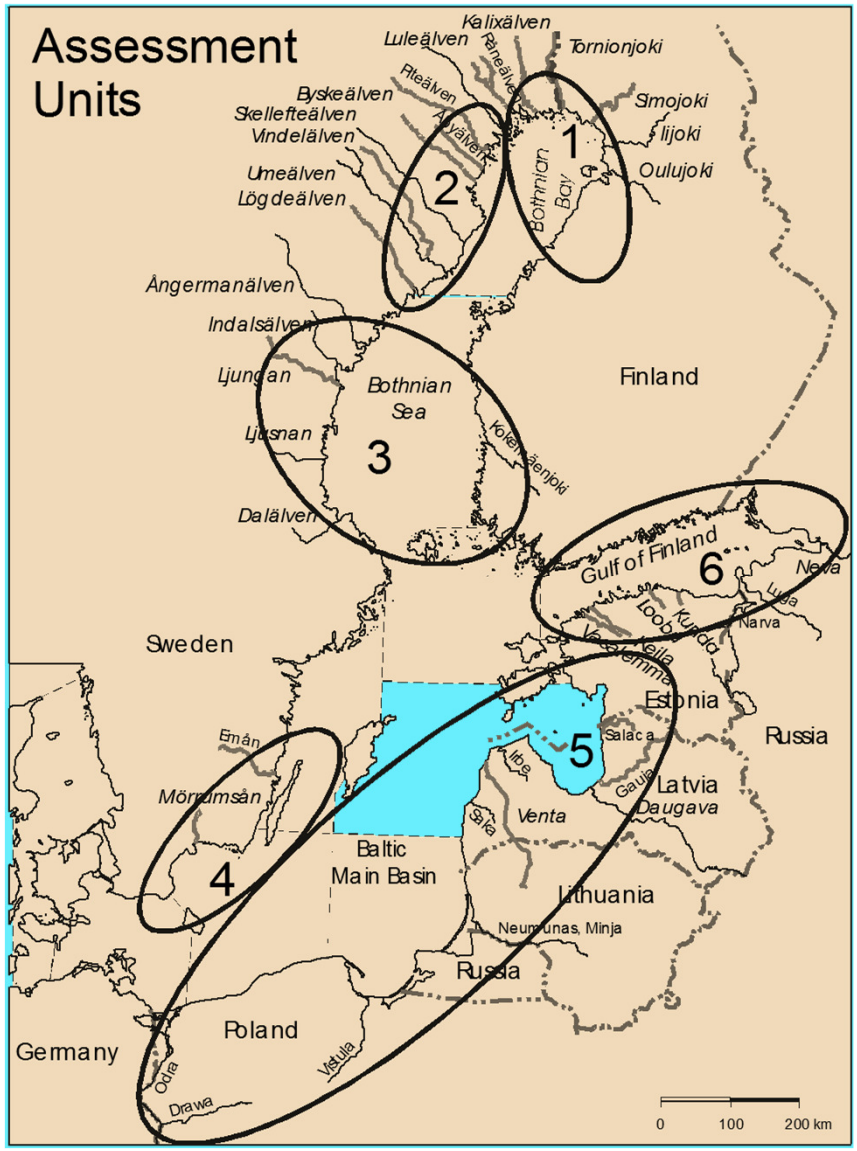




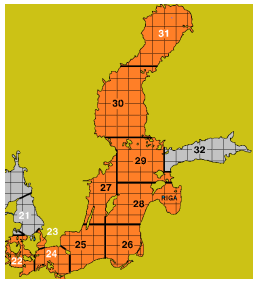




Baltic salmon assessment units



Salmon in the Main Basin and Gulf of Bothnia



Advice for 2013

1. **ICES advises on the basis of the MSY approach a TAC of not more than 54 000 individuals of salmon. As the perception of the stock status has not changed markedly since last year's assessment, the advice for the fishery in 2013 is the same as the advice given in 2011 for the 2012 fishery and, therefore, a decrease in exploitation with respect to the TAC implemented in 2012 is required.**

2. **The share of the total catch that is mis- and un-reported was estimated to be about 30% in 2011. Reducing these unaccounted removals would allow a higher TAC recommendation.**

3. **Salmon management should be based on the assessments of the status of individual stocks in the rivers. Fisheries on mixed stocks that cannot direct fishing only to those stocks that are close to or above their targets, present particular threats, and effort in such fisheries should be reduced. Fisheries in open-sea areas or coastal waters are more likely to pose these problems than fisheries in estuaries and rivers.**

Salmon in the Main Basin and Gulf of Bothnia

River-specific probabilities of meeting 75% of PSPC in 2011 and in 2017/2018 (depending on the assessment unit) under the five effort scenarios. Cells which indicate a higher probability of meeting the objective in 2017/2018 than in 2011 are presented in green, whereas those indicating lower probability are presented in purple. Cells with values higher than 0.7 are surrounded by frames.

Scenario	Fishing effort for year 2013 and onwards
1	2011 level excluding Swedish longlining
2	-20% from level in scenario 1
3	-40% from level in scenario 1
4	-60% from level in scenario 1
5	-80% from level in scenario 1

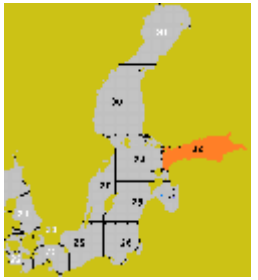
Post-smolt survival of wild salmon
Projection starts from the 2010 survival estimate and is expected to approach the 2009 survival (7.5%) in the long run

Post-smolt survival of reared salmon
Same relative difference to wild salmon as on average in history

M74 survival
Projection starts from the 2011 survival estimate and is expected to approach the historical median (92%) in the long run

River	2011	Year of comparison	Scen 1	Scen 2	Scen 3	Scen 4	Scen 5
Tornionjoki	0.55	2018	0.50	0.57	0.64	0.73	0.79
Simojoki	0.31	2018	0.03	0.03	0.06	0.07	0.12
Kalixälven	0.75	2018	0.80	0.80	0.85	0.85	0.86
Råneälven	0.28	2018	0.33	0.40	0.45	0.51	0.58
Piteälven	0.48	2018	0.72	0.76	0.82	0.82	0.84
Åbyälven	0.43	2018	0.42	0.48	0.51	0.57	0.61
Byskeälven	0.60	2018	0.61	0.67	0.69	0.72	0.78
Rickleån	0.04	2018	0.04	0.05	0.05	0.06	0.07
Sävarån	0.23	2018	0.37	0.39	0.45	0.46	0.5
Ume/Vindelälven	0.64	2018	0.83	0.85	0.84	0.86	0.89
Öreälven	0.02	2018	0.06	0.07	0.09	0.09	0.14
Lögdeälven	0.11	2018	0.16	0.19	0.22	0.28	0.31
Ljungan	0.34	2018	0.33	0.35	0.38	0.40	0.44
Mörrumsån	0.57	2017	0.20	0.23	0.28	0.29	0.34
Emån	0.00	2017	0	0	0	0	0

Salmon in the Gulf of Finland



Advice for 2013

- ICES advises **on the basis of precautionary considerations that catches of wild salmon should be kept to a minimum.** To maintain a low bycatch of wild salmon in the coastal salmon fisheries, effort should be reduced in these fisheries. Additional measures to minimize catch of wild salmon in coastal fisheries close to the wild salmon rivers should be considered. Such measures could include relocation of coastal fisheries away from sites likely to be on the migration paths of Gulf of Finland wild salmon, relocating fisheries away from rivers and river mouths supporting wild stocks, and **protection of wild salmon (from poaching)** when they return to rivers. Also, reduction in exploitation in the fishery in the Main Basin needs to be considered as salmon from the Gulf of Finland to a large extent have the Main Basin as their feeding area.

Salmon in the Gulf of Finland

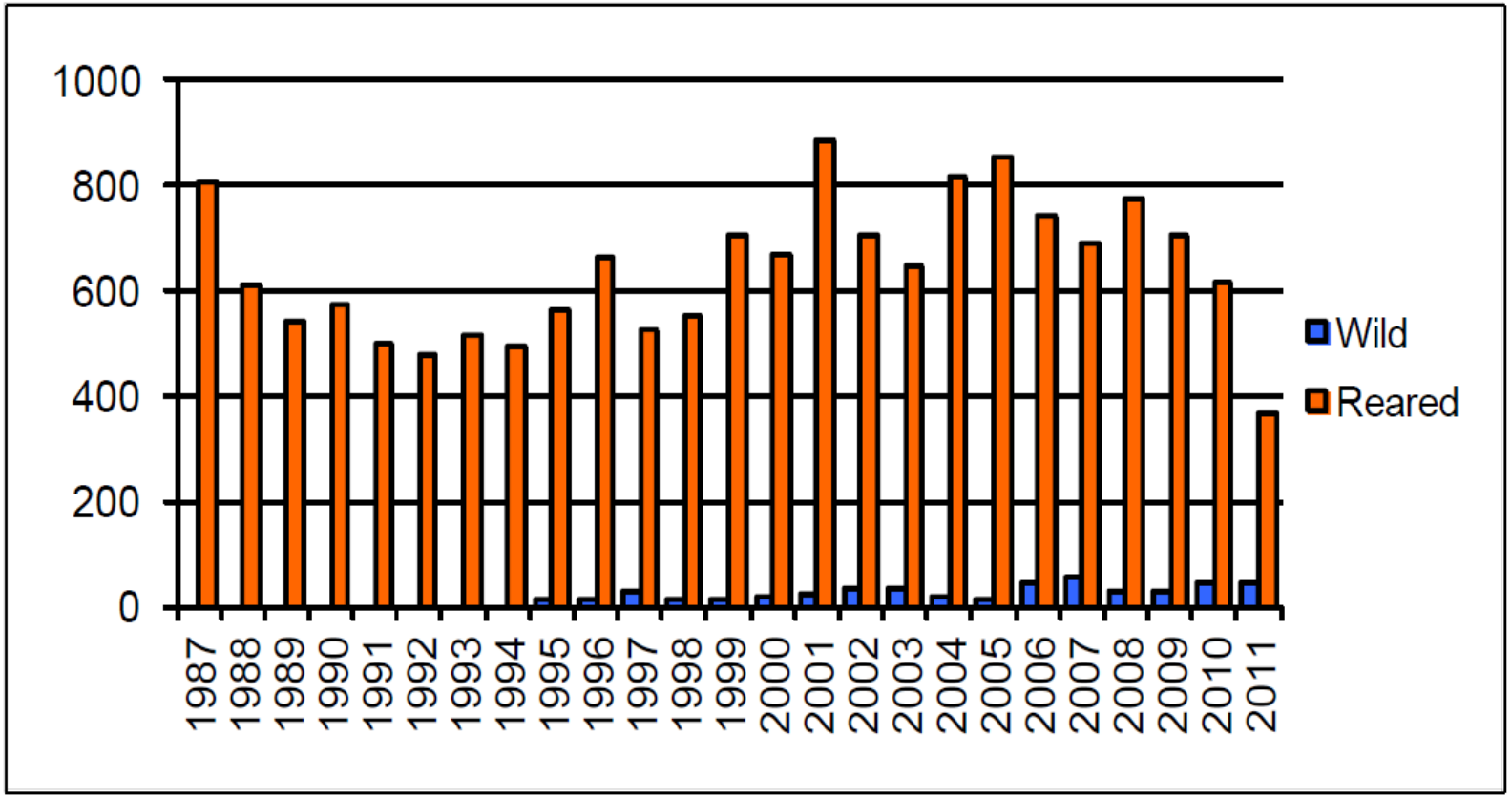


Figure 8.4.15.3 Salmon in Subdivision 32 (Gulf of Finland). Annual production (in thousands) of wild and reared smolts in the Gulf of Finland. No information is available on wild production before 1995.

Summary	Precautionary				MSY Approach		Target	Mgmt	Proposed TAC by ICES for 2013	Agreed TAC by Council (Russia not included)
Stock	Blim	Bpa	Flim	Fpa	Fmsy	MSY Btrigger	SSB MGT	Fmgt	(tonnes) Salmon ind.	(tonnes) Salmon ind.
cod-2224	Not defined	23 000 t MBAL	Not defined	Not defined	0.25	23 000	Undefined	0.6 EU management plan 2007	20 800	20 043
cod-2532	Undefined	Undefined	0.96 Fmed estimated in 1998	0.6 5th percentile of Fmed	0.3	Undefined	Undefined	0.3 EU management plan 2007	65 900	61 565
spr-22-32	Not defined	Not defined	Not defined	0.4	0.35	Not defined	Not defined	Not defined	278 000	249 978
Her3a22	Not defined	Not defined	Not defined	Not defined	0.25	110 000	Not defined	Not defined	25 800	25 800
Her-2532-Ex-Go	Not defined	Not defined	Not defined	0.19	0.16	Not defined	Not defined	Not defined	117 000	85 155

Summary	Precautionary				MSY Approach		Target	Management	Proposed TAC by ICES for 2013	Agreed TAC by Council (Russia not included)
Stock	Blim	Bpa	Flim	Fpa	Fmsy	MSY Btrigger	SSB MGT	Fmgt	(tonnes) Salmon ind.	(tonnes) Salmon ind.
her-riga	Not defined	Not defined	Not defined	0.4 Medium term projections	0.35	60 000	Not defined	Not defined	23 200	27 640
her-30	Not defined	Not defined	Not defined	Not defined	0.16 F giving the highest yield(new simul. 2012)	271 000 2.5% lower percentile of B_{MSY}.	Not defined	Not defined	97 000	99 100
her-31	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not defined	Not defined	2 100	*) combined to SD 30
sal-2231	Not defined	Not defined	Not defined	Not defined	75% of PSPC	Not defined	Not defined	Not defined	54 000	108 762
sal-32	Not defined	Not defined	Not defined	Not defined	75% of PSPC	Not defined	Not defined	Not defined	As low as possible	15 419

Thank you for your attention