

SUSTAINABLE FISHERIES MANAGEMENT PLAN FOR THE ESTONIAN FISHERIES IN THE BALTIC SEA

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ABSTRACT

This paper sets forth a layout of a sustainable fisheries management plan for the Estonian Baltic Sea fisheries. The plan takes into consideration the European Union's (EU) principles of sustainable fisheries and the FAO Code of Conduct, as well as the principles of the Estonian fisheries plan. Both fisheries management and fisheries economics methods are used to analyse fisheries management measures.

There are two reasons, why I examined these issues. The first is that Estonia will be joining the EU in May 2004. Before Estonia unites with the EU it has to harmonise its legislation with EU legislation. The second reason is that Estonia lacks a long-term fisheries management plan in the Baltic Sea, which complies with the EU Common Fisheries Policy (CFP).

This is a draft of management plan, which could be the basis for a future management plan in the Estonian Baltic Sea fisheries.

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1 INTRODUCTION

The Estonian fisheries are divided into five areas: distant waters (Atlantic Ocean), the Baltic Sea, the Baltic Sea coastal fishery, inland waters and aquaculture. Estonian total catches, in 2002 were 101,443 metric tons and catch in the Baltic Sea was 68,000 metric tons. Yearly, the fisheries department issues approximately 400 fishing permits to 80 fishing companies, which own 145 fishing vessels. The fisheries sector has changed substantially since it became independent of the Soviet Union in 1990.

For the years 2000 and 2001, the Estonian catch has been higher than recommended by the International Baltic Sea Fishery Commission (IBSFC). The government of Estonia during this period objected to the IBSFC findings and increased the quota for Estonia unilaterally. This is because the herring stock situation in the Gulf of Riga was at a historically high level and at the same time the herring stock situation in the open part of the Baltic was at its historically lowest level. The IBSFC did not follow scientific advice to manage these stocks separately. However, in 2002 and 2003 the IBSFC decided to allocate to Estonia and Latvia higher TAC for herring than their allocation key would have given recognising the need to manage two different herring populations in the Baltic Sea separately and for rational utilisation of these different herring stocks in the Baltic.

Estonia will be joining the European Union (EU) on 1 May 2004. Before Estonia joins the EU, it has to harmonise its own legislation with EU legislation. The EU has the Common Fisheries Policy (CFP), which regulates management of EU fisheries. Estonia needs a long-term fisheries management plan in the Baltic Sea, which complies with the EU CFP.

The aim of this project is to suggest a sustainable fisheries management plan for the Estonian part of the Baltic Sea fisheries. Such a plan should include the EU principles of sustainable fisheries, as well as principles and problems of the Estonian fisheries plan. It will also take into account the FAO Code of Conduct (COC) for responsible fisheries.

During the last twenty years, the CFP has developed substantially but it has also been shown to have coherence problems and defects. The main problem in the EU is excessive fishing capacity. Stocks are at present outside of safe biological limits. Poor enforcement of decisions has also contributed to over-fishing. In the future, the Community total catch will have to be significantly lower than it is today (The European Commission 1999).

It is important to find a solution to over – exploitation and excessive fishing capacity and to find appropriate tools to manage the Baltic Sea fisheries. The paper is organised as follows: section 1 is an introduction to the paper, section 2 is an overview of Estonian fisheries, in section 3 the objective for Estonian fisheries management is set and section 4 draws an outline for a management plan. The purpose of the project is to produce a long-term management plan that will consider all the abovementioned factors.

2 OVERVIEW OF ESTONIAN FISHERIES

2.1 Estonian fisheries management in the Baltic Sea

The republic of Estonia is located on the east coast of the Baltic Sea. The land borders of Estonia are 663 km, including the border with Russia (294km) and the Republic of Latvia (339 km). Estonia covers 45,227 km². The most important fisheries resources are the Baltic Sea and inland waters. The coastline of the Baltic Sea is 3,794 km and territorial sea extends to 12 miles from the coast. Estonia has 1,521 islands in the Baltic Sea with a total area of 4,130 km² (about 9.1% of the whole territory). Figure 1 shows a map of Estonia. There are two big islands (Saaremaa and Hiiumaa) to the west, and that is where most of the fishing occurs. The Gulf of Riga and Gulf of Finland and the area around the islands are the most important areas for Estonian Baltic Sea fisheries.



Figure 1: Map of Estonia, including the Gulf of Finland and Gulf of Riga (The World Factbook 2003) .

The most important species in the Baltic Sea fisheries are herring (*Clupea harengus*), sprat (*Sprattus sprattus*) and cod (*Gadus morhua*). The International Baltic Sea Fishery Commission (IBSFC) co-ordinates the Total Allowable Catch (TAC) for the Baltic Sea fisheries. The Standing Committee on Regulatory Measures in the IBSFC analyses the scientific advice provided by the Advisory Committee on Fishery Management (ACFM) of the International Council for the Exploration of the Sea (ICES) and prepares proposals for regulatory measures to be adopted by the annual meeting of the IBSFC. According to the Rules of Procedure for the IBSFC, each contracting party has one vote. There are now 6 contracting parties: the European Community (representing Denmark, Germany, Finland and Sweden), Estonia, Latvia, Lithuania, Poland and the Russian Federation. Consensus is the one goal of the decision making process in the IBSFC in order to make the IBSFC recommendations binding to all contracting parties and all fishery zones in the Baltic Sea. Each year the

IBSFC divides the TAC of the Baltic Sea between the Member States (IBSFC 2003). Table 1 shows the allocation of TAC in % between all member states of the IBSFC. The EU has the largest share of the TAC in the IBSFC. The EU is the most important partner for Estonia, because Estonia needs a cod quota from the EU since cod is not abundant in Estonian territorial waters.

Table 1: The IBSFC allocation of TAC to each member state in % (IBSFC 2003).

Contracting party	Herring (TAC %)	Sprat (TAC %)	Cod (TAC %)
	22-29+32 (area)	22-29+32 (area)	25-32 (area)
Estonia	10.14	10.3	1.78
EU	54.95	36.28	60.9
Latvia	6.86	12.44	6.77
Lithuania	2.14	4.5	4.45
Poland	20.14	26.4	21.1
Russian Federation	5.77	10.08	5

In Estonia, the Ministry of the Environment - Fisheries Resources Department divides IBSFC quota in the Baltic Sea area between fishing companies. The Fisheries Resources Department (FRD) divides the TAC between the Baltic Sea fisheries and coastal area fisheries. The coastal area receives approximately 8% based on historical catches. The coastal area share is not divided among individual fishermen but is allocated by gear type and fishing area. Commercial fishermen in the coastal areas use gear such as gill nets, longlines, traps, seine nets but trawl fisheries are in the Baltic Sea. The remaining 92% of the allocated quota is allocated to trawlers, as Individual Quota (IQ).

Fishing companies have to submit a declaration before 1 December each year stating how much they want to catch the next year (Parliament of Estonia 2004). If the total TAC is lower than the total catch requested by all fishing companies, the quota is divided among the companies based on historical catch for the previous three years. Upon division, it is ensured that the proportion of the fishing quotas acquired by each applicant remains the same in relation to the quotas acquired by other persons for the same waters during the previous three years (historical fishing limits). The functions used to calculate historical fishing limits, are as follows (see equations 1-4) (Parliament of Estonia 2004):

$$(1) T = topv_1 + topv_2 + topv_3$$

T – Tonnage harvested by each applicant catch the last three years

topv₁ – catch year 1

topv₂ – catch year 2

topv₃ – catch year 3

(2) Total sum that applicants request

$$S_n = T_1 + T_2 + \dots + T_{n-1} + T_n$$

n – Number of applicants

(3) Individual holding of the total request

$$O = \frac{T}{S_n}$$

O - holding

(4) Allocated tonnage

$$AT = O \times ATa$$

AT – allocated tonnage

ATa – allocated TAC in the year.

This can be written as:

$$AT_k = \frac{T_k}{\sum_{k=1}^n \sum_{i=1}^3 T_{ki}} TAC$$

AT_k - Allocated TAC to company k

T_k - Total catch in the last three years for company k

Quota is divided between companies and each company can divide the quota between its own vessels. At least 50% of the fee for the quota to fish commercially must be paid prior to the receipt of a document certifying the right to fish. The herring and the sprat fee is \$2.2 per ton and cod fee is \$33 per ton. The remainder of the fee must be paid within 10 days after having used 1/2 of the fishing quota (Parliament of Estonia 2004). Additional fishing quota discovered after the division of the fishing rights is sold at auction. This system has been used for two years in the Baltic Sea and distant waters fisheries. The auction system brings concentration of quotas around both of the big islands – Saaremaa and Hiiumaa, with the largest share going to three or four big fishing companies. The idea of auction was to allow new entrants into the Baltic Sea fisheries. The IBSFC has decreased TAC every year and fishing has become more expensive each year. Therefore it remained difficult for new entrants to enter the fishery. The Government wants to manage social problems with the same tool. Politicians need votes and they promise fishermen that they will have more quota. This was a solution to the unemployment problem on the island. Estonian fishing management includes issues from many other sectors, but fisheries management has to manage the fisheries sector with clear tools and objectives. Problems of social origin must be dealt with using other tools. This is one of the weaknesses of the Estonian fishing management.

2.2 Baltic Sea fishing vessels

The Baltic Sea fishing fleet consists mostly of trawlers. The total number had reached 191 at the end of 2000, including 10 small trawling boats with a length of up to 12 metres. There are eight vessels used for fishing cod with nets. The Baltic Sea fishing fleet is divided into six segments according to vessel type (Table 2). The fisheries department issues yearly approximately 400 fishing permits to 80 fishing companies. In 2003 the number of vessels in the Baltic Sea decreased to 158, including the 10 smaller vessels (<12 m). According to the EU CFP fishing effort must be limited (EC 2002). Scientific advice is that fishing mortality rates should be reduced on average by about 40%. This would suggest that there is more than 40% overcapacity in the fleet. Overall, the objectives of the Multi-annual Guidance Programmes (MAGP) III represented an overall reduction of approximately 10% of the Community fleet (The Commission of the European Communities 2000).

In accordance with EU law, Estonia will only have to register and re-measure all new vessels in the fleet by 1 May 2004 (The Council of the European Union 1993).

The main vessel type is MRTK – small stern trawl (Figure 2), length L-25.5 m and l-22.01 m; breadth 6.8 m and 3.3 m; draught 1.90 m and 2.84 m with cargo; BT 117 tons and GT 35 tons.

SCS – medium Black Sea Seiner, length L-25.23 m and l-22 m; breadth 5.6 m and 2.8 m; draught 1.94 m and 2.62 m; BRT 78.5 tons and GRT 20 tons.

PTS – reception transport vessel, length L-27.1 m and l-24.6 m; breadth 2.5 m and 2.5 m; draught 1.66 m and 2.19 m; BT 84.3 tons and GT 26.9 tons.

MSTB – small steel trawl boat, length L-17.6 m and l-14.6 m; breadth 4.27 m and 1.85 m; BT 20 tons and GT 6 tons.

Table 2: Vessel types in the Baltic Sea fishing fleet (FRD 2000)*.

Vessel type	Number of vessels	Average engine power (KW)	Average overall length (m)
Bigger than MRTK	12	474	30.3
MRTK	35	220	25.4
SCS	14	176	25.2
PTS	57	203	27.1
MSTB	19	103	17.5
Small trawlers	52	64	12.9
Total	189	1240	

*The Table does not contain trawling boats with the length of up to 12 meters due to the lack of measuring methods, the total tonnage of these vessels has not been estimated.



Figure 2: The main vessel type in the Baltic Sea is a small stern trawler - MRTK as show in this figure.

2.3 Total catch of Estonian vessels in the Baltic Sea

In 1993 - 2004 the TAC of herring allocated to Estonia decreased from 56,800 tons to 28,536 tons and catch in the same years ranged from 33,047 tons to 41,738 tons (Table 3).

Table 3: Distribution of TAC for herring in the Baltic Sea by the IBSFC (in tons) and the Estonian catch and over –harvesting (FRD 2003).

Year	Total TAC	The Estonian TAC	The Estonian total catch	Over-harvesting
1993	650,000	56,800	33,047	
1994	650,000	56,800	34,493	
1995	670,000	56,800	43,481	
1996	670,000	56,800	45,296	
1997	670,000	56,800	52,435	
1998	670,000	56,800	42,721	
1999	570,000	48,270	44,038	
2000	490,000	41,070	41,735	665
2001	372,000	30,420	41,738*	11,318
2002	260,000	20,280	36,250*	15,970
2003	143,000	26,036	29,826	
2004	143,000	28,536		

*After the objection

In the years 1993 - 2004, the Estonian part of the TAC of sprat ranged from 36,100 tons to 43,260 tons and total catch in the same years was between 5,763 tons – 41,394 tons (Table 4). In 1993 – 1999 Estonia leased some of its quota to other countries, because in the beginning of the 1990s the Russian market disappeared. Estonia did therefore not make use of all its TAC and sold quota to other countries.

Table 4: Distribution of TAC in the Baltic Sea by the IBSFC (in tons) and the Estonian catch and over –harvesting (FRD 2003).

Year	Total TAC	The Estonian TAC	The Estonian total catch	Over-harvesting
1993	415,000	36,100	5,763	
1994	700,000	72,200	9,079	
1995	500,000	51,500	13,051	
1996	500,000	51,500	22,493	
1997	550,000	56,560	39,693	
1998	550,000	56,650	40,623	
1999	468,000	48,210	35,858	
2000	400,000	41,200	41,394	194
2001	355,000	36,570	40,777*	4207
2002	380,000	39,140	40,717*	1577
2003	310,000	31,930	29,281	
2004	420,000	43,260		

*After the objection

In 2000 the TAC and catch was identical, but Estonia made an objection to the Committee about the TAC for both species in 2001 and 2002, and exceeded the TAC on both species in both years (Tables 3 and 4). After the objections by Estonia, the EU prohibited Estonian vessels from catching cod in EU waters. Nevertheless, Estonia made a new objection and caught the allocated TAC. Total over – harvesting for both species for the three years was 33,931 tons (Table 3 for herring and Table 4 for sprat). The herring is in the most critical situation of the species in the Baltic Sea. The Baltic Sea is divided into a northern part and a southern part by six different squares: 28-2; 28-5 (Gulf of Riga), 29-2; 29-4 (Väinameri), 32-1; 32-2 (Gulf of Finland) (Figure 2). Estonian scientists found that fish resources in the Gulf of Riga in the Baltic Sea were normal and that it was safe to continue fishing at the same level as before.

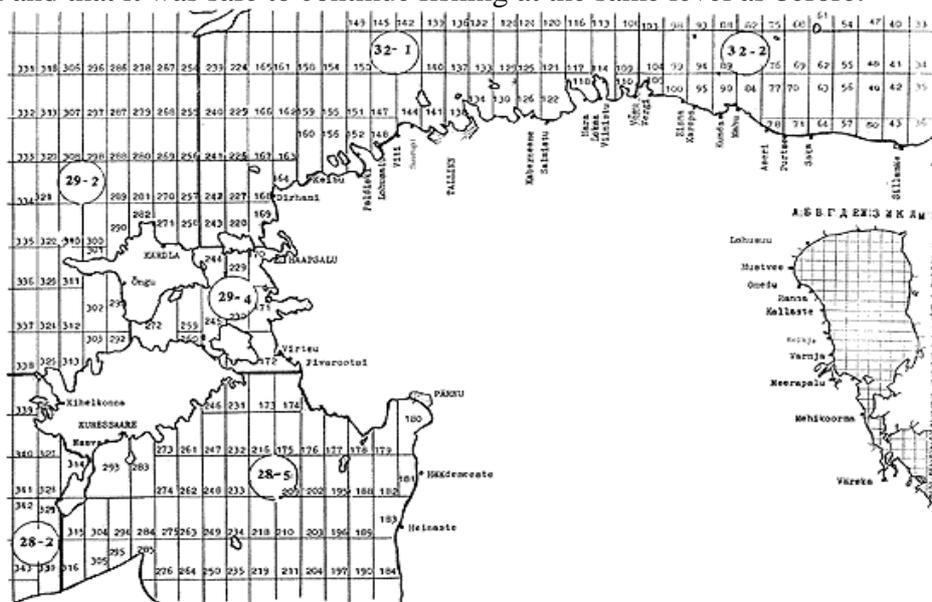


Figure 3 : Catch squares in the Baltic Sea (FRD 2002).

2.4 Analysis of over-harvesting

The Tragedy of the Commons (Hardin 1968), states that each resource used in common by a group of individuals will in the end become depleted. If many individuals harvest the same waters then the users must have an agreement about fishing in the area in order to avoid the tragedy of the commons. Estonia has an agreement with other countries on how and where to catch in the Baltic Sea. This is a situation where the rational behaviour level of the collective is not conforming. The reason may be lack of confidence and trust in the other partners. Cooperative games are particularly important in fisheries economics.

Estonia has exceeded its allocated TAC for the last three years in the Baltic Sea. Estonia made two objections about allocated TAC to IBSFC in 2000 and 2001. This is a situation, where the rational behaviour level of the collective is not conforming. One way to look at the situation between Estonia and IBSFC is presented in Table 5.

Table 5: Analysis on the relationship between Estonia and IBSFC.

		ESTONIA	
		Infringe a promise	Keep a promise
IBSFC	Infringe a promise	Stock decrease	IBSFC over-harvesting
	Keep a promise	Estonia over-harvesting	Stock increase

If both countries violate the TAC, fish stocks will decrease. If only Estonia keeps the promise and IBSFC does not, the Estonian stock will decrease and the IBSFC will over-harvest. If only IBSFC keeps the promise and the Estonians do not, the Estonian stock will decrease because of over-harvesting. But if both parties keep the promise, the stock will increase or stay at the same level, provided the predictions made by the fisheries biologists are correct.

This situation is denominating strategy equilibrium or sustainable fishing. Not abiding by agreements is one weakness in the Estonian fisheries.

3 SETTING THE OBJECTIVES FOR ESTONIAN FISHERIES MANAGEMENT

Several of the world's most important fisheries are subject to excess fishing capacity, and this is a cause for growing concern. Excess capacity means that in many of the world's fisheries fleets are not only larger than they need to be to catch and land (at the lowest cost) the volumes of fish currently available, but they would also exceed the requirements for fishing in the event of stocks being permitted to recover in size. Excess fishing capacity is thus caused by lack of control over fishers' access to fish stocks (The Commission of the European Communities 1998).

The Code of Conduct for Responsible Fisheries was ratified on 31 October 1995 at the FAO conference. This Code sets out principles and international standards of behaviour for responsible practices with a view to ensure the effective conservation,

management and development of living aquatic resources, with due respect for the ecosystem and biodiversity (FAO 1995).

The common fisheries policy (CFP) is the EU's instrument for the management of fisheries and aquaculture. It was created to manage a common resource and to meet the obligations set in the original Community Treaties. Because fish is a natural, renewable, biological and mobile resource, they are considered as common property. In addition, the Treaties, which created the Community, stated that there should be a common policy in this area, that is, common rules adopted at the Community level and implemented in all member states (Commission of the European Communities 1998).

The main aim of the CFP is to guarantee international co-operation to efficient fish resources protection and to find supplementary fishing possibilities. In the EU, only marine fishing is regulated but inland fishing is left under the management of the member states. The CFP of the EU considers biological, economical and social aspects and it include four sectors, which relate to conservation, structures, markets and relations with the outside world. There is a Financial Instrument for Fisheries Guidance (FIFG), which contributes to buyback programmes for fishing vessels. The Council approved the regulations for the revision of the Community Structural Funds, including the Financial Instrument for Fisheries Guidance (FIFG) (The Council of the European Union 1999).

FIFG's objectives have not changed and aim to:

- Contribute to achieving a lasting balance between fisheries resources and their exploitation;
- Strengthen competitiveness and the development of economically viable businesses in the fishing industry;
- Improve market supply and increase the value that can be added to fish and aquaculture products through processing;
- Help revitalise areas dependent on fisheries and aquaculture.

The FIFG objectives are aimed at the following areas: fleet renewal and modernisation of fishing vessels, adjustment of fishing effort, joint enterprises, small-scale coastal fishing, socio-economic measures, protection of marine resources in coastal waters, aquaculture, fishing port facilities, temporary cessation of activities and other financial compensation, innovative actions and technical assistance (The European Commission 1999). Funds available for financial assistance to the fisheries sector under FIFG for the period 2000-2006 and the total amount of aid for this period is €3.7 billion. Planned allocation of FIFG funding (2000-2006) by percentage is:

- Permanent withdrawn of vessels-18%
- Renewal and modernisation of the fleet-22%
- Socio-economic measures-3%
- Fishing port facilities-8%
- Processing and marketing-22%
- Aquaculture-9%
- Other measures-18%

Traditional analysis of fisheries policies has centred on single objectives, with particular focus on the objective of biological conservation. In contrast, economists have tended to favour cost-benefit analyses (Sylvia 1994). More and more scientists have found that fisheries management has to be multi-objective.

Hannesson (1996) has analysed fisheries policies in Norway, the Faeroe Islands, Iceland, and Newfoundland. In these countries, fisheries are an overpopulated and overcapitalised industry. Other problems include irrational economic policies and subsidy policies. His solution is limiting access to fishing outside the 200 mile zone, extending the exclusive economic zone and changing the institutional framework in which the industry operates in a way that provides appropriate incentives to conserve the fish stocks and limit fishing capacity to what is strictly needed.

A precautionary approach in fisheries management is one measure, which could help to maintain stay stocks at an optimal level. Precautionary tools include:

- Stock specific target reference points and, at the same time, the action to be taken if they are exceeded;
- Stock-specific limit reference points and, at the same time, the action to be taken if they are exceeded; when a limit reference point is approached, measures should be taken to ensure that it will not be exceeded.

Taking into consideration the problems of Estonian fisheries, problems of EU fisheries management and FAO COC principles, the main objectives of an Estonian fisheries management plan should be:

1. Estonia recognises that long-term sustainable use of fisheries resources is the dominant objective of conservation and management.
2. Estonian fisheries management has to effect long-term (between 20 - 30 years) instead of short-term plans, with the aim to move Estonian fisheries to the optimum position.
3. Fisheries management has to be concerned with the stock unit over its entire area of distribution and take into account previously agreed management measures established and applied in the same region, the biological unity, and other biological characteristics of the stock.
4. Estonia is a member of a sub-regional organisation. Estonia will implement internationally agreed measures adopted in the framework of such organisations, and be consistent with international law.
5. Estonia applies the precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment.

The objective for Estonian fisheries management comprises a long-term management plan in the Baltic Sea. The long-term management plan includes different fisheries management tools that help to implement in the objectives.

The long – term management plan would include (The European Commission 1999 and FAO COC):

1. Limiting the level of fishing capacity (harmonising the fleet with available resources);
2. Adopting technical measures;
3. Strengthening monitoring;
4. Limiting access to resources;
5. International co-operation.

Limiting the level of fishing capacity is possible by segmentation, modernisation and renewal of the fishing fleet. Chapter 4 explains each part of the management plan.

4 OUTLINE FOR A MANAGEMENT PLAN

4.1 Limitations on fishing capacity

Fishing capacity can be measured as a vessel's tonnage in GT and its power in kW. GT means the measure of the overall size of a ship determined in accordance with the provisions of the present Convention (The International Convention on Tonnage Measurement of Ships 1969). The engine power shall be the total of the maximum continuous power which can be obtained at the flywheel of each engine and which can, by mechanical, electrical, hydraulic or other means, be applied to vessel propulsion (Council of the European Union 1986).

Most fleet problems of excessive fishing capacity involve capital stock and effort utilisation.

The natural reproduction capacity of fish populations has to be preserved in the use of fish resources, since fish resources may sink below a biologically acceptable limit. To maintain the competitiveness of the fisheries sector, it is necessary to achieve a balance between the natural reproduction of fish and the use of fish as a resource. The intensive use of fish stock depends, above all, on the existing fishing capacity. Optimal fishing management and the preservation of the stability of fish resources, is then dependent on fleet reduction.

The following chapters describe how Estonia needs to carry out its fisheries management plan to achieve the optimal level.

4.1.1 Segmentation of the fishing fleet

The main aim of the EFMP is limiting the level of fishing capacity to the resources available. Conservation measures have constantly been undermined by fishing activities at levels well beyond the level of pressure that the available fish stocks could safely withstand. As new technology in the Baltic Sea makes fishing ever more efficient, the capacity of the fleet should be reduced to maintain a balance between fishing capacity and the quantities of fish that can safely be taken out of the sea by fishing (Ministry of Finance 2003). The current level of the fishing capacity in the Baltic Sea is 33% more than the optimal (Eero 2002) (Table 6). Estonia has to reduce its fleet by 98 fishing vessels. The reason for the current over capacity is that vessels entered the fishing industry in the 1990s without permission. Until 1998 the fishery was managed by TAC limitation, but fleet size was not regulated.

Table 6: Current and optimal number of vessels (Eero 2002).

Type of vessels	Currently number of vessels	Optimum number of vessels
MRTK	34	34
>MRTK	11	11
PTS	32	7
SCS	5	2
MSTB	11	0
SMALL trawl	59	0
TOTAL	152	54

The EU CFP consists of three fisheries management elements:

- 1) Fishing fleet register (FFR);
- 2) Fishing permit;
- 3) Fishing licence.

This system will be effective, if all three elements can be related. A special fishing permit (fishing permit) means a prior fishing authorisation issued to a Community fishing vessel to supplement its fishing licence, thereby enabling it to carry out fishing activities during a specified period, in a given area, for a given fishery, in accordance with the measures adopted by the Council. The fishing fleet register regulated the fishing fleet (Parliament of Estonia 2004). Currently, there are 70 vessels between 12 and 24 m in length and 83 vessels between 24 and 40 m in length in the FFR registered (Table 7). These are fishing vessels flying the flag of Estonia.

Table 7: Marine fishing fleet register based on the number of vessels and engine power (kW) on 1 December 2003 (FRD 2003).

Length category (LOA)	Number of vessels	KW
<10 m	294	521.13
10 - < 12 m	63	724.73
12 - < 15 m	44	251.04
15 - < 18 m	21	185.16
18 - < 24 m	5	96.10
24 - < 40 m	83	2,179.30
? 40 m	9	1,609.80
Total:	519	5,567.26

The fishing fleet will be divided into five segments according to fishing area, fishing gear, species and type of vessel (Table 8). MAGP (Multi-Annual Guidance Programme in the EU) has been dividing vessels into segments. Thereby, giving an opportunity to enter into the fishing fleet in the segments where capacity exceeded TAC. The size of the segment takes into consideration capacity (Parliament of Estonia 2004). If one segment is increasing that will bring more vessels. If a segment does not increase, new vessels can only be entered instead of a similar old vessel (capacity). Such segmentation will contribute to a balance between fishing capacity and fishing opportunities. Estonia lacks information on vessels for the fleet register.

Table 8: The fishing fleets segments according to fishing area, fishing gear, species and type of vessel (FRD 2003).

Code of segment	Fishing area	Fishing gear	Species	Type of vessel
4S1	Baltic Sea	passive, active	pelagic, demersal	vessels < 12m
4S1	Baltic Sea	active	pelagic, demersal	unapproved
4S3	Distant waters	active	pelagic, demersal	vessels > 12m
4S4	Baltic Sea	passive	pelagic, demersal	unapproved
4S5	Inland waters	unapproved	unapproved	vessels < 12m

Over the period 1 January 2003 to 31 December 2004, a certain capacity must be permanently withdrawn without aid according to the following ratios:

1) 1 GT withdrawn for 1 GT introduced, for vessels up to 100 GT.

In practical terms this means that before a vessel of, for example, 90 GT is introduced with aid into the fleet, another vessel of 90 GT or two vessels of, for example, 60 and 30 GT will have to be permanently removed without aid.

2) 1.35 GT withdrawn for 1 GT introduced, for vessels between 100 and 400 GT.

In the case of a new vessel of 300 GT, for example, the capacity to be withdrawn will be 405 GT. In this case too, removal of capacity can be achieved through the withdrawal of one or more vessels representing a minimum of 405 GT.

4.1.2 *Modernisation and renewal of the fishing fleet*

The fishing fleet consists mostly of old fishing vessels of Soviet origin, built in the 1970s and 1980s of low quality steel and equipment with unreliable engines. In order to optimise the costs of fishing and improve the quality of fishing, the fishing vessels of Estonia need to be modernised with more contemporary and selective catching technologies. The measure facilitates investment in modern vessels, implementing selective fishing technologies and improving working conditions and the occupational safety of fishermen working on the vessel. The renewal of the fishing fleet will not increase the fishing capacity. This will be ensured by the exit-entry schemes of the fishing fleet register. To take full advantage of better fishing technology, the number of fishermen and boats must be reduced as necessary to preserve the biological productivity of the fish stocks (Hannesson 1996) (Objective nr 3).

The FRD have renewed the fishing fleet through vessel buyback programmes and modernisation of the fishing vessels. The fishermen who retire from fishing and utilise their own vessel, can apply for money for vessel decommissioning from the FIFG. If an owner receives support from the state for his/her vessel, then in the future the same owner cannot come back with a new vessel in the fishing fleet register.

One opportunity is to use EU structure funds (FIFG). There is one measure to modernising the fishing fleet.

The specific objectives of the measure are:

- To reduce fishing capacity of the fishing fleet to ensure balance between the natural reproduction of fish stock;
- To improve technical conditions of fishing vessels, fish processing conditions, working conditions and occupational safety; promoting the introduction of selective fishing techniques;
- To extend premiums to fishermen on permanent reassignment of a vessel.

The restructuring of fisheries will result in decreased employment in the sector. To stop the ageing of the labour force active in the sector, it is necessary to support young

fishermen. This measure helps to alleviate the unfavourable social and economic impact caused by the restructuring of the fisheries.

4.1.3 *Indicative activities*

- Compensation for the utilisation of fishing vessels;
- Permanent reassignment of vessels, including using the vessels for training, research, cultural heritage, tourism, etc;
- Modernisation and renewal of the fishing fleet;
- Rationalisation of fishing operations, especially for applying more selective fishing technologies and methods on vessels;
- Improving the quality of fish caught and preserved on board vessels, applying better catching and preserving methods and implementing legal and regulating norms;
- Improving working and occupational safety conditions;
- Individual premiums to fishermen who loose their jobs.

Approximate financial weighting of the measure in the priority 20% and state aid will be granted (Ministry of Finance 2003).

4.2 Regulation of fishing effort with technical measures

The European Council has established Community measures to govern access to waters and resources in the sustainable pursuit of fishing activities. The measures have been established to take into account available scientific, technical and economic advice and in particular of the reports drawn up by the Scientific, Technical and Economic Committee for Fisheries (STECF). STECF is consulted at regular intervals on matters pertaining to the conservation and management of living aquatic resources, including biological, economical, environmental, social and technical considerations (EC 2002).

The FRD has established technical measures in the Baltic Sea, taking into account available scientific, technical and economic advice (Objective points 3 and 5). Every year the FRD reviews rules and evaluates fishing measures. The most important measures are:

- 1) The structure of fishing gear, the number and size of fishing gears on board;
- 2) Zones and /or periods in which fishing activities are prohibited or restricted for the protection of spawning and nursery areas;
- 3) Minimum size of fish that may be retained on board and/or landed;
- 4) Specific measures to reduce the impact of fishing activities on marine ecosystems and non-target species.

The Government of the Republic will not have to wait for a response from scientists if the international organisation or the international agreement will anticipate restrictions on catch (Parliament of Estonia 2004). This allows for a more rapid response by the FRD implementing technical measures to prevent over-fishing. A quicker response should help to rebuild fish stocks in the future. The absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures.

4.3 Strengthen monitoring

The main components in the Fisheries Management Regime (FMR) are a Fisheries Management System (FMS), Monitoring, Control and Surveillance (MCS), and a Fisheries Judicial System (FJS).

MCS consists of data monitoring (monitoring and surveillance) and enforcement monitoring (monitoring and control).

Data gathering is divided between biological monitoring (for biological research, stock assessment) and economic monitoring (economic research, costs and price). Biological monitoring in Estonia is carried out by the Estonian Marine Institute (University of Tartu), Ministry of the Environment and the Inspection of Environment. Activities related to biological monitoring are examination of landing catch, records of fishing behaviour (location, gear, logbooks, and observers) and field trips on research vessels. Economic monitoring (prices, cost, technology, fishing effort by gear and vessel type) is difficult and is usually carried out by an economics or fisheries economics research agency, but Estonia lacks these agencies. Economic monitoring is a very important function. Without such monitoring, the TAC and other management measures cannot be set optimally and progress in fisheries management cannot be judged (Arnason 1996). Fisheries management needs monitoring, control and surveillance that will make analysis about fisheries possible. This is best carried out by a special office or institute (Objective point 5).

Enforcement monitoring measures for the Baltic Sea are:

- 1) The satellite-based Vessel Monitoring System, which helps monitoring in the Baltic Sea. By 1 January 2005 all fishing vessels over the length of 15 m will be provided with satellite communication. Each vessel (over 15 m) included in the fishing fleet register has to have the satellite system (Parliament of Estonia 2004).
- 2) The Common Info System, which helps collect data about fish stocks, makes it possible to rapidly organise a license and restrict fishing measures. This system will be active in 2004.

The EU system established includes the following particular provisions for technical monitoring (The Council of the European Union 1993):

- 1) Conservation and resource management measures;
- 2) Structural measures;
- 3) Measures concerning the common organisation of the market.

The Estonian monitoring system should include all these measures, because the country has to harmonise its own legislation with EU legislation before Estonia enters the EU.

4.4 Limited access to resources

For effective fishery management the number of participants needs to be reduced (Objective point 2). This can be done by decreasing the fleet size. If the government will buy back old vessels profits will increase, if access to the fishery is limited (chapter 4.1.2). The fishing fleet segment system helps to regulate open access in the Baltic Sea (chapter 4.1.1.). The Baltic Sea has only two commercial species - Atlantic herring and Baltic sprat. The FRD gives quota to vessels by licence. Community fishing vessels have equal access to waters and resources in all Community waters (EC 2002).

4.5 International co-operation

Many countries are fishing in the Baltic Sea area. There are bilateral agreements about exchanges of quota or fishing in the EEZ of other countries. There are agreements with Latvia, EU and the Russian Federation.

The EU's ambition should be to build with partner coastal states a sustainable fisheries framework where Community interests have a positive role to play. The Community fisheries agreements should incorporate the relevant aspects from other Community policies. Estonia has to contribute to improve global governance in fisheries and related matters through the effective implementation of the current international legal framework and the strengthening and promoting of regional co-operation mechanisms.

International fishery agreements have not been effective in preventing or terminating the over-fishing of fishery resources. There is a danger that irreversible effects from over-harvesting will take place before an effective international agreement on fishery management jurisdiction can be negotiated, signed, ratified, and implemented.

The Estonian government should comply with international agreements made with other participants in the Baltic Sea (Objective point 4).

5 DISCUSSION AND CONCLUSIONS

The current project comprises an overview of Estonian fisheries management in the Baltic Sea and a possible management plan in this fishing area. The management plan includes principles of the EU CFP and the FAO COC.

The main problem in Estonian and EU in fisheries management is excessive fishing capacity. In the Estonian fishery, the capacity is 33% greater than is recommended resulting in over-fishing of the main species (herring and sprat). The solution is to reduce fishing capacity (buy back old vessels), to create segments of fishing vessels, monitor fishing capacity and fishing area and modernise the fishing fleet. Before these measures can be completed, Estonia must establish a new and correct fishing fleet register.

The most frequently used form of fisheries management is regulating with technical measures. Estonia has, in the past, created regulations such as area management and period restrictions. Estonia has fisheries tools but uses them incorrectly. If Estonia used the tools, fisheries management would become more effective.

One weakness in the Baltic Sea management is control in fishing areas and in ports. A satellite system will be provided in 2005 for all fishing vessels over the length of 15 m. The Common Info System helps collect data on fish stocks and to organise license systems and restrict fishing measures. This system will be implemented in 2004. These two systems will help improve monitoring and control in the Baltic Sea. The main problem is economic monitoring. There are only 4-5 active fisheries scientists in Estonia. There is a need to further education in this field of speciality. Fisheries management needs both biological and economic data for an objective analysis.

Limiting access in effective management is very important. Low exploitation costs and reduced employment results in a greater profit in the fisheries sector. Concurrently with decreased fishing capacity, social problems increase. One solution to social problems is co-operation between the Ministry of the Environment and the Ministry of Social Affairs. The Fisheries Resources Department has to be responsible for fish stocks not solutions to social problems.

In implementing the precautionary approach, Estonia should take into account; inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock conditions in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities, including discards, on non-target and associated or dependent species.

Estonia must abide by the rules of the agreements that divide the common property between other members. Every country has to approve of sustainability to use the common property. Achievement of outcomes has to originate from long-term planning, that consists of the measures described in this report.

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