

**COMMISSION OF THE EUROPEAN COMMUNITIES**

**Directorate-General for Fisheries**

**Regional Socio-economic Studies on Employment and  
the Level of Dependency on Fishing**

**Lot No.23: Coordination and Consolidation Study**

**FINAL REPORT**



**MegaPesca Lda. Portugal**

*in collaboration with*

**Centre for Agricultural Strategy, UK**

**COMMISSION OF THE EUROPEAN COMMUNITIES**

**Directorate-General for Fisheries**

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## CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	AIMS OF THE STUDIES .....	1
1.2	IMPLEMENTATION .....	1
1.3	AIMS OF THIS REPORT .....	2
1.4	OUTLINE OF THE REPORT .....	3
<b>2</b>	<b>METHODOLOGY.....</b>	<b>4</b>
2.1	OVERVIEW OF METHODOLOGY .....	4
2.1.1	<i>Task 1: Brief Analysis of the Fishing Industry.....</i>	<i>4</i>
2.1.2	<i>Task 2: Quantifying, Describing and Examining the Level of Dependency.....</i>	<i>4</i>
2.1.3	<i>Task 3: Examination of the Development of the Industry and Level of Dependency.....</i>	<i>5</i>
2.1.4	<i>Task 4: Examination of Existing Socio-economic Measures, Proposals for Improving these Measures and Forward Study of Trends in Employment.....</i>	<i>5</i>
2.2	DATA SPECIFICATIONS.....	5
2.3	METHODOLOGICAL PROBLEMS AND THEIR SOLUTION .....	9
2.3.1	<i>Comparison of Employment Data with Previous Studies.....</i>	<i>9</i>
2.3.2	<i>Calculation of Ratios.....</i>	<i>9</i>
2.3.3	<i>Employment Multipliers.....</i>	<i>14</i>
2.3.4	<i>Comparability with Previous Studies .....</i>	<i>14</i>
2.4	MAPS AND DATABASE OF DEPENDENCY .....	15
2.4.1	<i>Description of Maps and Database .....</i>	<i>15</i>
2.4.2	<i>Methodology.....</i>	<i>15</i>
2.4.3	<i>Technical Issues.....</i>	<i>16</i>
2.4.4	<i>Data Issues.....</i>	<i>16</i>
2.4.5	<i>Interpretation.....</i>	<i>16</i>
<b>3</b>	<b>TASK 1: BRIEF ANALYSIS OF FISHING AND RELATED ACTIVITIES IN THE EU.....</b>	<b>17</b>
3.1	INTRODUCTION .....	17
3.2	FISHING AND RELATED ACTIVITIES.....	17
3.2.1	<i>Fleet Structure.....</i>	<i>17</i>
3.2.2	<i>Landings of Marine Fish.....</i>	<i>18</i>
3.2.3	<i>Fish Processing .....</i>	<i>19</i>
3.2.4	<i>Marine Aquaculture Production.....</i>	<i>21</i>
3.2.5	<i>Inland Aquaculture Production.....</i>	<i>24</i>
3.2.6	<i>Production from Inland Capture Fishing.....</i>	<i>26</i>
3.3	EMPLOYMENT IN FISHERIES.....	28
3.3.1	<i>Overview of Employment in the Fishery Sector.....</i>	<i>28</i>
3.3.2	<i>Employment in Marine Capture Fishing.....</i>	<i>35</i>
3.3.3	<i>Employment in Processing .....</i>	<i>38</i>
3.3.4	<i>Employment in Marine Aquaculture .....</i>	<i>41</i>
3.3.5	<i>Employment in Inland Aquaculture.....</i>	<i>41</i>
3.3.6	<i>Employment in Inland Fishing .....</i>	<i>45</i>
3.4	REGIONAL AND SOCIO-ECONOMIC IMPORTANCE OF FISHERIES .....	46
3.5	STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS AT REGIONAL AND COMMUNITY LEVEL .....	47
3.5.1	<i>Strengths.....</i>	<i>47</i>
3.5.2	<i>Weaknesses.....</i>	<i>48</i>
3.5.3	<i>Opportunities.....</i>	<i>49</i>
3.5.4	<i>Threats.....</i>	<i>49</i>
<b>4</b>	<b>TASK 2: QUANTIFYING, DESCRIBING AND EXAMINING THE LEVEL OF DEPENDENCY. 51</b>	
4.1	INTRODUCTION .....	51
4.2	OVERVIEW OF FISHERIES DEPENDENCY IN THE EU.....	51
4.2.1	<i>Fisheries dependency defined by Ratio 2 Fishing.....</i>	<i>51</i>

4.2.2	<i>Fisheries dependency defined by Ratio 2 total fishery sector employment</i> .....	52
4.3	RATIO 1: VALUE ADDED IN FISHERIES.....	57
4.3.1	<i>Regional Analysis for Ratio 1</i> .....	57
4.3.2	<i>Areas Most Dependent on Fishing</i> .....	58
4.3.3	<i>Areas Most Dependent on Fish Processing</i> .....	58
4.3.4	<i>Areas Most Dependent on All Fisheries Activity</i> .....	59
4.4	RATIO 2: EMPLOYMENT IN FISHERIES.....	59
4.4.1	<i>Regional Analysis for Ratio 2</i> .....	59
4.4.2	<i>Areas Most Dependent on Fishing</i> .....	61
4.4.3	<i>Areas Most Dependent on Fish Processing</i> .....	61
4.4.4	<i>Areas Most Dependent on Aquaculture</i> .....	62
4.4.5	<i>Areas Most Dependent on All Fisheries Activity</i> .....	62
4.5	REGIONAL ANALYSIS FOR RATIO 3.....	63
4.6	DEPENDENCY IN RELATION TO STRUCTURAL FUND OBJECTIVES.....	65
4.6.1	<i>Objective 1</i> .....	65
4.6.2	<i>Objective 2</i> .....	66
4.7	MULTIPLIER INDICATORS OF DEPENDENCY.....	69
4.7.1	<i>Regional Analysis of Multipliers</i> .....	69
4.7.2	<i>Interpretation of Multipliers</i> .....	74
4.7.3	<i>Relation Between Employment at Sea and on Land</i> .....	74
4.8	THE NATURE OF FISHERIES DEPENDENCY.....	76
4.8.1	<i>Dependency on Stocks Under Quota</i> .....	76
4.8.2	<i>Dependency on Fleet Segments Undergoing Structural Adjustment</i> .....	77
4.8.3	<i>Dependency on Third Country Access</i> .....	81
4.8.4	<i>Dependency in the Processing Sector</i> .....	84
<b>5</b>	<b>TASK 3: EXAMINATION OF THE DEVELOPMENT OF EMPLOYMENT AND DEPENDENCY SINCE 1990</b> .....	<b>86</b>
5.1	CHANGE IN FISHING EMPLOYMENT.....	86
5.2	CHANGES IN FISHING EMPLOYMENT IN RELATION TO FLEET CAPACITY.....	87
5.3	CHANGE IN FISH PROCESSING EMPLOYMENT.....	89
5.4	CHANGES IN FISHERIES DEPENDENCY RATIOS.....	91
5.5	CHANGES IN FISHERIES DEPENDENT AREAS.....	93
<b>6</b>	<b>TASK 4: FORWARD STUDY OF TRENDS IN EMPLOYMENT</b> .....	<b>95</b>
6.1	INTRODUCTION.....	95
6.2	EMPLOYMENT IMPACT ASSESSMENT.....	95
6.2.1	<i>Impact of MAPG IV</i> .....	95
6.2.2	<i>Impact of Quota Reductions</i> .....	96
6.2.3	<i>Impact on Processing</i> .....	96
6.2.4	<i>Effect of Loss of Access to Third Country Fisheries</i> .....	97
6.2.5	<i>Effect of Competition from Imports as a Result of Reduced Tariff Barriers under WTO</i> ... 98	
<b>7</b>	<b>TASK 4: SUGGESTIONS FOR IMPROVED SOCIO-ECONOMIC SUPPORT MEASURES</b> .....	<b>99</b>
7.1	OBJECTIVES OF SUPPORT MEASURES.....	99
7.2	TARGETING OF SUPPORT MEASURES.....	99
7.2.1	<i>Benefits of Targeting of Support Measures</i> .....	99
7.2.2	<i>Identification of Target Areas</i> .....	100
7.2.3	<i>Regional Fisheries Development Plans</i> .....	101
7.3	SUPPORT MEASURES FOR FISHERS.....	101
7.4	SUPPORT MEASURES FOR FISH PROCESSING.....	101
7.4.1	<i>Processing Investment Support</i> .....	101
7.4.2	<i>Support for Training in Processing Skills</i> .....	102
7.4.3	<i>Gender Issues</i> .....	102
7.5	SUPPORT MEASURES FOR ALTERNATIVE EMPLOYMENT OPPORTUNITIES.....	103
7.6	ADMINISTRATIVE DESIGN OF SUPPORT MEASURES.....	105
7.6.1	<i>Application Procedures</i> .....	105
7.6.2	<i>Qualifying Conditions</i> .....	105

7.6.3 Grant Versus Credit Support .....	105
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## TABLES

TABLE 1: LIST OF THE REGIONS STUDIED.....	2
TABLE 2: OFFICIAL MEDIAN ECU EXCHANGE RATES 1996-1998 .....	9
TABLE 3: REGIONAL EMPLOYMENT DEFINITIONS.....	11
TABLE 4: EU FLEET STRUCTURE.....	18
TABLE 5: LANDINGS OF MAIN MARINE FISH SPECIES BY EU MEMBER STATES 1996/97.....	19
TABLE 6: VALUE AND QUANTITY OF OUTPUT OF THE FISH PROCESSING SECTOR IN 1996/97 .....	20
TABLE 7: TOTAL EU MARINE AQUACULTURE PRODUCTION, VOLUME AND VALUE (1996/97).....	22
TABLE 8: VALUE AND VOLUME OF MARINE AQUACULTURE PRODUCTION OF CRUSTACEA AND BIVALVES (1996/97) .....	23
TABLE 9: VALUE AND VOLUME OF MARINE AQUACULTURE PRODUCTION OF FISH (1996/97).....	24
TABLE 10: INLAND AQUACULTURE PRODUCTION (1996/97).....	25
TABLE 11: OUTPUT QUANTITY AND VALUE IN INLAND FISHING IN THE EU (1996/97).....	27
TABLE 12: SUMMARY OF FISHERIES EMPLOYMENT IN THE EU (1996/97).....	30
TABLE 13: PERCENTAGE DISTRIBUTION OF FISHERIES EMPLOYMENT IN THE EU (1996/97).....	33
TABLE 14: EMPLOYMENT IN CAPTURE FISHING.....	36
TABLE 15: CLASSIFICATION OF CAPTURE FISHING EMPLOYMENT BY AGE.....	38
TABLE 16: EMPLOYMENT IN FISH PROCESSING.....	39
TABLE 17: EMPLOYMENT IN MARINE AQUACULTURE .....	43
TABLE 18: EMPLOYMENT IN INLAND AQUACULTURE .....	44
TABLE 19: EMPLOYMENT IN INLAND FISHING.....	45
TABLE 20: PRINCIPAL ECONOMIC DIMENSIONS OF THE EU FISHERY SECTOR.....	46
TABLE 21: NUMBER AND EMPLOYMENT CHARACTERISTICS OF EU FISHERIES DEPENDENT AREAS DEFINED BY RATIO 2 FISHING AT NUTS 3 LEVEL IN 1996/97.....	53
TABLE 22: NUMBER AND EMPLOYMENT CHARACTERISTICS OF EU FISHERIES DEPENDENT AREAS DEFINED BY RATIO 2 FISHING AT NUTS 4/5 LEVEL IN 1996/97.....	54
TABLE 23: NUMBER AND EMPLOYMENT CHARACTERISTICS OF EU FISHERIES DEPENDENT AREAS DEFINED BY RATIO 2 (TOTAL FISHERY SECTOR EMPLOYMENT) AT NUTS 3 LEVEL IN 1996/97.....	55
TABLE 24: NUMBER AND EMPLOYMENT CHARACTERISTICS OF EU FISHERIES DEPENDENT AREAS DEFINED BY RATIO 2 (TOTAL FISHERY SECTOR EMPLOYMENT) AT NUTS 4/5 LEVEL IN 1996/97.....	55
TABLE 25: SUMMARY OF MOST FISHERIES DEPENDENT AREAS (AT NUTS 3 LEVEL) IN EACH STUDY REGION (AS DEFINED BY RATIO 1 - TOTAL FISHERY SECTOR ADDED VALUE).....	57
TABLE 26: SUMMARY OF MOST FISHERIES DEPENDENT AREAS (AT NUTS 4/5 LEVEL) IN EACH STUDY REGION (AS DEFINED BY RATIO 1 - TOTAL FISHERY SECTOR ADDED VALUE) .....	58
TABLE 27: SUMMARY OF MOST FISHERIES DEPENDENT AREAS (AT NUTS 3 LEVEL) IN EACH STUDY REGION (AS DEFINED BY RATIO 2 - TOTAL FISHERY SECTOR EMPLOYMENT).....	60
TABLE 28: SUMMARY OF MOST FISHERIES DEPENDENT AREAS (AT NUTS 4/5 LEVEL) IN EACH STUDY REGION (AS DEFINED BY RATIO 2 - TOTAL FISHERY SECTOR EMPLOYMENT).....	60
TABLE 29: NUTS 2/3 AREAS MOST DEPENDENT ON SPECIES SUBJECT TO MANAGEMENT MEASURES.....	64
TABLE 30: NUTS 4/5 AREAS MOST DEPENDENT ON SPECIES SUBJECT TO MANAGEMENT MEASURES.....	64
TABLE 31: NUMBERS OF EMPLOYED IN FISHERIES IN EU OBJECTIVE 1 REGIONS.....	67
TABLE 32: NUMBER AND EMPLOYMENT CHARACTERISTICS OF EU FISHERIES DEPENDENT NUTS AREAS FALLING WITHIN OBJECTIVE 1 REGIONS.....	68
TABLE 33: BACKWARDS AND FORWARDS EMPLOYMENT MULTIPLIERS FOR FISHING AND FISH PROCESSING IN THE EU .....	70
TABLE 34: ESTIMATIONS OF FISHERIES EMPLOYMENT MULTIPLIERS IN EU REGIONS.....	72
TABLE 35: RELATIONSHIP BETWEEN DIRECT EMPLOYMENT IN MARINE FISHING AND OTHER FISHERIES RELATED EMPLOYMENT .....	75
TABLE 36: JOB LOSSES IN FISHING AND FISH PROCESSING DUE TO IMPACT OF SARDINE QUOTAS IN PORTUGAL.....	76
TABLE 37: AVERAGE LABOUR UTILISATION IN EU FISHING FLEETS.....	77
TABLE 38: ESTIMATES OF AVERAGE OUTPUT PER JOB IN THE EU FISHERY SECTOR.....	79

TABLE 41: PRINCIPAL FISHERIES ACCESS AGREEMENTS CONCLUDED BY THE EU.....	81
TABLE 42: EMPLOYMENT IN AREAS DEPENDENT ON MOROCCAN FISHERIES ACCESS.....	82
TABLE 43: EU FISHING OPPORTUNITIES UNDER EU-MOROCCO FISHERIES AGREEMENT, 1995-1999.....	83
TABLE 44: LINKS BETWEEN FISH LANDINGS AND THE EU PROCESSING SECTOR.....	85
TABLE 45: EMPLOYMENT CHANGES IN FISHING (NOMINALLY BETWEEN 1990 AND 1996/97).....	86
TABLE 46: CHANGES IN EU FLEET STRUCTURE 1990 - 1996/97.....	88
TABLE 48: CHANGES IN EMPLOYMENT IN FISH PROCESSING BETWEEN 1990 AND 1996/97.....	90
TABLE 49: EU FISHERIES DEPENDENT AREAS WITH MOST SIGNIFICANT DEPENDENCY INCREASES (NOMINALLY BETWEEN 1990 AND 1997).....	92
TABLE 50: EU FISHERIES DEPENDENT AREAS WITH MOST SIGNIFICANT DEPENDENCY DECREASES (NOMINALLY BETWEEN 1990 AND 1997).....	92
TABLE 51: NUMBER AND EMPLOYMENT CHARACTERISTICS OF EU FISHERIES DEPENDENT AREAS (ZONES OF DEPENDENCY) IN 1990.....	93
TABLE 52: POTENTIAL EMPLOYMENT IMPACT OF REDUCTIONS IN FLEET CAPACITY.....	96
TABLE 53: ESTIMATED NUMBERS EMPLOYED IN TUNA CANNING.....	98

**LIST OF ACRONYMS USED**

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<b>ACP</b>	African Caribbean and Pacific (Lome Convention) Countries
<b>CFP</b>	Common Fisheries Policy
<b>ERDF</b>	European Regional Development Fund
<b>ESF</b>	European Social Fund
<b>FDA</b>	Fisheries Dependent Area
<b>FIFG</b>	Financial Instrument for Fisheries Guidance
<b>FT</b>	Full-time
<b>FTE</b>	Full-time equivalent
<b>GRIT</b>	Generation of Regional Input-output Tables
<b>MAGP</b>	Multi-Annual Guidance Programme
<b>MS</b>	Member State (of the European Union)
<b>NGO</b>	Non-Governmental Organisation
<b>NUTS</b>	Nomenclature of Territorial Units for Statistics
<b>PO</b>	Producer Organisation
<b>PT</b>	Part time
<b>SWOT</b>	Strengths, weaknesses, opportunities and threats
<b>TAC</b>	Total Allowable Catch
<b>TTWA</b>	Travel to Work Area
<b>WTO</b>	World Trade Organisation

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**DEFINITIONS OF KEY TERMS**

<b>Aquaculture</b>	The managed reproduction and/or on-growing of fishery products.
<b>Common Fisheries Policy</b>	A collection of market, structural and conservation policy measures implemented at Community level by the EU
<b>Employment Multiplier</b>	A factor applied to the number employed in an activity which provides an estimate of the number of up- and down-stream jobs which are dependent on that activity.
<b>Financial Instrument for Fisheries Guidance</b>	An EU structural fund designed to support the structural component of the Common Fisheries Policy
<b>Fisheries Fishery products</b>	The exploitation of living aquatic resources Fish, mollusca and crustacea obtained from fishing and/or aquaculture (including shellfish culture and farming in fresh, brackish or seawater); also includes sea algae, sea urchins, sponges and corals of economic importance
<b>Fishing</b>	The capture, harvesting or gathering of fishery products from the wild when pursued with a vessel and/or equipment designed for the purpose
<b>Inland aquaculture</b>	The aquaculture of freshwater or euryhaline species of fish, mollusca or crustacea in freshwater.
<b>Inland fishing</b>	Fishing in freshwater.
<b>Marine aquaculture</b>	The aquaculture of marine or euryhaline species of fish, mollusca or crustacea in brackish water or seawater, including land-based systems
<b>Marine fishing</b>	Fishing in the sea, estuarine or coastal lagoon waters
<b>Multi-Annual Guidance Programme</b>	An agreed programme of managed changes to the Community fishing fleet as measured by the fleet registers of Member States
<b>Producer Organisation</b>	A voluntary association of fishers or aquaculture producers formed for the purpose of ensuring improved marketing conditions for their production.

# 1 Introduction

Fisheries may be defined as the exploitation of living aquatic resources, and is pursued for subsistence, economic and recreational purposes. One of the principal benefits of this activity is the socio-economic impact on jobs and incomes, not just in fishing, but also in up- and down-stream activities. These benefits frequently fall in areas which have few other alternative economic activities. In the European Union, as elsewhere, fisheries-related employment is affected by several factors. Like other industries based on exploitation of natural resources, it is subject to global trends in supply and demand, and from competitive pressures. Capital investment in pursuit of improved efficiency and productivity can also replace labour. Regulatory requirements for higher standards of safety and hygiene also impact on employment by increasing costs. In addition, in the EU, the structural component of the Common Fisheries Policy, as implemented through the Multi-Annual Guidance Programmes, requires Member States to ensure a phased reduction of registered fishing capacity in selected fleet segments.

The restructuring of the fishing industry resulting from these factors is frequently accompanied by unemployment and hardship for many people who are dependent upon fishing for their livelihoods. These effects have particular impact where a whole community is affected, where other industries in the area are tied in closely with the fishing industry, creating negative up- and down-stream effects, and where there are few opportunities for finding alternative work. EU present policy in such areas is to compensate for these negative effects, and to provide support through investments in job creation and training programmes. It is vital that the areas whose local economies are the most dependent upon the fishery sector are identified in order that efforts to reduce the negative impact of the fleet reductions can be targeted effectively.

In 1991 the European Commission DGXIV Fisheries commissioned a number of studies of fisheries dependency throughout the Member States. A second series of studies, which is the subject of this report, was commissioned in 1998, for implementation during 1999. These studies were conducted in each of 22 defined regions, covering the whole of the EU fishery sector.

## 1.1 Aims of the Studies

The aims of this series of studies are set out in the Specifications which are included in Annex 1. They can be described briefly thus;

- To quantify and describe the socio-economic importance of fishing and aquaculture industries in Europe.
- To determine the level of dependency of these areas in terms of jobs and incomes.
- To examine the trends in evolution of employment since the 1991 socio-economic studies and provide some kind of explanations for this change.
- To examine the extent to which the socio-economic measures currently in place have been implemented.
- To examine the potential of the coastal areas for conversion and diversification of their employment.

## 1.2 Implementation

The work was conducted by considering 22 separate fisheries regions, broadly reflecting natural geographical divisions in the nature of fisheries activity. These regions are defined in **Table 1**. Each region was the subject of a separate study undertaken by consultants contracted by the Directorate

General for Fisheries of the European Commission. An additional study was contracted to coordinate methodologies and consolidate the results. This is the report of the consolidation study, implemented by Megapesca Lda., fisheries consultants in Portugal.

**Table 1: List of the regions studied**

COUNTRY	REGION	COMPOSITION OF REGION
Belgium & Luxembourg	BL1	The two countries together
Germany & Austria	DA1	The two countries together
Denmark	DK1	The whole country
Spain	E1	Galicia, Asturias, Cantabria, Basque Country, Rioja, Navarre, Aragon, Madrid, Castile-Leon, Castile-La Mancha
Spain	E2	Andalusia (Atlantic coast), Canary Islands, Extremadura
Spain	E3	Andalusia (Mediterranean coast), Murcia, Valencia, Catalonia, Balearic Islands, Ceuta-Melilla
France	F1	Nord/Pas-de-Calais, Picardy, Upper Normandy, Lower Normandy, Lorraine, Alsace, Franche-Comté, Burgundy, Centre, Champagne-Ardenne, Île-de-France
France	F2	Brittany, Loire Region, Poitou-Charentes, Aquitaine, Limousin, Midi-Pyrénées
France	F3	Languedoc-Roussillon, Provence-Alpes-Côte d'Azur, Corsica, Auvergne, Rhône-Alpes
France	F4	Guadeloupe, Martinique, French Guiana, Réunion
Greece	GR1	The whole country
Italy	I1	Liguria, Tuscany, Lazio, Campania, Calabria, Piedmont, Valle d'Aosta, Lombardy
Italy	I2	Friuli-Venezia, Giulia, Veneto, Emilia-Romagna, Marche, Abruzzi, Molise, Apulia, Basilicata, Trentino, Umbria
Italy	I3	Sicily, Sardinia
Ireland	IRL1	The whole country
The Netherlands	NL1	The whole country
Portugal	P1	Mainland Portugal
Portugal	P2	Azores, Madeira
United Kingdom	UK1	England, Wales
United Kingdom	UK2	Scotland, Northern Ireland
Sweden	SV1	The whole country
Finland	FIN1	The whole country

### 1.3 Aims of this Report

The aims of this report are;

- To describe the general methodology adopted for the studies and to highlight the data shortfalls and methodological difficulties that have arisen with the project, and the associated limits on interpretation of the data.
- To provide an overview of the situation in the European fisheries sector, including aquaculture.

- To summarise the fisheries dependency ratios resulting from the 22 regional studies, and to provide an EU wide synthesis of fisheries dependency.
- To analyse the changes in fisheries-related employment and dependency since 1991.
- To examine the impact of current socio-economic measures at regional and sub-regional levels, and to propose a future direction for the support of fisheries dependent communities.

#### **1.4 Outline of the Report**

The methodology adopted for data collection and analysis is described. The report then follows the structure of the study described in the Specifications, which was divided into four tasks.

- |        |  |
|--------|--|
| Task 1 | • Brief analysis of fishing and related activities               |
| Task 2 | • Quantifying, describing and examining the nature of dependency |
| Task 3 | • Examination of the development of the industry                 |
| Task 4 | • Examination of socio-economic measures                         |

The last section considers forward trends in factors which will impact on fisheries employment, and in particular those which will result from implementation of CFP policy measures such as capacity reduction and management of catch quantities. Through an understanding of the nature and location of such impacts, policy options for new and improved socio-economic support measures are then discussed and proposed.

## 2 Methodology

### 2.1 Overview of Methodology

The broad approach to the methodology is defined in the Specifications in Annex 1. The detailed methodology was developed by the consultants undertaking the Coordination and Consolidation Study, in collaboration with the European Commission DG Fisheries.

Two workshops were held in Brussels, with the participation of all of the consultants undertaking the regional studies, the coordination group and staff from DG Fisheries. The first workshop was to assist the development of a harmonised methodology across the study regions, and was held on 14<sup>th</sup>.December 1998. On the basis of this workshop, and the consensual decisions made, the consultants prepared detailed Methodological Guidelines (available at <http://www.megapesca.com>) which were distributed to all of the regional study participants in January 1999.

The second workshop was held in Brussels on 14<sup>th</sup>.October 1999, with the objective of undertaking a detailed comparison of the definitions of the key variables in the different study regions, and deciding on the common definitions and calculation methods for the indicators of dependency to be used.

The methodology applied in the studies can be considered in relation to the four tasks, which are described briefly as follows.

#### 2.1.1 Task 1: Brief Analysis of the Fishing Industry

Task 1 provided an overview of the whole fishing industry in each lot, covering the basic economic parameters of fleet structure, production, processing, on-shore infrastructure and ancillary trades (such as vessel construction and repair). Aquaculture (both coastal and inland) was also included. In all cases there was a focus on data relating to employment and value added. Task 1 was achieved mainly by using secondary data sources, not only from the Community and Member State sources, but also from local authorities, port authorities and regional fisheries administrations, previous research documents and other similar sources.

Also undertaken was a brief assessment of compliance with community directives on health and safety in the fishery sector, and the undertaking of a SWOT analysis to identify the industry's strengths, weaknesses, opportunities and threats.

#### 2.1.2 Task 2: Quantifying, Describing and Examining the Level of Dependency

Task 2 involved measuring three indicators of dependency. These were the share of fisheries activity in the value added of the area (**Ratio 1**), the share of fisheries employment in total regional employment (**Ratio 2**), and the share of catches subject to CFP quota management measures as a proportion of total catches (**Ratio 3**). These were the indicators used in the previous socio-economic fisheries studies (1991) and their recalculation is designed to highlight change since those studies.

In addition to these measures of dependency, wherever feasible, employment multipliers were calculated to gauge the level of linkages between fishing and other related industries in the region. These can measure the extent to which changes in fishing will have an impact on the local economy, and therefore provide a important indicator of the ultimate dependency of a region on a local landings of fish. Multipliers were calculated by creating local input-output models from national input-output tables. The national tables were adjusted using location quotients which reflected the relative importance of

each type of industry in the local area, along with additional local data on cost structures and outputs to improve the models.

In addition to the quantitative indicators, case studies were undertaken in each of the 22 study regions. These helped to illustrate the different kinds of dependency which exist within the different regions of the EU, and also provided some in-depth data to help interpret the dependency measures, and to provide a basis for estimates of additional parameters such as gender breakdowns and full-time equivalence in employment.

### **2.1.3 Task 3: Examination of the Development of the Industry and Level of Dependency**

Task 3 was an examination of the changes over time in socio-economic parameters and levels of dependency. A key requirement was therefore to ensure consistency of definitions (both of regions and employment variables) with those established in the earlier socio-economic studies conducted in 1991. This Task also took into account the major structural developments in Community fisheries, namely the addition of the Swedish and Finnish fisheries, and the re-unification of Germany.

### **2.1.4 Task 4: Examination of Existing Socio-economic Measures, Proposals for Improving these Measures and Forward Study of Trends in Employment**

This fourth task required identification and comment on the types of measures available to the fishery sector in each region, the extent of their application and their actual and perceived effects, taking into account the likely future trends in the fishery sector of each region.

## **2.2 Data Specifications**

To help with data collection, and also to ensure a compatible database, a standardised set of data tables was completed by all of the study participants. These covered data requirements for all four tasks. Detailed guidance notes for rapid appraisal in the case study areas, and also on topics that needed to be covered under task four were also sent round by the Coordination and Consolidation study team.

Any EU-wide study of regional economic conditions will experience the problem of comparability of data. This is due to significant variations in availability and quality of data, as well as the use of different definitions of economic variables in different member states. Before any meaningful interpretation of the data on regional fisheries dependency can be applied for policy-making purposes, there is a need for thorough understanding of these variations.

### **2.2.1.1 Regional level**

It was decided that the minimum regional level would be NUTS 3 (except for inland fisheries and aquaculture where NUTS 2 would be acceptable). However, where data were available, NUTS 4 and NUTS 5 regional levels would provide a more realistic picture of fisheries dependency. It was stressed, however, that these territorial units should be aligned so comparisons between the different regions could be made easily. However, in some regions, data were not available even at NUTS 3, for example, in the UK, where all of the employment data for fisheries are available on a port by port basis, using Travel to Work Areas as the basis of the regional definitions.

A major constraint was also the regional disaggregation used in the previous 1991 studies, since for Task 3 it was necessary to maintain, as far as possible, comparability of data. The areas for which the 1991 study developed dependency indicators were extremely heterogeneous, with different regions

reporting at different NUTS levels, such that in many cases the only common base for comparison was at NUTS 2 level.

### **2.2.1.2 Year**

To make the data as comparable as possible, it was decided to standardise, as far as possible, the year for which data were collected. Having established details of data availability for the different years, it was decided that the target reference year of 1997 be utilized for all of the tasks, in following countries (total 12 study regions):

- Belgium and Luxembourg
- France
- Italy
- Ireland
- Finland
- Denmark
- Netherlands

The target reference year of 1996 was decided upon for the following countries (10 study regions):

- Germany and Austria
- Spain
- Greece
- Portugal
- UK
- Sweden

It was then proposed that as far as possible, for the 1996 target year countries, that data for Task 1 should also be provided for 1997. This would provide as much data as possible for inter-state comparisons for the common year of 1997.

There were situations where it was decided that the data available in the target year were not of sufficient quality, or simply not available, and other years were used. For example, for fish processing, the data collected for the UK 1 (England and Wales) and Portugal P1 (Mainland) were taken from 1995, and for Ireland, from 1998. Where different years have been used, this is identified in the text and tables.

### **2.2.1.3 Employment by Gender**

Due to the known high proportion of women employed in parts of the fishery sector in some regions, the breakdown of employment data by gender is of particular interest for these studies. However, in many regions, these data were not available, especially for coastal fishing. Frequently, the fishers were all assumed to be male, for example, in Ireland, Sweden, Greece, Netherlands and Denmark. In Greece, although males appear to be exclusively involved in capture fishing, women also participate, for example, in coiling and baiting long lines. Better data were found for processing, where gender breakdowns were available for 14 out of the 22 regions, and marine aquaculture (with seven out of the 22 regions providing an employment breakdown by gender).

### **2.2.1.4 Employment by Hours Worked**

Ideally, data would have been available not only for the actual numbers of people involved in the industry, but also in terms of full-time equivalent (FTE) or with some indication of a breakdown between full-time and part-time. However, because of the nature of the fishing industry, with large numbers self-employed, the work is often seasonal and/or casual. Fishers rarely work a standard 8-hour day and these data are hard to come by. In many cases, there are no data. Some participants made estimates based on average numbers of hours worked (Portugal) or months worked (France) or a general assumption that part-time is equivalent to a certain fraction of full-time (for example, in the UK studies, part-time is assumed to be 0.5 of full-time).

In general, the employment data for processing are better documented and a breakdown by part-time/full-time more frequently found, but not always (for example, there is no breakdown in Belgium & Luxembourg). It was decided that all employment data should be provided both as total numbers (full-time plus part-time) and FTEs, and that where these data are not available, estimates would be made. However, in several cases, no data were available to permit estimation.

#### ***2.2.1.5 Disaggregation by Industrial Sector***

The disaggregation of output and employment data by type of industry was problematic. Definitions for each classification were not always available, and this caused problems when trying to compare the different types of employment in the fishing sector. It is not only a problem from region to region, but also between years. For example, in the Netherlands, wholesaling and trading was included with processing in the 1991 study data, but the classification has now changed to exclude these activities, leading to the appearance of a huge reduction in processing employment. Aquaculture, in particular, is also frequently poorly defined. In Portugal for example, the statistical data on aquaculture include 'viveiros', the harvesting of bivalve mollusca from privately managed fisheries. To overcome this difficulty and to assist comparison, employment data were presented in the most disaggregated form possible. Each study also presented in their final report a summary of the definitions and sources of all data on employment, value added and dependency.

#### ***2.2.1.6 Value-Added Data***

Data on value added in fishing and processing were required for Ratio 1 as described in the Specifications, yet they were not always available directly and estimates were made, using different techniques. Finland, Ireland and Portugal used wage data as a proxy for value-added. In Greece, for each NUTS 3 region, the fishery sector gross product was divided by the gross domestic product, as was done in the previous 1991 studies. This may overstate the ratio slightly, but at least means that change from the previous study can be measured. In the UK studies, value added was calculated from 'crew share plus vessel share' (i.e. wages to employees and management of total landings) as a proportion of local landings (expressed as local vessel landings plus foreign landings by local vessels) and for the processing value-added, the broad regional value-added per FTE was multiplied by the local employment in processing.

#### ***2.2.1.7 A Note on Exchange Rates***

In all cases regional studies provided financial values in actual local currencies. These data have been converted in this report to ECU at the official annual average exchange rates shown in Table 2.

**Table 2: Official median ECU exchange rates 1996-1998 (Source European Commission)**

COUNTRY	1995	1996	1997	1998
Belgium		39.29860	40.55320	
Germany		1.90954	1.96438	
Denmark		7.35934	7.48361	
Spain		160.74800	165.88700	
France		6.49300	6.61260	
Greece		305.54600	309.35500	
Italy		1958.96000	1929.30000	
Ireland		0.79345	0.74752	0.78625
Netherlands		2.13973	2.21081	
Portugal	196.10500	195.76100	198.58900	
United Kingdom	0.828789	0.813798	0.692304	
Sweden		8.51472	8.65117	
Finland		5.82817	5.88064	

*NB. The final report for Austria gives values in ECU*

### 2.3 Methodological Problems and their Solution

Some of the problems encountered have already been covered above under data availability and quality. The majority of the problems became an issue when trying to compare the data, either from one time period to the next, or from one region to the next.

#### 2.3.1 Comparison of Employment Data with Previous Studies

In the summary results of the previous studies, the capture fishing sector was examined separately, but all other fishing related activities were consolidated in an 'others' category. However, this category was frequently not fully defined. Where definitions were given it was clear that they varied significantly from one region to another. In some cases, aquaculture and processing were considered separately, in others aquaculture and processing were combined in the "others" category. In addition, some studies included in this category a wide range of other upstream and downstream activities, for example, under a general heading of "ancillary industries". Except for fishing as such, this makes it very difficult, and in some cases impossible, to compare the employment data from the present studies with those previously undertaken. This should be taken into account when considering the results for Task 3.

Another problem arose in the use of different sources of data from one time period to the next, which included/excluded different things. One final problem lay in the matching up of regions, for example in Denmark where it was considered to be too complex a task to aggregate data from hundreds of NUTS 5 areas used in the 1991 study. Also in some regions, data were presented in terms of 'zones of dependency' which were not defined, making it impossible to calculate the ratios in the present studies on the same basis.

#### 2.3.2 Calculation of Ratios

Three main problems arose with the calculations of the ratios. These were related to

- Definition of NUTS areas
- Use of FTEs for Ratio 2
- Level of aggregation for wider measurements of ratio

### **2.3.2.1 NUTS Areas**

To enable comparison of regional dependency indicators, there is a need to ensure that the definition of areas within regions is consistent across study regions. The Specifications require fisheries dependency ratios at a minimum level of NUTS 3. One major problem experienced with this was that in some regions, the territorial divisions for which employment data were available were not NUTS based. This was the case for all the study regions in France and the UK. In the UK, the fishing employment data are collected on a port, rather than NUTS basis, and so fisheries dependency areas were based on TTWAs (travel to work areas). There was no option but to accept this regional definition in the UK study. A separate study will be required to prepare estimates of dependency at NUTS 3 level for UK. In France, TTWAs were also used as these were considered to be a better basis for calculating dependency. However, in this case the data were capable of being re-aggregated to NUTS 3 level.

There was a second problem here that relates to the fact that the NUTS definitions are based on historical administrative boundaries. This means that the area and population size of the NUTS 3 areas can vary considerably between member states which can significantly affect the ratio. Furthermore, although a NUTS 4/5 area may appear to be very dependent on fishing, if the NUTS 3 area of which it is a part has a very large population, when the ratio is calculated at this level, the dependency will appear insignificant. There is nothing that can be done to address this without redesigning the territorial classification. It is therefore important that the dependency ratios should be considered in the context of the total population of the areas to which they apply.

### **2.3.2.2 Choice of Employment Measure**

It is important when comparing data between regions and years to ensure that one is comparing like with like and especially so when considering employment ratios. However, across the European regions, the employment data are collected in many different ways, and include and exclude different features. The following Table 3 provides a summary of definitions of employment in fishing and processing applied in the different study regions.

Providing that the same basis is used for the both the numerator and the denominator of Ratio 2 (ie. total employment) then the effect on the ratios is considered to be minimised. However in terms of an absolute measure of fisheries employment, it was decided to use PT+FT in all cases where feasible, since it was considered to represent more fully the real importance of fishing in an area. Most regional studies were able to manage this.

In terms of employment in fishing, the exceptions were Denmark and Sweden (which could only provide full-time equivalents) and Netherlands (where only full-time fishers are recorded). In cases where FT+PT data were not available, estimates were made based on the FTE data. In terms of processing employment, most regional studies were able to provide data on total number employed (FT+PT). In Denmark, where data were not available directly, an estimate was made based on the annual employment survey. Sweden could only provide data in FTE form (but in the case of fishing this was considered to be equal to full-time) and Finland could only provide numbers of full-time employees (although an FTE estimate is available).

The choice of the denominator of Ratio 2 also required detailed consideration. The Specifications ask for total employment. However, this was not always available as such, and for some regions an estimate was made based on workforce factored by unemployment rates, or based on historical ratios between employment and population of working age. Estimates of total employment were made for France F3 (Mediterranean), Portugal P1 and P2 and the UK2 Regions. The precise methodologies used are specified in the regional reports.

Table 3: Regional Employment Definitions

COUNTRY	REGION	FISHING EMPLOYMENT	PROCESSING EMPLOYMENT
Belgium & Luxembourg	BL1	Total number employed (FT+PT) in fishing	Total number employed (FT+PT)
Germany & Austria	DA1	Total number employed (FT+PT); includes marine aquaculture (mussels) but excludes inshore fishermen	Total number employed (FT+PT); includes wholesaling activities of processing companies
Denmark	DK1	FTE Equivalent	FTE Equivalent; Total number employed (FT+PT) estimated from annual survey
Spain	E1	Total number employed (FT+PT) in fishing, inc. onshore	Total number employed (FT+PT)
Spain	E2	Total number employed (FT+PT) in fishing	Total number employed (FT+PT)
Spain	E3		
France	F1	Total number employed (FT+PT) in fishing	Total number employed (FT+PT) excluding <i>mareyage</i> Includes inland processing locations
France	F2		
France	F3		
France	F4		
Greece	GR1	Total number employed (FT+PT) in fishing	Total number employed (FT+PT)
Italy	I1	Total number employed (FT+PT) in fishing	Total number employed (FT+PT)
Italy	I2		
Italy	I3		
Ireland	IRL1	Total number employed (FT+PT) in fishing	Total number employed (FT+PT)
The Netherlands	NL1	Number of full-time fishers (excludes part-time)	Total number employed (FT+PT) exc. companies <20 employees
Portugal	P1	Total numbers employed (FT+PT) in fishing	Total numbers employed (FT+PT)
Portugal	P2		
United Kingdom	UK1	Total numbers employed (FT+PT). FTE estimated on basis that $PT=0.5*FT$	Total numbers employed (FT+PT)
United Kingdom	UK2	Total numbers employed (FT+PT).; FTE estimated on basis that $PT=0.5*FT$ (crofter fishers $0.3*FT$ )	Total numbers employed (FT+PT)
Sweden	SV1	FTE only available (no.of licensed fishers)	FTE only available
Finland	FIN1	Full time or main occupation; FTE available	Full-time employees and FTE available

Note:

*Mareyage*, encountered in France, is the activity of wholesaling of fresh fish accompanied by a limited amount of primary processing



### 2.3.2.3 Aggregation Level of Wider Measurement of Fishery Related Activities

The problems arising from different aggregations of ‘fishing–related’ activities were considered briefly in Section 2.3.1. These problems relate to the inclusion of different sub-sectors, and overlap between different activities. Many of these were evident on an initial comparison of the ratios from region to region.

After detailed consideration of which activities should be included in the numerators of Ratio 2, the following disaggregations and definitions were agreed:

<b>Fishing</b>	All fishing activities conducted from a vessel
<b>Processing</b>	All fish processing activities, including primary processing, but excluding <i>mareyage</i> <sup>1</sup> and distribution activities
<b>Marine aquaculture</b>	Activities in the culture of finfish and bivalve mollusca when introduction of juveniles and/or feeding is conducted
<b>Total fishery sector</b>	All activities including the above, plus (where data available) inland fishing, inland aquaculture, vessel construction and repair, marketing and distribution (including <i>mareyage</i> ) and gathering of bivalve mollusca.

The Ratio 2 (Total) is included to enable comparison with the previous study. Because the extent of inclusion of activities varies across regions, inter-regional comparisons using this ratio should be interpreted with caution. In some regions only the capture fishing, processing and aquaculture are included, whereas in others, it may include vessel construction and repair, marketing and distribution and estimations of other upstream and downstream activities.

It was agreed by the study participants that employment in processing should be defined narrowly, as being involved in transformation of the product. Wholesale and retail marketing and distribution were excluded from these figures, and this should be borne in mind when considering total numbers of employed in the fishery sector. In the case of France, the activity of *mareyage* was therefore described separately, and is not included in the ratio calculations for the processing sector, although it is included in the Ratio 2 (Total).

It was also decided that employment in marine aquaculture should be defined as employment in the culture of marine fish and mollusca, but would exclude the gathering of mollusca by hand, even from leased-managed systems (for example clams from *viveiros* in Portugal). The numbers employed in this activity are included in the "others" category, and classified in the same category as *marisqueo* in Spain or *pêche des coquillages à pied* in France. The numbers engaged in this activity are quite substantial. Note that mollusc fishing from a vessel (eg. scallop dredging in Scotland) is considered to be a fishing activity and treated accordingly.

### 2.3.2.4 Estimations of Fishery-related Employment

In some instances data on numbers employed in a sector were not available, and estimations were made. This was especially the case for regional aquaculture employment, for example in Denmark and Germany, where employment was estimated using productivity per employee figures, thus assuming constant productivity between the regions. The Danish national figures for total marine and inland and aquaculture employment were only available at national level from specific one-off surveys, which did not examine the regional breakdown. Estimates were made for ancillary industries. For the Netherlands,

<sup>1</sup>*Mareyage*, encountered in France, is the activity of wholesaling of fresh fish accompanied by a limited amount of primary processing

employment in vessel construction and repair (VCR) was estimated from cost structures of the fishing sector in combination with surveys of experts. In Germany, it was estimated on the basis of gross landings. Both these measurements are circular and make it difficult to make estimations of multipliers and ratios where fishing related industries are included, since the direct and indirect employment are thus directly related.

### **2.3.2.5 Calculation of Ratio 3**

Ratio 3 is the share of landings subject to CFP quota management measures as a proportion of total landings. It was decided that the share should be calculated on the basis of landing value, rather than volume.

### **2.3.3 Employment Multipliers**

The method for estimation of employment multipliers proposed by the Coordination study was based on the Generation of Regional Input-output Tables (GRIT) technique. The method involved the mechanical adjustment of national input-output tables with employment data, and then the insertion of any 'superior' or local data, where available in relevant branches.

Sufficient data to calculate the multipliers using the GRIT method were not available in all study regions. In some cases, the national input-output tables were insufficiently disaggregated (for example, France). In others, the general employment data were not well disaggregated and did not match the classifications used by the national input-output tables (for example Ireland). Instead, both of these studies used a basic ratio of employment in fishing to employment in fishing-related activities to produce estimates of multipliers. In several other regions sufficient data were not available to calculate multipliers using the GRIT method, but case study data were used to provide estimations.

In the event, only ten of the regional studies produced usable multipliers based on the GRIT method. These were Denmark, Greece, Portugal (Mainland), Portugal P2 (Islands), Spain E1 and E2, UK1 (England & Wales), and UK2 (Scotland and N.Ireland), Sweden and Finland. Belgium, Germany, France (Regions F1 North and F2 Brittany and Bay of Biscay) and Ireland produced estimates based on ratios of capture fishing to onshore fishing related activities. Italy provided estimates of employment multipliers, but data anomalies could not be resolved in time for this report. No estimates were presented for Spain E3, France (Region F3 Mediterranean & F4 Exterior) and the Netherlands.

### **2.3.4 Comparability with Previous Studies**

The level of comparability with the previous studies depends on the correspondence of three main variables. These are regional boundary definitions, the nature of the time period selected for study, and content of the aggregations of fishing and fishing-related industries.

Firstly, the regions need to be directly comparable, for example if NUTS 3 areas were used in the previous studies, then they should here be used in this one for direct comparison. This is not entirely straightforward, however, as some of the Community's NUTS boundaries have been changed. Also, some of the previous studies used 'Fishing dependent areas' based on Travel-to-work areas (TTWAs) or amalgamations of NUTS 4 and 5 areas. This creates difficulties in trying to create a comparison from one time period to the next, and in making inter-regional comparisons. For the present studies, all consultants were requested to use units that could be aggregated to NUTS 3 for inter-regional comparison, but owing to the way fisheries and employment data are collected in some countries, this was not possible.

Secondly, the start and end year of the development period should ideally have been the same. However, in the previous studies, number of fishers were quoted, depending on the area, for points in time ranging from mid-1981 (in the case of Portugal) to the end of 1991. Similarly for the present studies,

number of fishers are quoted for periods between January 1996 and the end of 1997. This creates different developmental time periods, and any interpretation of the development of the sector should bear in mind that the period over which the change is quoted may vary quite significantly ( in extreme cases between six and fifteen years).

The third factor, that of aggregations of fishing and fisheries-related industries is the most intractable. In the studies, most of the countries provided data for fishing, and then for a category called 'others'. Both of these categories incorporated different fisheries related activities in different regions. In some instances, the fishing category just included marine capture fishing, and in others it also included aquaculture and inland fishing. The 'others' category is even more diverse, with some studies including only fish processing, while others included aquaculture, inland fishing, boat building and repairs, commerce, retail and wholesale distribution as well as other fishing-related activities. This significantly reduces the validity of inter-regional comparisons. In some cases there was also a change in the sources of data or the definition of a key variable over time, which has the effect of reducing the validity of making comparisons of the ratios over time. The Task 3 analysis should therefore be interpreted with caution.

## **2.4 Maps and Database of Dependency**

### **2.4.1 Description of Maps and Database**

The availability of regional structural funds in the EU is determined by boundaries defined by the NUTS classification system. It is therefore necessary to present data for mapping of fisheries dependency defined by NUTS 3 areas. Apart from this report, one of the main outputs of these projects is the development of dependency maps (and data tables) to illustrate graphically, at NUTS 3 levels (and lower regional levels of disaggregation where available), the regional values of the Ratios 1, 2 and 3, as well as other key economic indicators for the fishery sector.

Therefore for each region (with the exception of the UK1 and UK2 regions, up to five maps are presented at NUTS 3 level to show:

- Employment in fishing and Employment Ratio 2 (fishing)
- Value of fish landings and Value Added Ratio 1 (fishing)
- Employment in processing and Employment Ratio 2 (processing)
- Volume of fish landings and Ratio 3 (quota dependency)
- Volume of marine aquaculture production and Employment Ratio 2 (marine aquaculture)

The aquaculture maps are only constructed for regions where there is a significant aquaculture activity. In addition to the above, where data are available at a lower level of regional disaggregation eg. NUTS 4 or NUTS 5, these are also presented, either in a table format, or as a map, where such maps were produced in the final report of the regional study.

For the UK, the mapping is prepared on the basis of the TTWAs, and there are some variations in the way that the above variables are presented.

### **2.4.2 Methodology**

In order to present the results of the studies in a map format the use of boundary coordinate data and mapping software is necessary. The coordinate sets for NUTS 3 boundaries were purchased from a commercial supplier (GISCO). These are readable both in MapInfo and Arcview, which are two of the major mapping software programs. These commercial software packages are costly, and require some familiarisation for their effective use.

For the maps and database to be usable, it is necessary to employ software which all users possess, and which is easy to use. For this reason it was decided to produce digital maps by using the mapping option within Microsoft Excel 97, and to present these in association with tables containing the key socio-economic data for each region, also in Excel format.

To generate maps with Excel 97, it was first necessary to read the boundary data into MapInfo and export the coordinates as MapInfo files. The data to be mapped were requested from the study partners in the form of summary Excel spreadsheets with the corresponding NUTS 3 codes. Maps were then generated and the data allocated to the NUTS 3 area accordingly. The Excel files are available to be transported in either map format or picture format into other software packages such as Microsoft Word or PowerPoint, and can be converted to HTML files for publication on the internet.

### **2.4.3 Technical Issues**

The Excel mapping option is not as sophisticated as MapInfo and problems were experienced when processing the larger files, for example when trying to generate maps of the entire EU15 Member States. Further problems were encountered during the tagging of NUTS codes to the corresponding area, especially where these were divided areas or archipelagos of islands. Furthermore the Excel mapping software automatically allocates the shading or size of graduated symbol to the range of values being mapped. Given the wide range of dependency ratios (from less than 1 to 35%) care is therefore needed in the comparison of maps between different regions since the variable ranges and shading conventions are not consistent.

### **2.4.4 Data Issues**

The GISCO coordinate set defines NUTS 3 boundaries and most regional studies were able to provide data at this or higher levels of disaggregation, such as NUTS 4 and 5. However, as discussed, the regional studies for the UK1 and UK2 were unable to provide their data sets aggregated to NUTS 3 levels. Here the maps present dependency defined by the TTWAs (which cross NUTS 3 boundaries).

### **2.4.5 Interpretation**

The maps provide a guide to relative dependency on fisheries within regions. However, caution is advised in the use of the maps to compare dependency ratios between regions, since there are sufficient differences in the methodologies used to calculate the ratios (for example in computation of value added, and definitions of employment) such that apparent differences in dependency could be due as much to methodological variation as to true differences in the socio-economic characteristics of the region. This is especially the case when comparing dependency ratios at low levels of dependency, and when the data are highly disaggregated.

It should also be remembered that the Eurostat NUTS 3 regions follow administrative boundaries and the average population of these areas varies substantially. Dependency ratios should always be considered in the light of the relative population size of the area concerned, in order to assess the true socio-economic impact of the fishery sector.

## **3 Task 1: Brief Analysis of Fishing and Related Activities in the EU**

### **3.1 Introduction**

This section gives an overview of the fisheries sector of the EU. It is divided into four parts. The first provides a summary of fishing and related activities, presenting and describing the key structural and economic data on the fishery sector in each of the Member States. Sections are presented on fleet structure, and production quantity and value in fishing, processing, coastal and inland aquaculture and inland fishing. Where no date is given the data presented are for 1997. An asterisk (\*) signifies 1996 data. Where other years are used, the year is specified.

The second part provides summaries of employment in the different sub-sectors (in fishing, processing, coastal and inland aquaculture and inland fishing), broken down where available by gender and by numbers employed (by part-time/full-time and FTEs). The third part provides a synthesis at Community level of the regional SWOT analyses (Strengths, Weaknesses, Opportunities and Threats) conducted by each of the regional studies. A review of the key fishery sectors on a region by region basis, along with dependency maps is provided in a separate volume, and is also available on CD and on the internet at <http://www.megapesca.com>

### **3.2 Fishing and related activities**

#### **3.2.1 Fleet Structure**

In 1997, there was a total of 99,528 vessels registered in the EU Member States. Total fishing power was just under 8 million kW, and the total tonnage was just over 2 million GRT. Greece had the largest fleet in terms of numbers, with over 20,000 vessels (21% of the total), but over 90% of these vessels were under 10m. The second largest fleet was in Spain and this had almost one third of the total tonnage of the EU. This is despite 75% of the fleet being under 10 m in length. Table 4 highlights the enormous variation in structural characteristics of the EU fleet.

The pattern of a small modern segment of the fleet representing a large percentage of the capacity is common; for example in Germany, out of a total of 2,377 vessels, 13 large trawlers represent almost 50% of the fleet tonnage. These trawlers are registered in the ports of Rostock, Bremerhaven and Cuxhaven. For the EU as a whole, 70% of the vessels are under 10m, and only in the Netherlands and Belgium are there greater numbers of vessels over 10m than under. The Belgian fleet is unusual in that most of the vessels are corporate (as opposed to family) owned, with a correspondingly different capital structure. On the whole, the EU fleet is an aging fleet, with few vessels introduced in recent years - only 12.5% of the total EU fleet had been purchased in the ten years previous to 1997. The regions with relatively newer fleets are the Netherlands, Northern France, Finland and Belgium.

**Table 4: EU Fleet Structure**

<b>COUNTRY</b>	<b>REGION</b>	<b>NUMBER OF VESSELS</b>	<b>CAPACITY (GRT)</b>	<b>POWER (kW)</b>
<i>Belgium</i>	<i>BL1</i>	<i>152</i>	<i>22,875</i>	<i>65,228</i>
<i>Germany</i>	<i>DA1</i>	<i>2,337</i>	<i>59,035</i>	<i>161,503</i>
<i>Denmark</i>	<i>DK1</i>	<i>4,582</i>	<i>97,985</i>	<i>355,215</i>
<i>Spain*</i>	E1	10,025	353,807	799,610
	E2	3,257	116,275	485,075
	E3	4,959	89,853	563,207
	<b>Total</b>	<b>18,241</b>	<b>559,935</b>	<b>1,847,892</b>
<i>France</i>	F1	1,024	36,797	199,200
	F2	3,331	115,610	591,567
	F3	1,900	17,773	170,055
	F4	2,820	17,566	182,237
	<b>Total</b>	<b>9,075</b>	<b>187,746</b>	<b>1,143,059</b>
<i>Greece*</i>	<i>GRI</i>	<i>20,491</i>	<i>110,904</i>	<i>655,891</i>
<i>Italy</i>	I1	4,685	48,930	345,290
	I2	6,704	106,437	688,941
	I3	4,954	88,734	442,828
	<b>Total</b>	<b>16,343</b>	<b>244,101</b>	<b>1,477,059</b>
<i>Ireland</i>	<i>IRL1</i>	<i>1,244</i>	<i>61,000</i>	<i>190,349</i>
<i>Netherlands</i>	<i>NLI</i>	<i>464</i>	<i>134,628</i>	<i>384,325</i>
<i>Portugal*</i>	P1	9,319	102,248	330,816
	P2	2,273	18,170	64,504
	<b>Total</b>	<b>11,592</b>	<b>120,418</b>	<b>395,320</b>
<i>UK *</i>	UK1	4,856	93,344	473,370
	UK2	3,158	111,554	486,182
	<b>Total</b>	<b>8,014</b>	<b>204,898</b>	<b>959,552</b>
<i>Sweden</i>	<i>SV1</i>	<i>2,077</i>	<i>44,224</i>	<i>230,721</i>
<i>Finland</i>	<i>FIN1</i>	<i>3,987</i>	<i>24,070</i>	<i>219,441</i>
<b>EU TOTAL</b>		<b>99,528</b>	<b>2,053,240</b>	<b>7,991,591</b>

*Sources:*

1. *Figures for kW and GRT taken from the Community Register of Fishing Vessels Half Yearly Bulletin Jul-Dec 1997*
2. *Annual Report to the Council and the European Parliament on the results of the multi-annual guidance programmes for the fishing fleet at the end of 1997. European Commission COM (1999) 175 Final, Brussels 1999*

*Note:*

1. *\* indicates data from 1996*
2. *Swedish data from 1998*

**3.2.2 Landings of Marine Fish**

The landings of the main species of marine fish are shown in Table 5. A more comprehensive table is provided in Annex 2.

Total annual landings in the EU in 1996/97 amounted to 5.6 million tonnes, with a value of 6.3 billion ECU. Although Denmark lands some 32% of the EU total (1.8 million tonnes) most of this is used for reduction, and is of relatively low unit value. In all other regions with the exception of Sweden, the

landings are utilised mainly for human consumption, and have much higher unit value. After Denmark the UK had the next highest landings, with 645,000 tonnes (11% of the EU total). Spain is the next largest producer, with landings of 611,000 tonnes about half of which are in the region Spain E1 North. Landings in Italy and France were 440,000 and 400,000 tonnes respectively. In terms of value, the catches from Italy, Spain, France and the UK are the most valuable, accounting for 24%, 17%, 16% and 11% respectively. Finland, Portugal P2 Islands (Azores and Madeira), and Belgium are the regions with the smallest catches in terms of both volume and value.

**Table 5: Landings of main marine fish species by EU member states 1996/97**

COUNTRY	VALUE (ECU)	% BY VALUE	VOLUME (TONNES)	% BY VOLUME
Belgium	71,631,050	1.14	20,854	0.37
Germany	160,205,256	2.55	208,415	3.71
Denmark	437,355,768	6.96	1,812,686	32.31
Spain*	1,056,067,257	16.80	611,923	10.91
France	978,504,673	15.57	399,969	7.13
Greece	451,086,671	7.18	124,386	2.22
Italy	1,524,311,927	24.25	441,326	7.87
Ireland	176,750,732	2.81	239,702	4.27
Netherlands	358,142,491	5.70	431,590	7.69
Portugal*	253,207,899	4.03	202,950	3.62
United Kingdom*	676,096,780	10.76	645,391	11.50
Sweden	115,591,302	1.84	351,000	6.26
Finland	26,709,678	0.42	120,220	2.14
<b>EU TOTAL</b>	<b>6,285,661,484</b>	<b>100.00</b>	<b>5,610,412</b>	<b>100.00</b>

Notes:

1. \* indicates 1996 data
2. Swedish data include landings in Denmark
3. Values are at first sale excluding landings made by third country vessels into the regions
4. Not all regions could provide data on the source of landings. In some regions landings include EU landings by national vessels outside of the region, in others it may include landings of fish by vessels of other MS. There may be therefore double counting of some landings.
5. The regional and EU totals include a wide range of products, including part processed products (eg. fish frozen at sea) and bivalve mollusca

### 3.2.3 Fish Processing

Data on the output of the fish processing sector are less reliable than that for fishing, because of the different methods of data collection and definition of this activity in different regions. In some regions, processing excludes small businesses and wholesale trading; in others, these activities are included. Data on volume of output are not always available, and in any case are not directly comparable between regions (or even between sectors within regions) because of the wide variation of presentations.

The estimated total output of the processing industry is nearly 11.3 billion ECU, as shown in Table 6. This is almost double the output of the fishing sector. Spain, France, Denmark, Germany, and Portugal produce the greatest value of processed fish, each with an output over 1 billion ECU per year in 1996/97. Spain is by far the largest producer, with an output of 2.25 billion ECU in 1996, accounting for 20% of the EU production. In Spain, the activity is concentrated in Regions E1 North (especially in Galicia) and E2 (Atlantic coast and Canary Isles). France accounts for 16.5% of output, mainly from the regions F1

(North) and F2 (Brittany and the Atlantic coast).) Denmark and Germany (with Austria) are also major producers of processed fish, with outputs corresponding to 12.7% and 11.2% of EU value.

A comparison of Tables 5 and 6 illustrates the general lack of linkages between fish landings and the processing sector. For example Portugal, with only 4% by value of EU landings, produces 9% of the processed fish. Italy, with over 24% by value of EU landings, produces only 5% of the value of processed fish. The differences reflect the extent to which the market uses processed rather than fresh fish, and the use of imports rather than local supplies as raw material for processing.

**Table 6: Value and quantity of output of the fish processing sector in 1996/97**

COUNTRY	REGION	VALUE (ECU)	% BY VALUE	QUANTITY (TONNES)
<i>Belgium</i>	<i>BL1</i>	236,627,442	2.08	41,282
<i>Luxembourg</i>	<i>L1</i>	<i>n.a.</i>	<i>n.a.</i>	<i>na.</i>
<i>Germany</i>	<i>DA1</i>	1,269,880,064	11.19	416,894
<i>Austria</i>	<i>AU1</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<i>Denmark</i>	<i>DK1</i>	1,446,880,049	12.75	
<i>Spain*</i>	E1	1,057,267,899	9.31	
	E2	341,780,831	3.01	151,780
	E3	871,611,970	7.68	
	<b>Total</b>	<b>2,270,660,700</b>	<b>20.00</b>	
<i>France</i>	F1	820,252,246	7.23	
	F2	919,456,795	8.10	
	F3	130,054,744	1.15	
	F4	<i>n.a.</i>	<i>n.a.</i>	
	<b>Total</b>	<b>1,869,763,785</b>	<b>16.47</b>	
<i>Greece</i>	<i>GR1</i>	89,793,280	0.79	29,321
<i>Italy</i>	I1	251,973,773	2.22	48,054
	I2	224,919,401	1.98	42,837
	I3	105,295,703	0.93	20,082
	<b>Total</b>	<b>582,188,358</b>	<b>5.13</b>	<b>110,973</b>
<i>Ireland</i>	<i>IRL1</i>	270,907,923	2.39	145,000
<i>Netherlands</i>	<i>NL1</i>	464,535,623	4.09	82,000
<i>Portugal*</i>	P1	434,971,061	3.83	139,000
	P2	582,188,877	5.13	
	<b>Total</b>	<b>1,017,159,938</b>	<b>8.96</b>	
<i>UK*</i>	UK1	578,434,318	5.10	433,900
	UK2	294,544,838	2.59	
	<b>Total</b>	<b>872,979,156</b>	<b>7.69</b>	
<i>Sweden*</i>	<i>SV1</i>	297,291,397	2.62	77,208
<i>Finland</i>	<i>FIN1</i>	79,923,274	0.70	38,771
<b>TOTAL</b>		<b>11,350,779,866</b>	<b>100.00</b>	

Note:

1. \* indicates 1996
2. UK1 data are for 1995
3. Ireland data are for 1998

### 3.2.4 Marine Aquaculture Production

Table 7 shows the principal economic features of the marine aquaculture sector in each of the 22 study regions. Note that the definition of employment in marine aquaculture excludes the small scale harvesting of bivalve mollusca from managed estuarine waters (eg. the *viveiros* in Portugal P1). However, for the purposes of aquaculture output, such production is included, but to provide a more accurate picture where data are available, the production is subsequently disaggregated into finfish and mollusca (in Table 8 and Table 9).

The total output volume was 903,374 tonnes in 1996, with a value of over 1385 million ECU. The major producers are France (220,277 tonnes), Spain (207,393 tonnes), Italy (143,200 tonnes) and the UK (114,250 tonnes), which account for nearly 75% of production volume between them. In terms of value, France and UK are the most important, with outputs of 362.5 million and 360.0 million ECU respectively, the UK's position being largely due to the influence of the Scottish salmon industry. Greece is also a significant producer; although the quantity is relatively low (46,644 tonnes with a value of 164.7 million ECU) a significant part of the production is high-value seabass and bream. Of the 22 study regions, Belgium and Luxembourg and Portugal P2 (Islands) had no production whatsoever.

Broadly speaking, about one third of the aquaculture production by value comprises bivalve mollusca, and the remainder is fish. Table 8 shows the production of bivalve mollusca in marine aquaculture. Total output was 514,052 tonnes, worth 488.3 million ECU (excluding Spain, where disaggregated aquaculture is not available). Within the major producing regions, concentrations of production are found in Galicia in Northern Spain, where mussels are the main produce, and the west coast of France in Marenne, La Rochelle and Arcachon (oysters).

Table 9 shows the production of fish species in marine aquaculture, again with the exclusion of Spain. The main species produced are seabass and bream, salmon, eel and turbot. Total production was 181,929 tonnes with a value 793.8 million ECU. The sector is dominated by the production of salmon in UK2 (Scotland and N.Ireland) most of which is located in Scotland, where 101,387 tonnes was produced in 1997, worth 350.3 million ECU. Greece is the next largest producer, with an output of 21,210 tonnes of seabass and seabream. This was worth 129.2 million ECU. Ireland is the only other producer of note, with a production of 15,441 tonnes of salmon, valued at 53.4 million ECU.

Greek hatcheries are also a major supplier of juvenile fish, generating revenues of another 31.4 million ECU, all of which is consumed by the aquaculture sector. Some of the other recorded output may also include juveniles so the total production for the sector in Table 7 and Table 9 is likely to be over-estimated.

Table 7: Total EU marine aquaculture production, volume and value (1996/97)

COUNTRY	REGION	VALUE (ECU)	% BY VALUE	PRODUCTION (TONNES)	% BY VOLUME
<i>Belgium</i>	<i>BL1</i>	0	0.00	0	0.00
<i>Germany</i>	<i>DA1</i>	11,010,090	0.79	22,424	2.48
<i>Denmark</i>	<i>DK1</i>	20,043,802	1.45	7,352	0.81
<i>Spain*</i>	E1	54,687,424	3.95	196,623	21.77
	E2	28,888,986	2.09	4,617	0.51
	E3	19,273,626	1.39	6,153	0.68
	<b>Total</b>	<b>102,850,036</b>	<b>7.43</b>	<b>207,393</b>	<b>22.96</b>
<i>France</i>	F1	68,354,354	4.94	39,456	4.37
	F2	242,415,993	17.50	155,342	17.20
	F3	49,148,595	3.55	25,240	2.79
	F4	2,495,236	0.18	239	0.03
	<b>Total</b>	<b>362,414,178</b>	<b>26.17</b>	<b>220,277</b>	<b>24.38</b>
<i>Greece*</i>	<i>GR1</i>	164,718,243	11.89	46,644	5.16
<i>Italy</i>	I1	59,347,432	4.28	44,991	4.98
	I2	84,173,016	6.08	82,972	9.18
	I3	30,727,726	2.22	15,237	1.69
	<b>Total</b>	<b>174,248,174</b>	<b>12.58</b>	<b>143,200</b>	<b>15.85</b>
<i>Ireland</i>	<i>IRL1</i>	66,230,021	4.78	31,113	3.44
<i>Netherlands</i>	<i>NL1</i>	56,223,737	4.06	89,400	9.90
<i>Portugal*</i>	P1	19,161,691	1.38	4,009	0.44
	P2	0	0.00	0	0.00
	<b>Total</b>	<b>19,161,691</b>	<b>1.38</b>	<b>4,009</b>	<b>0.44</b>
<i>United Kingdom*</i>	UK1	7,961,676	0.57	12,185	1.35
	UK2	352,012,563	25.42	102,065	11.30
	<b>Total</b>	<b>359,974,239</b>	<b>25.99</b>	<b>114,250</b>	<b>12.65</b>
<i>Sweden</i>	<i>SV1</i>	7,345,045	0.53	4,316	0.48
<i>Finland</i>	<i>FIN1</i>	40,811,884	2.95	12,998	1.44
<b>TOTAL</b>		<b>1,385,031,140</b>	<b>100.00</b>	<b>903,374</b>	<b>100.00</b>

## Notes:

1. Production value for Spain E1 is for Galicia only
2. \*1996 data. Note no date is given for Spain E2
3. Portugal P1 data include production in "viveiros"

**Table 8: Value and volume of marine aquaculture production of crustacea and bivalves (1996/97)**

<b>COUNTRY</b>	<b>REGION</b>	<b>SPECIES</b>	<b>VALUE (ECU)</b>	<b>VOLUME (TONNES)</b>
<i>Germany</i>	<i>DA1</i>	<i>Mussels</i>	<i>11,010,090</i>	<i>22,424</i>
<i>France</i>	F1	Oyster, mussels	54,290,294	37,756
	F2	Oyster, mussels	226,688,443	153,574
	F3	Oysters, mussels, crevettes	28,733,025	22,868
	<i>Total</i>		<i>320,721,852</i>	<i>236,622</i>
<i>Greece*</i>	<i>GR1</i>	<i>Mussels &amp; oysters</i>	<i>4,172,858</i>	<i>25,434</i>
<i>Italy</i>	I1	Mussels	22,923,858	40,206
	I2	Mussels	44,319,183	77,732
	I3	Mussels	6,877,106	12,062
	<i>Total</i>		<i>74,120,147</i>	<i>130,000</i>
<i>Ireland</i>	<i>IRL1</i>	Oysters	4,888,190	3,654
		Mussels	6,366,419	11,852
		Others	1,523,713	166
	<i>Total</i>		<i>12,778,322</i>	<i>15,672</i>
<i>The Netherlands</i>	<i>NL1</i>	<i>Mussels &amp; oysters</i>	<i>56,223,737</i>	<i>89,400</i>
<i>Portugal*</i>	<i>P1</i>	<i>Clams</i>	<i>12,398,809</i>	<i>3,018</i>
<i>United Kingdom</i>	<i>UK 1</i>	Mussels	5,906,943	11,684
		Oyster	1,448,063	401
	<i>Total</i>		<i>7,355,006</i>	<i>12,085</i>
<i>Sweden</i>	<i>SVI</i>	<i>Blue mussels</i>	<i>581,699</i>	<i>1,821</i>
<b>TOTAL</b>			<b>488,352,430</b>	<b>514,052</b>

*Notes:*

1. *Excludes Spain due to lack of disaggregated aquaculture data*
2. *\* 1996 data*
3. *Portugal P1 data includes production in "viveiros"*

**Table 9: Value and volume of marine aquaculture production of fish (1996/97)**

COUNTRY	REGION	SPECIES	VALUE (ECU)	VOLUME (TONNES)
<i>Denmark</i>	<i>DK1</i>	<i>Rainbow Trout</i>	<b>20,043,802</b>	<b>7,352</b>
<i>France</i>	F1	Fin fish (bar, daurade, salmon)	14,064,060	1,700
	F2	Finfish (turbot, trout, bar)	15,727,550	1,768
	F3	Fin fish	20,415,570	2,372
	F4	Crayfish & fin fish, tilapias and trout	2,495,236	239
	<b>Total</b>		<b>38,638,356</b>	<b>4,379</b>
<i>Greece*</i>	<i>GRI</i>	Bass & Bream Fry	31,415,892	n.a.
		Bass & Bream	129,129,493	21,210
	<b>Total</b>		<b>160,545,385</b>	<b>21,210</b>
<i>Italy</i>	I1	Seabass, gilthead seabream, other marine sp.	25,089,411	3,350
		European eel	11,334,163	1,435
	I2	Seabass, gilthead seabream, other marine sp.	28,085,316	3,750
		European eel	11,768,517	1,490
	I3	Seabass, gilthead seabream, other marine sp.	22,468,253	3,000
		European eel	1,382,367	175
	<b>Total</b>		<b>100.128.027,00</b>	<b>13.200,00</b>
<i>Ireland</i>	<i>IRL1</i>	<i>Salmon</i>	<b>53,451,699</b>	<b>15,441</b>
<i>Portugal*</i>	<i>P1</i>	<i>Fin fish</i>	<b>6,762,882</b>	<b>989</b>
<i>United Kingdom*</i>	UK1	Fish	606,670	100
	UK2	Salmon	350,265,201	101,387
	UK2	Salmon/Trout	1,747,362	678
	<b>Total</b>		<b>352,619,233</b>	<b>102,165</b>
<i>Sweden</i>	<i>SV1</i>	<i>Rainbow Trout/other</i>	<b>6,763,346</b>	<b>2,495</b>
<i>Finland</i>	<i>FIN1</i>	<i>Fish</i>	<b>40,811,884</b>	<b>12,998</b>
<b>TOTAL</b>			<b>793,828,674</b>	<b>181,929</b>

Notes:

1. Excludes Spain due to lack of disaggregated aquaculture
2. \* indicates data from 1996

### 3.2.5 Inland Aquaculture Production

Inland aquaculture production is widely practised in all EU member states. The output of inland aquaculture was estimated to be 632 million ECU in 1997, corresponding to 203,000 tonnes as shown in Table 10. The main species produced are trout and carp.

The sector is particularly important in Germany (22.6% of EU output value, mainly trout and carp) and Italy (21.4% by value). France also has an important inland aquaculture industry and produced 27,350 tonnes of trout, mostly in Brittany and Aquitaine. Inland aquaculture is also important in Denmark which produced 31,597 tonnes (12.0% of EU output value), more than it does in marine aquaculture. Here the production was mainly rainbow trout and eels. The UK production of trout amounts to 7.1% by volume and 10% by value of the total of the EU.

Table 10: Inland aquaculture production (1996/97)

COUNTRY	REGION	SPECIES	VALUE (ECU)	%	OUTPUT (TONNES)	%
<i>Belgium &amp; Luxembourg</i>	BL1	Trout	3,231,919	0.5	1,100	0.5
		Carp	1,233,557	0.2	500	0.2
	<b>Total</b>		<b>4,465,475</b>	<b>0.7</b>	<b>1,600</b>	<b>0.8</b>
<i>Germany</i>	DA1	Trout	60,642,544	9.6	18,808	9.3
		Other	81,896,069	13.0	20,737	10.2
	<b>Total</b>		<b>142,538,613</b>	<b>22.6</b>	<b>39,545</b>	<b>19.5</b>
<i>Austria</i>	DA1	Carp	1,680,000	0.3	800	0.4
		Rainbow trout	10,686	0.0	3,800	1.7
	<b>Total</b>		<b>12,366,000</b>	<b>2.0</b>	<b>4,200</b>	<b>2.1</b>
<i>Denmark</i>	DK1	Rainbow Trout	64,407,418	10.2	31,957	15.7
		Eels	11,685,831	1.9	1,200	0.6
	<b>Total</b>		<b>76,093,249</b>	<b>12.0</b>	<b>33,157</b>	<b>16.3</b>
<i>Spain*</i>	E1	Rainbow Trout	14,824,446	2.3	6,337	3.1
		Sub-total	18,622,502	2.9	n.a.	n.a.
	E2		n.a.	n.a.	n.a.	n.a.
	E3	Sub-total	370,745	0.1	530	0.3
	<b>Total</b>		<b>18,993,247</b>	<b>3.0</b>	<b>6,867</b>	<b>3.4</b>
<i>France*</i>	F1	Trout	30,999,935	4.9	12,111	6.0
	F2	Trout	70,001,339	11.1	27,348	13.5
	F3		n.a.	n.a.	n.a.	n.a.
	F4		n.a.	n.a.	n.a.	n.a.
	<b>Total</b>		<b>101001274</b>	<b>16.0</b>	<b>39,459</b>	<b>19.4</b>
<i>Greece</i>	GR1	Trout	5,903,203	0.9	2,244	1.1
		Other	3,142,702	0.5	531	0.3
	<b>Total</b>		<b>9,045,905</b>	<b>1.4</b>	<b>2,775</b>	<b>1.4</b>
<i>Italy*</i>	I1		29,974,602	4.7	10,676	5.3
	I2		104,787,229	16.6	37,323	18.4
	I3		235,837	0.0	84	0.0
	<b>Total</b>		<b>134,997,668</b>	<b>21.4</b>	<b>48,083</b>	<b>23.7</b>
<i>Ireland</i>	IRL1	<i>Rainbow Trout</i>	<b>3,008,630</b>	<b>0.5</b>	<b>1,250</b>	<b>0.6</b>
		<i>Arctic char</i>	<b>282,601</b>	<b>0.0</b>	<b>65</b>	<b>0.0</b>
		<i>Salmon Smolts</i>	<b>6,321,315</b>	<b>1.0</b>		<b>0.0</b>
		<i>Eels</i>	<b>164,811</b>	<b>0.0</b>	<b>22</b>	<b>0.0</b>
	<b>Total</b>		<b>9,777,357</b>	<b>1.5</b>	<b>1,337</b>	<b>0.7</b>
<i>Netherlands</i>	NL1	<b>Total</b>	<b>23,792,185</b>	<b>3.8</b>	<b>4,400</b>	<b>2.2</b>
<i>Portugal</i>	P1	Trout	3,042,611	0.5	1,326	0.7
	P2	Trout	52,104	0.0	12	0.0
	<b>Total</b>		<b>3,094,715</b>	<b>0.5</b>	<b>1,338</b>	<b>0.7</b>
<i>United Kingdom</i>	UK1	Rainbow Trout	1,846,530	0.3	7,102	3.5
		Brown Trout		0.0	478	0.2
		Sub-total	1,846,530	0.3	7,580	3.7
	UK2	Scotland,	60,067,543	9.5	5,664	2.8
		Northern Ireland	2,457,612	0.4	1,100	0.5
		Sub-total	62,525,155	9.9	6,764	3.3
	<b>Total</b>		<b>64,371,685</b>	<b>10.2</b>	<b>14,344</b>	<b>7.1</b>
<i>Sweden</i>	SV1	Rainbow trout	7,091,601	1.1	2,467	1.2
		Arctic Char	437,125	0.1	83	0.0
	<b>Total</b>		<b>9,165,892</b>	<b>1.5</b>	<b>2,753</b>	<b>1.4</b>

COUNTRY	REGION	SPECIES	VALUE (ECU)	%	OUTPUT (TONNES)	%
<i>Finland</i>	FIN1	Crayfish	221,064	0.0		0.0
		Salmon Juveniles	25,507,428	4.0		0.0
	<i>Total</i>		<i>21,936,388</i>	<i>3.5</i>	<i>3,330</i>	<i>1.6</i>
<b>EU TOTAL</b>			<b>631,639,653</b>	<b>100.0</b>	<b>203,188</b>	<b>100.0</b>

Notes to Table 11:

1. Value of French aquaculture production is estimated from EU average unit values

2. Danish trout production is 1998

3. It should be noted that some of the recorded output( ie juveniles and eggs) provides inputs elsewhere in the aquaculture industry. Aquaculture output figures are therefore considered to be over estimated.

4. Percentage shares are distorted by non-availability of data

5. 1996 data for Spain E1 and E3, Greece, Northern Ireland and Sweden.

### 3.2.6 Production from Inland Capture Fishing

This sector is not of major economic importance compared to other fishery sub-sectors, with total production of 89,200 tonnes, value 258 million in ECU in 1997, as shown in Table 11. Inland capture fishing is of significance in only a few EU regions. Italy is by far the largest producer, with nearly 70,000 tonnes (78% of the total). The main species are carp, trout eels and members of the perch family, and most of the production is in the Italy I1 region. Other countries with a notable production are Finland (5.2% of production, 2.6% of value) and Germany (4.6% of production, 7.5% of value.)

Table 11: Output quantity and value in inland fishing in the EU (1996/97)

COUNTRY	REGION	SPECIES	VALUE (ECU)	%	OUTPUT (TONNES)	%
<i>Belgium</i>	<i>BL1</i>	<i>n.a.</i>				
<i>Germany</i>	<i>DA1</i>	<i>Total</i>	<b>19,242,713</b>	<b>7.46</b>	<b>4,136</b>	<b>4.62</b>
<i>Denmark</i>	<i>DK1</i>	<i>n.a.</i>				
<i>Spain</i>	<i>Total</i>	<i>n.a.</i>				
<i>France</i>	<i>Total</i>	<i>n.a.</i>				
<i>Greece*</i>	<i>GRI</i>	<i>Total</i>	<b>7,473,179</b>	<b>2.90</b>	<b>2,938</b>	<b>3.28</b>
Italy	I1	Carp & trout	26,657,855		10,084	
		Eels	6,150,936		2,061	
		Pikes and black bass	9,096,564		3,462	
		Bleak, common carps & tenches	37,313,015		14,602	
		Siverside	32,364,588		11,466	
		Sub-total	111,582,958	43.28	41,675	46.50
Italy	I2	Carp & trout	3,658,840		1,400	
		Eels	9,863,681		3,206	
		Pikes and black bass	4,792,930		1,606	
		Bleak, common carps & tenches	14,717,255		4,739	
		Siverside	51,293,733		16,859	
		Sub-total	84,326,439	32.71	27,810	31.03
Italy	I3	Carp & trout	1,408,283		255	
		Bleak, common carps & tenches	55,461		10	
		Sub-total	1,463,744	0.57	265	0.30
<b>Italy Total</b>	<b>Total</b>		<b>197,372,104</b>	<b>76.56</b>	<b>69,750</b>	<b>77.83</b>
<i>Ireland</i>	IRL1	Salmon	2,172,529		570	
		Eels	849,480		168	
		<b>Total</b>	<b>3,022,009</b>	<b>1.17</b>	<b>738</b>	<b>0.82</b>
<i>Netherlands</i>	<i>NLI</i>	<b>Total</b>	<b>9,136,923</b>	<b>3.54</b>	<b>3,500</b>	<b>3.91</b>
<i>Portugal *</i>	<i>P1</i>	<b>Total</b>	<b>2,371,733</b>	<b>0.92</b>	<b>1,022</b>	<b>1.14</b>
<i>Portugal</i>	<i>P2</i>		<b>0</b>		<b>0</b>	
<i>United Kingdom</i>	<i>UK1</i>	<i>n.a.</i>				
Scotland*	UK2	Sub-total	2,747,348		476	
Northern Ireland*		Sub-total	5,545,602		827	
	<b>Total</b>		<b>8,292,950</b>	<b>3.22</b>	<b>1,303</b>	<b>1.45</b>
<i>Sweden*</i>	SV1	Vendace	1,577,738		604	
		Perch	1,003,556		279	
		Others	1,712,329		722	
	<b>Total</b>		<b>4,293,623</b>	<b>1.67</b>	<b>1,605</b>	<b>1.79</b>
<i>Finland*</i>	FIN1	Vendace	4,415,623		2,264	
		Others	2,185,420		2,364	
	<b>Total</b>		<b>6,601,043</b>	<b>2.56</b>	<b>4,628</b>	<b>5.16</b>
<b>EU TOTAL</b>			<b>257,806,277</b>	<b>100.00</b>	<b>89,620</b>	<b>100.00</b>

\* indicates data from 1996

### 3.3 Employment in fisheries

#### 3.3.1 Overview of Employment in the Fishery Sector

Table 12 shows a summary of employment in fishing, fish processing and other fisheries related activities in each of the study regions, with sub-totals by country. Table 13 shows the regional employment by sector on a percentage basis.

The entire sector employed 526,034 people in 1996/97, corresponding to 0.33% of the total employment in the EU in 1997. Of these, 251,602 were employed in marine fishing, 96,250 in fish processing, and 56,438 in aquaculture (of which 45,341 were in marine aquaculture). A further 9,597 were employed in inland fishing. Estimates of other employment, which include a range of activities such as gathering of bivalve mollusca, vessel construction and repair and fish marketing and distribution (including *mareyage* in France) totalled 112,147.

Although the reliability of the data on employment in fishing and processing is considered to be quite high, less comprehensive data are available for activities such as inland fishing and for the "other" employment, which for several countries (such as Portugal, Greece and UK) does not include employment in fish distribution. It is also known that some fisheries dependent employment in vessel construction and repair was not recorded by the regional studies, since in many cases it is difficult to disaggregate these data. Inland fishing, being a diverse and largely artisanal part-time activity is also under-recorded in official statistics. For these reasons, the number of land-based jobs in the EU fishery sector, or directly dependent on it, is likely to be under-estimated in Table 12.

It is possible to make a better estimate of fisheries dependent employment in the EU based on the sum of the estimated forward and backwards multipliers for marine fishing (using a median value of 2.0, derived from Section 4.7). This would suggest that the total number of jobs dependent on fisheries was likely to be in the region of 580,000 to 600,000 in 1996/97.

In terms of the recorded numbers employed on a regional basis, Spain has the largest fishery sector, with a total of 132,631 employed in fisheries (25.2% of the EU total), followed by Italy with 106,984 (20.3%) and France with 66,804 (12.7%). Of all of the regions studied, Spain E1 (North) had the largest numbers employed in the sector, with 94,148. This pattern reflects the distribution of employment in marine capture fishing, with Spain accounting for 68,275 jobs in this activity (27% of the total), Italy 43,547 (17%) and France 25,084 (10%). Other Member States with relatively large numbers employed at sea are Greece (41,251), Portugal (29,416) and UK (18,706). Ireland, Germany, Denmark, Belgium, Finland, Sweden and Netherlands all have less than 7000 employed at sea. There is no employment in marine fishing in land-locked Austria and Luxembourg.

The distribution of employment in fish processing is quite different to that of employment in marine fishing. Fish processing is more evenly distributed throughout the EU, with the UK accounting for 19,920 jobs (some 20.7% of the EU total in this activity). Spain with 16,449 (17.5%) and France, with 12,132 (12.6%) employed also have significant employment in fish processing. Greece and Italy, despite having relatively high numbers employed in fishing (16.4% and 17.3% of fishers) have only relatively low levels of employment in processing (accounting for 2.5% and 6.7% of processing employment). This is the converse of the situation in Germany, which has a relatively large processing sector of 11,280 (11.7% of the EU processing employment), compared to employment in fishing of only 4,422 (1.8% of fishers).

The aquaculture sector accounts for 10.7% of the fishery-related jobs in the EU, and 81% of these are in marine aquaculture. France and Spain are the two countries with substantial employment in marine aquaculture, with 14,640 employed in the former and 14,542 in the latter, between them accounting for 64.4% of employment in the marine aquaculture sector. Most of this employment is in the culture of bivalve mollusca. Italy also has substantial employment in this activity (6,523 jobs). Greece and UK (in

particular Scotland) are the two regions where there is a substantial production of fish (seabass/ seabream and salmon respectively). Here employment is lower at 2,910 (6.4% of EU employed in the sector) and 2,625 (5.8%) respectively, despite the relatively higher value of production illustrated in Table 7. Inland aquaculture in the EU employs 11,045, with the major centres of employment found in Germany (2,825) and Italy (2,142). Although all other regions have some employment in this activity, France and UK are the only ones in which employment exceeds 1000.

Inland fishing accounts for only 1.8% of fishery sector employment. However there is no data for some regions and under-recording is suspected in the regions where zero employment is reported. Greece (2,701 employed), France (2501 employed), Portugal P1 (Mainland) (1,939 employed) and Finland (1,192) are the regions in which substantial numbers are recorded.

Table 12: Summary of fisheries employment in the EU (1996/97)

COUNTRY	REGION	FISHING	PROCESSING	AQUACULTURE			INLAND FISHING	OTHER	TOTAL FISHERIES
				MARINE	INLAND	TOTAL			
<i>Belgium</i>	<i>BL1</i>	745	1,261	0	137	137	0	436	2,579
<i>Luxembourg</i>	<i>BL1</i>				5	5		30	35
<i>Germany</i>	<i>DA1</i>	4,422	11,280	40	2,825	2,865	329	633	19,529
<i>Austria</i>	<i>DA1</i>	0	100		800	800			900
<i>Denmark</i>	<i>DK1</i>	5,866	8,588	300	793	1,093	5	3,714	19,266
<i>Spain*</i>	E1	38,797	13,123	13,565	303	13,868	0	28,360	94,148
	E2	11,951	2,028	466		466	0	3,195	17,640
	E3	17,527	1,699	511		511	0	1,106	20,843
	<b>Total</b>	<b>68,275</b>	<b>16,850</b>	<b>14,542</b>	<b>303</b>	<b>14,845</b>	<b>0</b>	<b>32,661</b>	<b>132,631</b>
<i>France</i>	F1	4,770	4,846	1,845	428	2,273	n.a.	3,247	15,136
	F2	12,939	6,156	10,270	785	11,055	n.a.	6,378	36,528
	F3	3,634	939	2,381		2,381	n.a.	1,351	8,305
	F4	3,741	191	144		144	n.a.	258	6,835
	<b>Total</b>	<b>25,084</b>	<b>12,132</b>	<b>14,640</b>	<b>1,213</b>	<b>15,853</b>	<b>2,501</b>	<b>11,234</b>	<b>66,804</b>
<i>Greece</i>	<i>GR1</i>	41,251	2,409	2,910	254	3,164	2,701		49,525
<i>Italy</i>	I1	10,258	2,874	751	1,044	1,795		16,134	31,061
	I2	16,939	2,400	4,490	1,088	5,578		20,906	45,823
	I3	16,350	1,173	1,282	10	1,292		11,285	30,100
	<b>Total</b>	<b>43,547</b>	<b>6,447</b>	<b>6,523</b>	<b>2,142</b>	<b>8,665</b>		<b>48,325</b>	<b>106,984</b>
<i>Ireland</i>	<i>IRL1</i>	6,274	4,920	1,958	240	2,198	150	2,000	15,542
<i>The Netherlands</i>	<i>NL1</i>	2,379	3,300	312	92	404	530	5,187	11,800
<i>Portugal*</i>	P1	24,194	5,059	452	81	533	1,939	5,963	37,688
	P2	5,222	1,416	5	6	11	0	54	6,703

COUNTRY	REGION	FISHING	PROCESSING	AQUACULTURE			INLAND FISHING	OTHER	TOTAL FISHERIES
				MARINE	INLAND	TOTAL			
	<b>Total</b>	<b>29,416</b>	<b>6,475</b>	<b>457</b>	<b>87</b>	<b>544</b>	<b>1,939</b>	<b>6,017</b>	<b>44,391</b>
<b>United Kingdom*</b>	UK1	9,895	9,598	850	855	1,705	0		21,198
	UK2	8,811	10,322	1,775	630	2,457			21,590
	<b>Total</b>	<b>18,706</b>	<b>19,920</b>	<b>2,625</b>	<b>1,485</b>	<b>4,162</b>	<b>0</b>		<b>42,788</b>
<b>Sweden</b>	<b>SV1</b>	<b>2,634</b>	<b>2,008</b>	<b>394</b>	<b>400</b>	<b>794</b>	<b>250</b>	<b>1,500</b>	<b>7,186</b>
<b>Finland</b>	<b>FIN1</b>	<b>3,003</b>	<b>560</b>	<b>640</b>	<b>269</b>	<b>909</b>	<b>1,192</b>	<b>410</b>	<b>6,074</b>
<b>TOTAL</b>		<b>251,602</b>	<b>96,250</b>	<b>45,341</b>	<b>11,045</b>	<b>56,438</b>	<b>9,597</b>	<b>112,147</b>	<b>526,034</b>

*Notes:*

1. All data are FT+PT, unless only FTE available ie. Germany "other" employment; Sweden fishing employment; Finland processing and aquaculture and employment
2. Database data are used in preference to the regional study report where discrepancies are identified
4. "Other" category includes small scale mollusc gathering (eg. "viveiros" in P1, "marisques" in E1 and "coquillage a pied" in F2), vessel construction and repair, and in some regions, and other up and down-stream activities. distribution and marketing.
4. Spain E1 processing employment includes 1,401 inland processing; other includes 9,200 jobs in "shellfishing"
5. France F1 F2 and F3; processing employment includes the coastal and inland processing locations (991 in F1, 17 in F2, 343 in F3); latter is not included in employment ratio tables calculations in Task 2
6. Italian "other" employment is estimated using employment multipliers as is "other" employment for Spain E1
7. Netherlands estimate of processing employment (including distribution) is 6051; "other" employment was calculated by from the overall total; includes c.2000 in vessel construction and repair and (6051-3300 =2751) in distribution.
8. Germany "other employment" is FTE
9. All data for France extracted from revised data sheets which differ from the regional study report.
10. Greece "other employment" not available
11. UK2 Aquaculture data differs from regional study report.
12. Finland processing and inland aquaculture employment is FTE

13. \* indicates data from 1996

Table 13: Percentage distribution of fisheries employment in the EU (1996/97)

COUNTRY	REGION	PERCENTAGE OF EMPLOYMENT IN THE SUB-SECTOR							
		FISHING	PROCESSING	AQUACULTURE	INLAND AQUACULTURE	TOTAL EMPLOYED IN AQUACULTURE	INLAND FISHING	OTHER	TOTAL EMPLOYED IN FISHERIES
<i>Belgium</i>	<i>BL1</i>	<i>0.3</i>	<i>1.3</i>	<i>0.0</i>	<i>1.2</i>	<i>0.2</i>	<i>0.0</i>	<i>0.4</i>	<i>0.5</i>
<i>Luxembourg</i>	<i>BL1</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>
<i>Germany</i>	<i>DA1</i>	<i>1.8</i>	<i>11.7</i>	<i>0.1</i>	<i>25.6</i>	<i>5.1</i>	<i>3.4</i>	<i>0.6</i>	<i>3.7</i>
<i>Austria</i>	<i>DA1</i>	<i>0.0</i>	<i>0.1</i>	<i>0.0</i>	<i>7.2</i>	<i>1.4</i>	<i>0.0</i>	<i>0.0</i>	<i>0.2</i>
<i>Denmark</i>	<i>DK1</i>	<i>2.3</i>	<i>8.9</i>	<i>0.7</i>	<i>7.2</i>	<i>1.9</i>	<i>0.1</i>	<i>3.3</i>	<i>3.7</i>
<i>Spain*</i>	E1	15.4	13.6	29.9	2.7	24.6	0.0	25.3	17.9
	E2	4.7	2.1	1.0	0.0	0.8	0.0	2.8	3.4
	E3	7.0	1.8	1.1	0.0	0.9	0.0	1.0	4.0
	<b>Total</b>	<b>27.1</b>	<b>17.5</b>	<b>32.1</b>	<b>2.7</b>	<b>26.3</b>	<b>0.0</b>	<b>29.1</b>	<b>25.2</b>
<i>France</i>	F1	1.9	5.0	4.1	3.9	4.0	0.0	2.9	2.9
	F2	5.1	6.4	22.7	7.1	19.6	0.0	5.7	6.9
	F3	1.4	1.0	5.3	0.0	4.2	0.0	1.2	1.6
	F4	1.5	0.2	0.3	0.0	0.3	26.1	0.2	1.3
	<b>Total</b>	<b>10.0</b>	<b>12.6</b>	<b>32.3</b>	<b>11.0</b>	<b>28.1</b>	<b>26.1</b>	<b>10.0</b>	<b>12.7</b>
<i>Greece</i>	<i>GRI</i>	<i>16.4</i>	<i>2.5</i>	<i>6.4</i>	<i>2.3</i>	<i>5.6</i>	<i>28.1</i>	<i>n.a.</i>	<i>9.4</i>
<i>Italy</i>	I1	4.1	3.0	1.7	9.5	3.2	n.a.	14.4	5.9
	I2	6.7	2.5	9.9	9.9	9.9	n.a.	18.6	8.7
	I3	6.5	1.2	2.8	0.1	2.3	n.a.	10.1	5.7
	<b>Total</b>	<b>17.3</b>	<b>6.7</b>	<b>14.4</b>	<b>19.4</b>	<b>15.4</b>	<b>n.a.</b>	<b>43.1</b>	<b>20.3</b>
<i>Ireland</i>	<i>IRL1</i>	<i>2.5</i>	<i>5.1</i>	<i>4.3</i>	<i>2.2</i>	<i>3.9</i>	<i>1.6</i>	<i>1.8</i>	<i>3.0</i>
<i>The Netherlands</i>	<i>NL1</i>	<i>0.9</i>	<i>3.4</i>	<i>0.7</i>	<i>0.8</i>	<i>0.7</i>	<i>5.5</i>	<i>4.6</i>	<i>2.2</i>
<i>Portugal*</i>	P1	9.6	5.3	1.0	0.7	0.9	20.2	5.3	7.2
	P2	2.1	1.5	0.0	0.1	0.0	0.0	0.0	1.3

COUNTRY	REGION	PERCENTAGE OF EMPLOYMENT IN THE SUB-SECTOR							
		FISHING	PROCESSING	AQUACULTURE	INLAND AQUACULTURE	TOTAL EMPLOYED IN AQUACULTURE	INLAND FISHING	OTHER	TOTAL EMPLOYED IN FISHERIES
	<i>Total</i>	<i>11.7</i>	<i>6.7</i>	<i>1.0</i>	<i>0.8</i>	<i>1.0</i>	<i>20.2</i>	<i>5.4</i>	<i>8.4</i>
<i>United Kingdom*</i>	UK1	3.9	10.0	1.9	7.7	3.0	0.0		4.0
	UK2	3.5	10.7	3.9	5.7	4.4	0.0		4.1
	<i>Total</i>	<i>7.4</i>	<i>20.7</i>	<i>5.8</i>	<i>13.4</i>	<i>7.4</i>	<i>0.0</i>	<i>0.0</i>	<i>8.1</i>
<i>Sweden</i>	<i>SV1</i>	<i>1.0</i>	<i>2.1</i>	<i>0.9</i>	<i>3.6</i>	<i>1.4</i>	<i>2.6</i>	<i>1.3</i>	<i>1.4</i>
<i>Finland</i>	<i>FIN1</i>	<i>1.2</i>	<i>0.6</i>	<i>1.4</i>	<i>2.4</i>	<i>1.6</i>	<i>12.4</i>	<i>0.4</i>	<i>1.2</i>
<b>TOTAL</b>		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

*Note*

1. *Percentage distributions are distorted by non-availability of data eg. "other" fishery sector employment in UK and Greece.*

*\* indicates data from 1996*

### 3.3.2 Employment in Marine Capture Fishing

Employment in capture fishing by region is shown in Table 14. The total number employed in fishing in the EU in 1996/97 was 251,602. One quarter of the fishers are Spanish with a total of 68,275, and more than half of these were in the region Spain E, with Galicia being the main centre. Italy has the next largest employment in fishing with 43,547, followed closely by Greece, with 41,334. Portugal has 29,416 employed in fishing and France, 25,804. As a percentage of the total national employment, only Greece has greater than 1% of the employment in fishing. Overall, the top 5 nations with the most fishers (Spain, Italy Greece, Portugal and France) accounted for 82.5% of fishing employment in the EU.

In terms of the gender of fishers, France, Ireland, UK, Sweden and Finland had no gender breakdown available in employment data. However gender data were available for other regions, comprising a total of 123,001 fishers (49% of the EU total). In these regions 6.2% of fishers were female. Female participation in fishing is recorded in fishing in Portugal P1, in an on-shore capacity in fishing corporations in Belgium & Luxembourg and Spain, and in gear repair and preparation in Greece. It should also be noted that a higher proportion of women are involved in mollusc harvesting in France, Spain and Portugal, but are not included in the number of fishers.

A breakdown in full-time and part-time was also difficult to find in many regions (such as Greece, Netherlands, Sweden, France, Portugal), although France managed to make estimates of FTEs from data on length of time worked. Where the data were available, it can be seen that part-time employment is of great importance in some areas. This was particularly so in Finland, where two-thirds of the fishers are part-time, and in Spain E2 Lot 5 (Atlantic Coast and Canary Islands), where 40% of the fishers are part-time. However, in Denmark, all the fishers were full-time, as are the majority in Northern Spain and Belgium & Luxembourg.

Most regional studies were able to provide estimates of FTE, either directly from statistical sources, or based on case study or direct survey. In some regions where a part-time/full-time split was available FTE was estimated by assuming (PT=0.5FT). Only in region F4 were was no estimate available. The population of EU fishers (FT+PT) for which FTE estimates were available was 247,875 corresponding to a FTE of 229,588. This indicates that on average the FTE/(FT+PT) ratio in fishing is 0.93, suggesting that fishers rely mostly on fishing as the only or main economic activity. Only in Greece, where survey data indicated a much lower value (0.52), is there a significantly different relationship between FTE and FT, suggesting that Greek fishers work in the sector substantially on a part-time basis).

A breakdown by age was available in 14 of the regions, of which 10 are in categories that can be compared. These are shown in Table 15. The table illustrates the relatively large numbers of older fishers involved in fishing in some regions. In particular, in Italy over 40% of the total employed are over 54 years in age (although the survey data on which this was based were limited). In addition in Greece (data not shown) 53% of the total workforce was over 45 years in age. The Danish fishing employment (also not shown) is also relatively old with over 30% of the workforce over 54. Spain E2 and E3 have a much lower proportion of older fishers, in the region of 11% over 54, and in France only a few fishers remain active past this age. Belgium and Netherlands appear to have the youngest workforces, with 23% of fishers under 26, and 16% of fishers under 25 respectively.

Table 14: Employment in Capture Fishing

COUNTRY	REGION	EMPLOYMENT		Year	Male			Female			Total Male and Female	
		PT+FT	FTEs		FT	PT	TOTAL	FT	PT	TOTAL	FT	PT
<i>Belgium</i>	<i>BL1</i>	745	700	1997	657	68	725	1	19	20	658	87
<i>Germany</i>	<i>DA1</i>	4,422	2,932	1997			4,422			0		
<i>Denmark</i>	<i>DK1</i>	5,866	5,866	1996								
<i>Spain*</i>	E1	38,797	36,856	1996	98%	2%	90%	50%	50%	10%	34,918	3,879
	E2	11,951	9,567	1996	7,108	4,693	11,801	75	75	150	7,183	4,768
	E3	17,527	16,736	1996	15,912	1,556	17,468	32	27	59	15,944	1,583
	<b>Total</b>	<b>68,275</b>	<b>63,159</b>									
<i>France*</i>	F1	4,770	3,563	1997							69%	
	F2	12,939	9,448	1997							65%	
	F3	3,634	2,490	1997							58%	
	F4	3,741		1997								
	<b>Total</b>	<b>25,084</b>										
<i>Greece</i>	<i>GR1</i>	41,251	21,489	1997			38,027			3,307		
<i>Italy</i>	I1	10,258	13,678	1997	10,258	0				0		
	I2	16,939	24,018	1997	16,939	0				0		
	I3	16,350	23,954	1997	16,350	0				0		
	<b>Total</b>	<b>43,547</b>	<b>61,650</b>									
<i>Ireland</i>	<i>IRL1</i>	6,274	5,494	1997	4,790	1,484						
<i>The Netherlands</i>	<i>NL1</i>	2,379	2,379	1997								
<i>Portugal*</i>	P1	24,194	24,194	1996								
	P2	5,222	5,222	1996			100%					
	<b>Total</b>	<b>29,416</b>	<b>29,416</b>									
<i>United Kingdom*</i>	UK1	9,895	8,589	1996							7,215	2,680

COUNTRY	REGION	EMPLOYMENT		Year	Male			Female			Total Male and Female	
		PT+FT	FTEs		FT	PT	TOTAL	FT	PT	TOTAL	FT	PT
Scotland	UK2	7,848	7,376	1996							83%	
Northern Ireland	UK2	963	889	1996	815	148					85%	
	<b>Total</b>	<b>18,706</b>	<b>16,854</b>									
<b>Sweden</b>		<b>2,634</b>	<b>2,648</b>	<b>1998</b>								
<b>Finland</b>		<b>3,003</b>	<b>1,500</b>	<b>1997</b>			<b>2,763</b>	<b>95% male</b>		<b>240</b>	<b>1,065</b>	<b>1,938</b>
<b>TOTAL</b>		<b>251,602</b>	<b>229,588</b>									

Note:

1. Spain FTEs and gender breakdowns are consultants estimates
2. Greece: FTE value determined by survey
3. UK No of fishers are 1996.
4. \* indicates data from 1996

**Table 15: Classification of Capture Fishing Employment by Age**

COUNTRY	REGION	25 YEARS OR YOUNGER	(%)	25-54 YEARS	(%)	55 YEARS OR OLDER	(%)
<i>Spain*</i>	<i>E2</i>	<i>1,464</i>	<i>12</i>	<i>8,724</i>	<i>73</i>	<i>1,813</i>	<i>12</i>
	<i>E3</i>	<i>1,820</i>	<i>10</i>	<i>13,568</i>	<i>78</i>	<i>1,971</i>	<i>11</i>
<i>France</i>	<i>F1</i>	<i>460</i>	<i>14</i>	<i>2,775</i>	<i>86</i>	<i>44</i>	<i>1</i>
	<i>F2</i>	<i>1,231</i>	<i>11</i>	<i>10,038</i>	<i>87</i>	<i>281</i>	<i>2</i>
	<i>F3</i>	<i>148</i>	<i>7</i>	<i>1,795</i>	<i>87</i>	<i>108</i>	<i>5</i>
<i>Italy</i>	<i>I1</i>		<i>11</i>		<i>47</i>		<i>42</i>
	<i>I2</i>		<i>12</i>		<i>46</i>		<i>42</i>
	<i>I2</i>		<i>12</i>		<i>46</i>		<i>42</i>
<i>The Netherlands</i>	<i>NL1</i>		<i>16</i>		<i>79</i>		<i>5</i>
<i>Sweden</i>	<i>SV1</i>	<i>96</i>	<i>4</i>	<i>1,619</i>	<i>61</i>	<i>927</i>	<i>35</i>

Note:

1. \* indicates data from 1996
2. Italian data are based on a small sample

### 3.3.3 Employment in Processing

In 1996/97 the EU fish processing industries employed 96,250 people as shown in Table 16. Of these, 19,920 (20.7% of the EU sector) work in the UK, with the next largest employment found in Spain, with a total of 16,850 (17.5%). France follows with 12,132, then Germany with 11,280. Fish processing is slightly less concentrated regionally than fishing; the five Member States providing most employment in fish processing (UK, Spain, France, Germany and Denmark) accounted for 71% of EU employment in this sector.

Gender breakdowns for employment in fish processing are available for a number of regions; Belgium and Luxembourg, Spain E2 and E3, all of Italy I1, the Netherlands, UK2 (Scotland only) and Sweden. In addition estimates based on survey or case study data are available for Greece, Portugal P1 (Mainland) and Portugal P2 (Islands). Gender breakdown data are therefore available for 34,511 of the 96,250 employees in the EU processing sector. In this sample women hold some 20,419 (59.2%) of the jobs in processing. Were this proportion applied to the total jobs in processing, it would suggest that women occupy 57,000 jobs in this sector.

The proportion of women in fish processing jobs also shows some regional variations, the highest levels being in Italy (in all regions being about 87%). Employment of women in Portugal P1 (Mainland), Portugal P2 (Islands) is 72% and 76% respectively. In France F2 (which includes the cannery sector in Brittany) the figure is 68%. In Spain E2 (Atlantic Coast and Canary Isles) women account for 48% of processing jobs, and in Spain E3 (Mediterranean) about 63%. Lower levels of female employment in the sector are found in the Netherlands (39%) and Greece (32%). It appears that high levels of female employment are associated particularly with the processing of canned tuna and sardines, which are the sectors of the processing industry which are also substantially dependent on EU landings for the raw material inputs.

Data on breakdowns of full-time and part-time employment are available to the same extent as gender breakdowns, covering 36% of the number employed. An estimated 80.2% of employees are full-time, and assuming the balance of part-time work to be about half-time (ie.PT=0.5FT) then this would suggest an FTE employment for the EU fish processing sector of about 86,625.

Table 16: Employment in Fish Processing

COUNTRY	REGION	DATE	COASTAL	INLAND	TOTAL	FTE	MALE				FEMALE				TOTAL	
							Full time	Part time	Total	%	Full time	Part time	Total	%	Full time	Part time
<i>Belgium</i>	<i>BL1</i>	<i>1997</i>	<i>1,261</i>		<i>1,261</i>				<i>691</i>	<i>54.8</i>			<i>569</i>	<i>45.1</i>		
<i>Germany</i>	<i>DA1</i>	<i>1997</i>	<i>11,280</i>		<i>11,280</i>	<i>8,360</i>			<i>5,076</i>	<i>45.0</i>			<i>6,204</i>	<i>55.0</i>		
<i>Austria</i>	<i>DA1</i>	<i>1997</i>	<i>100</i>		<i>100</i>											
<i>Denmark</i>	<i>DK1</i>	<i>1996</i>	<i>8,588</i>		<i>8,588</i>	<i>6,416</i>										
<i>Spain*</i>	E1	1996	11,722	1,401	13,123											
	E2	1996	2,028		2,028	1,966	788	50	838	51.5	739	50	789	48.5	1,527	100
	E3	1996	1,699		1,699				631	37.1			1,068	62.9	1,504	450
	<b>Total</b>	<b>1996</b>	<b>15,449</b>	<b>1,401</b>	<b>16,850</b>											
<i>France</i>	F1	1997	3,850	996	4,846											
	F2	1997	6,139	17	6,156				1,935	32.0			4,113	68.0		
	F3	1997	596	343	939											
	F4	1997	191		191											
	<b>Total</b>	<b>1997</b>	<b>10,776</b>	<b>1,356</b>	<b>12,132</b>											
<i>Greece</i>	<i>GRI</i>	<i>1997</i>	<i>2,409</i>		<i>2,409</i>				<i>1,638</i>	<i>68.0</i>			<i>771</i>	<i>32.0</i>	<i>1,455</i>	<i>954</i>
<i>Italy</i>	I1	1997	2,874		2,874	2,861	344	28	374	13.0	2,082	419	2,501	87.0	2,426	447
	I2	1997	2,400		2,400	2,301	292	26	316	13.2	1,665	1,665	2,084	86.8	1,957	448
	I3	1997	1,173		1,173	1,268	104	48	153	13.0	695	695	1,020	87.0	799	373
	<b>Total</b>	<b>1997</b>	<b>6,447</b>		<b>6,447</b>	<b>6,430</b>										
<i>Ireland</i>	<i>IRL1</i>	<i>1997</i>	<i>4,920</i>		<i>4,920</i>	<i>3,261</i>										
<i>The Netherlands</i>	<i>NL1</i>	<i>1996</i>	<i>3,300</i>		<i>3,300</i>				<i>2,000</i>	<i>60.6</i>			<i>1,300</i>	<i>39.4</i>		
<i>Portugal*</i>	P1	1996	5,059		5,059	4,098			1,417	28.0			3,642	72.0		

COUNTRY	REGION	DATE	COASTAL	INLAND	TOTAL	FTE	MALE				FEMALE				TOTAL	
							Full time	Part time	Total	%	Full time	Part time	Total	%	Full time	Part time
	P2	1996	1,416		1,416	1,147			337	23.8			1,079	76.2		
	<b>Total</b>	<b>1996</b>	<b>6,475</b>		<b>6,475</b>											
United Kingdom*	UK1	1996	9,598		9,598										9,680	2,310
Scotland	UK2	1996	9300		9,300	8,400	4,482	250	4,732	50.9	3,227	1,341	4,568	49.1	7,708	1,592
Northern Ireland	UK2	1996	1,022		1,022										814	208
	Sub-total	1996	10,322		10,322											
	<b>Total</b>	<b>1996</b>	<b>19,920</b>		<b>19,920</b>											
<b>Sweden</b>	<b>SV1</b>	<b>1998</b>	<b>2,008</b>		<b>2,008</b>	<b>1,993</b>			<b>965</b>	<b>48.4</b>			<b>1,028</b>	<b>51.6</b>		
<b>Finland</b>	<b>FIN1</b>	<b>1997</b>	<b>560</b>		<b>560</b>	<b>560</b>										
<b>TOTAL</b>			<b>90,736</b>	<b>5,514</b>	<b>96,250</b>				<b>14,092</b>	<b>40.8</b>			<b>20,419</b>	<b>59.2</b>		

Note:

1. In many cases gender and FT/PT breakdowns are for samples within regions; their sum is less than the regional totals
2. France ratios are calculated on basis of processing coastal zones
3. Assumes PT=0.5FT
4. \*indicates data from 1996

### 3.3.4 Employment in Marine Aquaculture

Table 17 shows the characteristics of employment in the marine aquaculture sector.

The sector employed a total of 45,341 people (both full- and part-time). Aquaculture employment is concentrated in those regions where there is a focus on production of bivalve mollusca, which is by nature an extensive production system, often with small business units (individuals or family businesses). Just two regions, Spain E1 (North) with 13,565 employed (29.9%) and France F2 (Brittany and Bay of Biscay) with 10,270 employed (22.7%), account for over half of the marine aquaculture jobs in the EU. Regions such as UK2 and Greece, with high value output of fish grown in capital intensive systems such as salmon and seabass, have proportionally fewer jobs, being 1775 and 2910 respectively. Ireland provides employment for 1958 in this sector.

In this study, the definition of marine aquaculture excludes the managed cultivation and harvesting of bivalve mollusca in estuarine waters subject to individual leasing. However, it may be treated as such in national statistics. These jobs are not included in the table below. The main example is the *viveiros* in Portugal P1 region, where the number employed is substantial (1,546 full-time and 3,254 part-time) and there is up to 50% female participation in some areas. There may also be some similar employment in Spain E1 (North) and France F2 (Brittany and Atlantic Coast).

Data sets for FTE and gender breakdown are incomplete in aquaculture. FTE data are only available for 13 of the 22 regions. These 13 regions have a total of 34,328 employed, providing a sample of 76% of the employment in the sector. In these regions the total employed corresponds to 27,994 FTE, suggesting a FTE ratio to total employment of 0.82. This would suggest an overall estimated FTE for EU employment in aquaculture in the region of 36,975. There is some evidence in the regional reports to suggest that part-time employment is more commonly encountered in mollusc culture, whereas finfish culture systems tend to rely more on full-time employment. Thus part time work is common in the aquaculture sectors of regions such as Spain E1 (North) and France (F2) Brittany and Bay of Biscay.

Gender breakdown data are available for only eight of the 22 regions. In these regions a total of 8,291 persons are employed, providing a sample of 18% of the total employment in the sector. In these regions 71.6% of those employed in aquaculture were male. If these proportions were applied to the entire EU it would provide an employment estimate for aquaculture of 32,464 men and 12,877 women.

### 3.3.5 Employment in Inland Aquaculture

Inland aquaculture in the EU employs an estimated total of 11,045 people, as shown in Table 18. Germany has the largest number in this sector (2,825) accounting for 25.6% of EU employment. The next largest source of employment is Italy with 2,142 (19.4%). UK and France (1,485 and 1,213 employed) have the next largest numbers employed. These four, along with Austria (700) account for 77% of EU employment in this sector.

Denmark employs 793, and there are 303 persons employed in Spain, mostly in Catalonia in the production of trout. The sector in Sweden employs 400 persons (FTE). In Finland the majority of the production is of trout and of salmon juveniles for release schemes, giving employment to 270 persons (FTE).

Data for FTE and gender breakdowns are relatively sparse compared to other sectors. FTE data were only available for six of the study regions and gender data for just three regions. The FTE total of 1,559 applied to just 1,768 employed (16% of EU total in the sector) and if extrapolated to the sector suggest an FTE number employed of 9,720. In terms of gender breakdown, the data applied to 1,528 of those employed and suggest that 85.2% of those in the sector are male.



Table 17: Employment in marine aquaculture

COUNTRY	REGION	YEAR	NUMBER EMPLOYED					
			Total	FTE	Male		Female	
					No.	%	No.	%
<i>Belgium</i>	<i>BL1</i>	<i>1997</i>	<i>0</i>	<i>0</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<i>Germany</i>	<i>DA1</i>	<i>1997</i>	<i>40</i>	<i>40</i>	<i>40</i>	<i>100</i>	<i>0</i>	<i>0.0</i>
<i>Denmark</i>	<i>DK1</i>	<i>1997</i>	<i>300</i>	<i>300</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<i>Spain*</i>	E1	1996	13,565	12,550	n.a.	n.a.	n.a.	n.a.
	E2	1996	466	388	451	96.8	15	3.2
	E3	1996	511	475	440	89.6	51	10.4
	<b>Total</b>	<b>1996</b>	<b>14,542</b>	<b>13,413</b>	<b>891</b>	<b>93.1</b>	<b>66</b>	<b>6.9</b>
<i>France</i>	F1	1997	1,845	1,308	1,321	77.0	395	23.0
	F2	1997	10,270	7,461	n.a.	n.a.	n.a.	n.a.
	F3	1997	2,381	1,665	n.a.	n.a.	n.a.	n.a.
	F4	1997	144		n.a.	n.a.	n.a.	n.a.
	<b>Total</b>	<b>1997</b>	<b>14,640</b>	<b>10,434</b>	<b>1,321</b>	<b>77.0</b>	<b>395</b>	<b>23.0</b>
<i>Greece</i>	<i>GRI</i>	<i>1997</i>	<i>2,910</i>		<i>1,455</i>	<i>50.0</i>	<i>1,455</i>	<i>50.0</i>
<i>Italy</i>	I1	1997	751		n.a.	n.a.	n.a.	n.a.
	I2	1997	4,490		n.a.	n.a.	n.a.	n.a.
	I3	1997	1,282		n.a.	n.a.	n.a.	n.a.
	<b>Total</b>	<b>1997</b>	<b>6,523</b>		<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>
<i>Ireland</i>	<i>IRL1</i>	<i>1997</i>	<i>1,958</i>	<i>1,227</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<i>The Netherlands</i>	<i>NL1</i>	<i>1997</i>	<i>312</i>	<i>285</i>	<i>312</i>	<i>100.0</i>	<i>0</i>	<i>0.0</i>
<i>Portugal*</i>	P1	1996	452		n.a.	n.a.	n.a.	n.a.
	P2	1996	5		n.a.	n.a.	n.a.	n.a.
	<b>Total</b>	<b>1996</b>	<b>457</b>		<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>
<i>United Kingdom*</i>	UK1	1996	850		n.a.	n.a.	n.a.	n.a.
	UK2	1996	1,775	1,520	1,476	85.0	260	15.0
	<b>Total</b>	<b>1996</b>	<b>2,625</b>		<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>
<i>Sweden</i>	<i>SV1</i>	<i>1998</i>	<i>394</i>	<i>394</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<i>Finland</i>	<i>FIN1</i>	<i>1997</i>	<i>640</i>	<i>381</i>	<i>267</i>	<i>70.1</i>	<i>114</i>	<i>29.9</i>
<b>TOTAL</b>			<b>45,341</b>	<b>27,994</b>	<b>5,762</b>	<b>71.6</b>	<b>2,290</b>	<b>28.4</b>

## Notes:

1. UK 2 Gender split based on Scotland only
2. Italy FTE data applies to total aquaculture (inland and marine)
3. For calculation of FTE one part time job was assumed to be equivalent to half a full-time job.
4. Where gender and FTE breakdowns were available for only part of the data within a region, the pro-rata breakdown was considered to apply to the total number employed.
5. \* indicates data from 1996

Table 18: Employment in Inland aquaculture

COUNTRY	REGION	NUMBER EMPLOYED					
		(FT+PT)	FTE	Male		Female	
				No.	%	No.	%
<i>Belgium</i>	<i>BL1</i>	<i>137</i>	<i>105</i>	<i>116</i>	<i>84.7</i>	<i>21</i>	<i>15.3</i>
<i>Luxembourg</i>	<i>BL1</i>	<i>5</i>					
<i>Germany</i>	<i>DA1</i>	<i>2825</i>					
<i>Austria</i>	<i>DA1</i>	<i>800</i>					
<i>Denmark</i>	<i>DK1</i>	<i>793</i>					
<i>Spain*</i>	E1*	303					
	E2						
	E3*						
	<i>Total</i>	<i>303</i>					
<i>France</i>	F1	428					
	F2	785					
	F3						
	F4						
	<i>Total</i>	<i>1213</i>					
<i>Greece</i>	<i>GR1</i>	<i>254</i>					
<i>Italy</i>	I1	1044					
	I2	1088					
	I3	10					
	<i>Total</i>	<i>2142</i>					
<i>Ireland</i>	<i>IRL1</i>	<i>240</i>	<i>174</i>				
<i>The Netherlands</i>	<i>NL1</i>	<i>92</i>	<i>77</i>	<i>81</i>	<i>88.0</i>	<i>11</i>	<i>12.0</i>
<i>Portugal*</i>	P1	81					
	P2	6					
	<i>Total</i>	<i>87</i>					
<i>United Kingdom*</i>	UK1	855					
	UK2	630	534	536	84.9	95	15.1
	<i>Total</i>	<i>1485</i>					
<i>Sweden</i>	<i>SV1</i>	<i>400</i>	<i>400</i>				
<i>Finland</i>	<i>FIN1</i>	<i>269</i>	<i>269</i>				
<b>TOTAL</b>		<b>11045</b>	<b>5067</b>	<b>768</b>	<b>85.2</b>	<b>133</b>	<b>14.8</b>

\* indicates data from 1996  
 Sweden data from 1998

### 3.3.6 Employment in Inland Fishing

This sector employs 9,597 fishers, although this is likely to be an underestimate since no data are reported for Sweden and Italy, and in many regions data are difficult to collect, given the disperse and part-time nature of the sector. Numbers are often based on professional licences issued. Employment patterns shown in Table 19 may therefore reflect the data availability. The largest employment is found in Greece, 2,701 (accounting for 28% of the EU). Most of this in the Nomos of Aitoloakarnania, which is the location of the majority of Greece's lagoons. However, there are no details of to what extent this employment is part-time. It is estimated however, that half of this employment is female. Employment in France is 2,501 (26%). Portugal P1 Mainland is the next highest, with 1,939 employed. The top five employing countries (the three above plus Finland and Netherlands) account for 92% of reported employment in the EU inland fishery sector. In Finland, although it is estimated that 1,200 people are involved in inland fishing, only 230 earn more than half their income from it. In the Netherlands, 530 people are employed in inland capture fisheries, and three-quarters of these are full-time.

There are few data on the gender of these fishers. FTE estimates are available for just four regions, accounting for 39% of EU employment in the sector. In these regions, a total of 3,794 employed corresponds to 2,680 FTE, suggesting that one person employed approximates to 0.71FTE. Applied to the sector as whole this would suggest an FTE employment of 6,813.

**Table 19: Employment in Inland Fishing**

COUNTRY	REGION	FT+PT	FTE
Belgium	BL1	0	
Germany	DA1	329	329
Denmark	DK1	5	
Spain*	E1	0	
Spain*	E2	0	
Spain	E3	0	
France	F1	0	
France	F2	0	
France	F3	0	
France	F4	2,501	
France total		2,501	
Greece	GR1	2,701	
Italy	I1	n.a.	
Italy	I2	n.a.	
Italy	I3	n.a.	
Ireland	IRL1	150	
Netherlands	NL1	530	385
Portugal*	P1	1,939	970
Portugal *	P2	0	
United Kingdom	UK1	0	
United Kingdom*	UK2	n.a.	
Sweden	SV1	250	
Finland	FIN1	1,192	996
<b>TOTALS</b>		<b>9,597</b>	<b>2,680</b>

*Note:*

1. \* indicates data from 1996

2. Swedish data from 1998

### 3.4 Regional and Socio-economic Importance of Fisheries

As already indicated, in 1996/97 the various parts of the EU fishery sector provided a total gross output of some 20 billion ECU and provided direct employment for a minimum of 526,000 people. Net sector output will be somewhat less since a significant proportion of output is consumed within the sector. Table 20 provides a summary of output and employment by sector, with FTE and gender breakdown estimates derived from extrapolations of the above data.

Marine fishing, with an output of about 6.3 billion ECU, accounts for the largest share of direct employment in the sector (251,600 jobs). Fish processing provided employment for a further 96,250 individuals (with a gross output of 11.3 billion ECU). Aquaculture provides another 56,000 jobs and 80% of these are in marine aquaculture where bivalve mollusc culture provides the most employment. The inland fishing sector is small in comparison with the marine capture and processing, employing only 9,597.

Given the noted under-estimations arising from the statistical limitations of the data on which the studies were based, the number employed in the sector is likely to be higher than indicated. Multiplier data from the study, reported in Section 4.7, suggests that for each job at sea, there are between 1.05 and 1.1 dependent jobs on shore (in both up- and down-stream activities). This would suggest that up to 277,000 shore jobs were dependent on marine fisheries. By adding in un-related employment in aquaculture (56,436), inland fishing (9,597) and harvesting of bivalve molluscs (14,000), total sector employment can be estimated at between 585,000 and 600,000, suggesting that the study has under-estimated numbers employed by between 60-75,000.

When viewed in terms of estimated numbers employed on a full-time equivalent basis, employment in the fleet sector is equivalent to 234,000, indicating the general low level of reliance on part-time work in the sector, and the dependence of fishers on fishing as their main source of income. Employment in processing of 96,250 is only slightly less dependent on part-time work, although there are some quite notable regional variations.

This work has also illustrated the significant employment of women in the fishery sector, with an estimated 87,000 jobs held by women throughout the EU. Even in fishing, which is traditionally regarded as a male preserve, women hold about 6% of the jobs. This excludes the harvesting of bivalve mollusca where there is a significant level of employment and a known high representation of women. Women hold the majority of jobs in fish processing (57,000 employed) and also fill about 31% of the 47,000 jobs in aquaculture. There is a clear argument for the consideration of gender issues in socio-economic policy measures for the EU fishery sector.

The regional importance of fisheries is considered in the following section of this report. To support the statistical analysis presented, a summary of the fisheries characteristics of each study region (along with dependency maps) is shown in a separate volume "Regional Socio-economic Profiles".

**Table 20: Principal economic dimensions of the EU fishery sector**

Sector	Production		No.employed			
	Volume Tonnes 1000	Value ECU million	FT+PT	FTE	Men	Women
Marine fishing	5610	6287	251602	234003	236016	15600
Fish processing	n.a.	11351	96250	86625	39270	56980
Marine aquaculture	903	1385	45341	36975	32464	12877
Inland aquaculture	203	632	11045	9720	9410	1635

Inland fishing	90	258	9597	6814	n.a.	n.a.
Other fishery sector	n.a.	n.a.	112147	n.a.	n.a.	n.a.
<b>TOTAL</b>	<b>6807</b>	<b>19,912</b>	<b>526034</b>	<b>374137</b>	<b>317160</b>	<b>87092</b>

*Notes:*

1. *Other includes distribution, mollusc gathering, vessel construction and repair, and is likely to underestimate employment by 60-75,000.*
2. *FTE and gender estimates are extrapolated from regions with data available.*
3. *Note that a significant proportion of primary output from fishing and aquaculture) is consumed within the sector.*

### **3.5 Strengths, Weaknesses, Opportunities and Threats at Regional and Community Level**

To facilitate the preparation of appropriate policies with respect to socio-economic support measures for workers in the fisheries sector, each regional study undertook a strategic review of the fishery sector and prepared a study of forward trends in employment. This focused on strengths, weaknesses opportunities and threats (SWOT) to the sector, with particular emphasis on structural aspects such as the nature and condition of the resource base, competitiveness of the industry and market trends. Fisheries employment in dependent areas may be sensitive to such changes, and to interventions in pursuit of the CFP objectives, such as stock management and fleet adjustment measures. Knowledge of these structural characteristics is essential if support measures are to be designed which effectively target susceptible groups.

The SWOT analysis conducted for each region is summarised at Community level in the sections following.

#### **3.5.1 Strengths**

The fishing industry has proved responsive to capacity reduction incentives of CFP, broadly resulting in the achievement of targets set under MAGPs I to IV. There has been substantial fleet investment to improve handling, quality and safety at sea, and many fleet segments are highly competitive. N.European countries such as DK, UK1 and 2 and Netherlands are regarded as having good port and market infrastructure, and well-trained fishers. Production of bivalve mollusca (which is an important source of employment in regions such as Spain E1, Portugal P1, France F3 and Italy) is stable and not threatened by over exploitation.

There is a concentration of processing activity in key regions/companies eg. in Humberside in UK1, Galicia in Spain E1, Bremerhaven in Germany, Boulogne (F1) and in Denmark, resulting in economies of scale and benefits of industrial clustering. The sector is highly competitive and well capitalised, with substantial cross border investment. There is widespread compliance with hygiene requirements and product quality and safety are considered to be high. There are good contacts and skills in international sourcing for supplies of raw material to the EU processing sector.

Many EU member states have generally good conditions for aquaculture development, with adequate marine and freshwater resources, and a number of species of fish and mollusca suitable for cultivation. Marine aquaculture is well established in Scotland, UK2, Greece, Ireland and Spain and highly efficient production systems have been developed. There is spare capacity for increasing production should market demand permit. Inland aquaculture is well established throughout many regions the EU.

The EU market is a high-income stable market, showing good growth in demand. In most regions there is a positive income elasticity of demand for fish, so consumption is stimulated as income grows. Tourism development in the Mediterranean region provides good market potential for regions such as Greece and Spain E3, although seasonal. In Northern European countries such as Belgium, UK and Netherlands

the transparency of auction markets results in market efficiency and good price information communicated to producers.

### 3.5.2 Weaknesses

Marketing of fish is problematic, with the products drawn from three *phyla* of the animal kingdom, and with production subject to biological variables. Primary production of commercial species cannot be increased except through aquaculture. There is a great diversity of fisheries activity in the EU, ranging from Baltic, N.Sea, Atlantic and Mediterranean basins. The Baltic region is characterised by highly fluctuating catches and short fishing seasons. The Mediterranean is characterised by a wide diversity of commercial species. Both pose difficulties in production and marketing.

In most regions there is a chronic over-capacity in the fishing fleet and many economically important stocks are considered to be under pressure from non-sustainable levels of effort. The situation is considered to be critical in the case of demersal fisheries in the North Sea, especially in some stocks pursued by the beam trawl segment of the Netherlands and Belgian fleets. As a result there is a progressive reduction of total allowable catches and application of CFP management to non-quota stocks. Fishing in the North Sea and the Baltic is especially dependent on species subject to quota. Some segments of the EU fleet (especially Spain E2, but also Portugal P1 and NL) are dependent on access to third country fisheries. Reduction of yields and opportunities to fish has had an impact on profitability, and landings are declining in some regions. Low levels of fleet investment result in a downward spiral of aging fleet, reduced efficiency and higher costs. Other effects of low profitability are also manifested as shortages of skilled crew and a low level of new entrants to the industry (in Belgium, Ireland, P2 islands, and France F2 region).

Coastal resources are particularly threatened by a proliferation of the small scale fleet, affecting particularly the Mediterranean, where national controls are weak, and where there is a wide variety of gear types (and where only four out of 20 bordering maritime nations are EU members, thus reducing the impact of conservation measures). Coastal resources are also subjected to environmental pressures such as pollution, considered to be critical in some regions, such as parts of the Mediterranean.

There is a low value added to EU landed fish, with most fish entering consumption directly or undergoing only primary processing, thus reducing the income for fishing communities. The lack of continuity of supply of whitefish to primary processing results in an under utilisation of capacity (especially in the UK). The processing sector has relatively high labour costs compared to, for example, third country supplies, especially of canned tuna, sardine and anchovy conserves. There are finite limits to improvements in productivity and quality that can be obtained. Some segments of S.European processing (eg. canning of anchovy and sardine in France, Spain and Italy) lack investment and experience difficulty upgrading to EU hygiene standards. They are approaching obsolescence.

Except for salmon, marine aquaculture has not realised its full potential, largely constrained by limited market acceptance of a narrow range of species which are amenable to culture technology. Expansion of aquaculture production is also limited by regulatory burdens, environmental concerns and conflicts with tourism and other coastal uses. In the two main regions (Scotland and Greece) aquaculture companies are largely dependent on a single species.

Some productive regions (such as UK2, Portugal P2 and France F2 and F4) are distant from main markets, resulting in increased difficulties and costs in reaching markets, and depressed prices. Some regions eg. France, Greece and Spain, have very long coastlines with dispersed production and landings, increasing costs and difficulty of distribution. Marketing infrastructure in such regions tends to be weak. Although Producer Organisations have had a significant impact in some regions, in others such as Greece they are poorly organised and have little impact. Even where POs do exist, there may be a lack of coordinated marketing arrangements, such as in Germany where there are only weak links to processing. Lack of marketing linkages in the chain results in poor coordination between demand and

landings, and a lack of linkage between quality and price. In some regions eg. around the N.Sea orderly marketing is undermined by so-called "black fish"<sup>2</sup>.

The EU markets for small pelagic fish are not well developed and producers (such as Ireland, Netherlands, Denmark) rely heavily on unstable markets in Russia and Africa. The low demand for small pelagic fish means that much potentially good quality fish is used for reduction, for example sprat in Sweden and sardine in the Canary Islands.

The North European food markets are dominated by oligopolistic supermarket chains, with strong buying power and leverage over the supply chain. The UK quayside marketing continues to be limited by reluctance to use metric measures.

### 3.5.3 Opportunities

Given the political will, there are substantial opportunities for improved resource management, to ensure a more sustainable fishery sector. This can be delivered by a reduction of the fishing effort applied to the main commercial species. The opportunity will be strengthened by improved management structures, both within the EU's Common Fisheries Policy, and by strengthened regional bodies in which the EU participates such as the GFCM (General Fisheries Council of the Mediterranean) and the IBSCF (International Baltic Sea Fisheries Commission). Enlargement of the EU will provide an opportunity to strengthen Baltic Sea and Mediterranean management. New management measures (such as marine protected areas applied in Italy) provide opportunities to improve stock conservation.

The introduction of new ways of managing quota (for example by the use of individual transferable quotas in Belgium) may improve profitability and permit fleet renewal in some segments. There are some, albeit limited, opportunities for the exploitation of presently unexploited fish resources. In particular Ireland and Portugal (P2) have access to deepwater fish species with potential for market development. This includes offshore crab and squid resources to the West of Ireland, and scabbard fish and orange roughly around the Azores. Research into the marine farming of demersal fish for which there is a high demand (such as cod and grouper) could provide a new growth opportunity for marine aquaculture. The use of artificial reefs, open sea ranching, and offshore farming may provide new opportunities for increased production without the negative environmental consequences and coastal use conflicts.

Better marketing and distribution opportunities are available through modern processing technology and through multiple retail outlets. There are new possibilities for market segmentation and eco-labelling eg. Marine Stewardship Council initiative, organic fish and niche markets. There is considerable potential for development of markets for under utilised fish resources such as small pelagic fish, blue whiting and ling, particularly if the new distribution opportunities presented by supermarkets can be utilised.

The availability of structural funds provides a means to stimulate better productivity and marketing, thus breaking the downward investment spiral. Promotion and consumer information to link quality to price may provide a boost to demand. The unification of auction systems across national boundaries (eg. through the Marsource project) could provide better price information to fishers, thus encouraging better coordination throughout the marketing chain.

### 3.5.4 Threats

Fishers, particularly of demersal stocks, in all regions are under threat in the short-term from the decline in the condition of many stocks. Opportunities to fish are being reduced by the progressive fall in Total Allowable Catches (TACs) eg. in the N.Sea cod fishery, the application of quota (or pre-cautionary

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<sup>2</sup> "black fish" is defined as fish which is retained onboard the fishing vessel in contravention of fisheries regulations

quota) to current non-quota species eg. Iberian sardine (P and E2) and the potential loss of access to some key third country fishing grounds (eg. Morocco). Furthermore in the longer term, there is the risk that chronic over-fishing may result in permanent damage to stocks.

Fleet capacity and effort reduction measures under the Multi-annual Guidance Programme may also limit the opportunities to fish. On a Community level and in most cases, the MAPG IV targets have been met, with tonnage 16% below target and power 7% below target, so additional reductions will only be implemented in the medium and long term under subsequent MAPGs. However, in the short term, capacity reduction measures will impact most on France and Netherlands, which have not met their objectives under MAGP IV, and where further capacity reductions may be anticipated during the remaining period of MAGP IV (until 2002).

Reduced opportunities to fish threaten reduced revenues, and increasing costs from an aging fleet threaten profitability. Lack of investment could result in obsolescence, increased safety risks and poorer quality. The low interest expressed by young people in entering the sector could result in a critical lack of skilled fishers, accelerating withdrawal of vessels from the fleet and causing hardship in fisheries dependent areas.

The APEC initiative to introduced accelerated tariff reduction through the WTO will, if successful, eliminate tariff barriers on fishery products supplied from third countries, threatening the viability of processors, especially in the canning sector where the labour cost forms a high proportion of the total. There are finite limits to improvements in productivity and quality, which can be obtained, thus threatening the retention of the EU base of operations. Many less viable sectors of the EU processing industry eg. anchovy and sardine canning in S.European countries are in any case threatened by the cost of upgrading to comply with EU hygiene standards.

Environmental concerns (in Scotland) and conflict with tourism (eg. in Greece and Spain E3) may halt or set back aquaculture development, especially in the coastal regions where most available optimal sites have been developed. Disease (Infectious Salmon Anaemia) and a possible link with toxic algal blooms also threaten the stability of salmon aquaculture in Scotland (UK2). The viability of aquaculture is further threatened by a divergence of market prices between farmed and wild fish, reported in Greece, and a growing consumer resistance to the lower quality of farmed fish compared to wild. Given the rapid growth in production capacity compared to demand, there is a danger of oversupply of all of the main aquaculture products (trout, salmon, and seabass/bream) to market.

## 4 Task 2: Quantifying, Describing and Examining the Level of Dependency

### 4.1 Introduction

The first part of this section provides an overview of fisheries dependency in the EU as indicated by the principal dependency indicator, Ratio 2 (for fishing and for all fishery related activities). This is followed by a more detailed consideration of fisheries dependency as indicated by the three dependency ratios (value added, employment and quota ratios) and their subdivisions by activity. For each ratio a brief regional analysis is provided, followed by a focus on the most dependent regions. The dependency ratios are presented at NUTS 3 level and where feasible, at greater levels of regional disaggregation.

The second part of this section considers the relationship between the fisheries dependent areas identified by the present series of studies, and the definitions of Objective 1 and Objective 2 regions. The third part of the section presents and discusses the data on employment multipliers in the fishery sector, where available, and investigates the general nature of the relationship between employment at sea and employment on the land. Some specific features of employment dependency are investigated.

Ratios 1 and 2 respectively indicate the percentage of value added and employment within a region which is attributable to fishing, processing, marine aquaculture and all fisheries activities. Since the size of the area varies between and within regions (even at the same NUTS level) the ratios may in some instances hide significant economic activity in fishing, when this takes place in a region with a much larger local economy. Conversely, the ratios may over-represent the importance of fisheries in smaller areas. Differences in the ratios may therefore be more a reflection of the size of the area studied, than true differences in dependency. The ratios should therefore be interpreted only with reference to the size of the area. Key features of the data where the size of the area has an impact on interpretation are noted in the text. In addition, and where feasible, the data on the dependency tables are arranged to facilitate this comparison, for example with total employment or value added shown in each area.

### 4.2 Overview of Fisheries dependency in the EU

The number of fisheries dependent areas depends on the criterion applied and the threshold value used to define dependency. Ratio 2 Fishing is considered to be the most reliable measure of dependency, since it is tangible, clearly defined between regions (and between the two studies) and provides a direct measure of the importance of fishing for peoples' livelihood.

The regional studies identified 343 NUTS 3 areas (or other defined "zones of dependency") with a measurable degree of dependency on fishing (as defined by employment Ratio 2 for fishing), and 553 areas at NUTS 4 or 5, as shown in Table 21 and Table 22. The numbers at the lower level of regional disaggregation do not include Greece, France F3 and F4 or Italy (since no NUTS 4/5 areas are defined in those regions).

The number of fishers working in these 343 NUTS 3 regions was 246,722 or 98.1% of the EU total number of fishers. The corresponding number in the 553 NUTS 4/5 regions was 139,135 representing 55.3% of the total fishers employed.

#### 4.2.1 Fisheries dependency defined by Ratio 2 Fishing

The tables show that at NUTS 3 level, no areas have more than 10% dependency on fishing itself. However, there are nine with a value of Ratio 2 fishing between 5 and 10%, 26 between 2 and 5% and 21

between 1 and 2%. The 1991 studies used an arbitrary level of 1% for Ratio 2 as the threshold to distinguish fisheries dependent areas, and if this convention is applied it would suggest that there were a total of 56 fisheries dependent NUTS 3 regions in the EU, in which 128,885 fishers were employed in 1996/97 (51% of the total) and a further 87,408 people directly employed in other fisheries related activities. If the threshold were to be established at 2%, then the number of dependent areas would fall to 35.

Dependency rates are higher at greater levels of regional disaggregation. At NUTS 4/5 level, of the 553 areas for which data were available, 33 had values for Ratio 2 Fishing above 10% and 46 areas had values between 5 and 10%. Applying a dependency criteria of 1% for Ratio 2 Fishing results in 238 areas dependent on fishing. If the criteria is 2%, there would be 164 dependent areas, and at 5%, 79 dependent areas. However, it should be remembered that these are substantial under-estimates of the numbers of fisheries dependent areas in the EU, since they omit data for Greece, France F3 and F4 and Italy, where substantial numbers of areas smaller than NUTS 3 are likely to exceed the threshold of dependency.

#### **4.2.2 Fisheries dependency defined by Ratio 2 total fishery sector employment**

Characteristics of fisheries dependent areas falling within different dependency zones defined by Ratio 2 for the entire fishery sector are shown in Table 23 and Table 24. The tables show that at a nominal NUTS 3 level, only one area has more than 10% of employment dependent on the fishery sector (this is Pontevedra in the region Spain EI). However, there are 16 areas with a value of Ratio 2 between 5 and 10%, 32 between 2 and 5% and 60 between 1 and 2%. The 1991 studies used an arbitrary level of 1% for Ratio 2 as the criteria to distinguish fisheries dependent areas, and if this convention is applied it would suggest that there are a total of 109 fisheries dependent NUTS 3 regions in the EU, in which are employed 335,641 persons in the fishery sector. This represents just over 64% of the total employed in the entire EU fishery sector. If the criteria were to be established at 2%, then the number of dependent areas would fall to 49.

At NUTS 4/5 level, of the 553 areas for which data is available at this level of disaggregation, 64 had values for Ratio 2 Fishing above 10% and 59 areas had values between 5 and 10%. Applying a dependency criteria of 1% for Ratio 2 Fishing results in 286 areas dependent on fishing. If the criteria is 2%, there would be 219 dependent areas, and at 5%, 123 dependent areas. However, it should be remembered that these are substantial under-estimates of the numbers of fisheries dependent areas in the EU, since once again they omit data for Greece, France F3 and F4 and Italy.

**Table 21: Number and employment characteristics of EU Fisheries dependent areas defined by Ratio 2 Fishing at NUTS 3 level in 1996/97**

<b>RATIO 2 FISHING</b>	<b>&gt;10%</b>		<b>5-10%</b>		<b>2-5%</b>		<b>1-2%</b>		<b>&lt;1%</b>	
<b>TOTALS WITHIN EACH RANGE</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No.of Zones	0	0	9	2.6	26	7.6	21	6.1	287	83.7
Total Employed	0	0	559,731	0.7	1,667,325	2.1	2,272,934	2.9	75,033,597	94.3
Employment in Fishing	0	0	40,632	16.4	56,294	22.7	31,959	12.9	119,554	48.1
Other Fishery Sector Employment	0	0	32,171	15.5	33,598	16.2	21,639	10.5	119,517	57.8
Total Fishery Sector Employment	0	0	72,803	16.0	89,892	19.7	53,598	11.8	239,071	52.5
<b>CUMULATIVE TOTALS</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No.of Zones	0	0	9	2.6	35	10.2	56	16.33	343	100
Total Employed	0	0	559,731	0.7	2,227,056	2.8	4,499,990	5.66	79,533,587	100
Employment in Fishing	0	0	40,632	16.3	96,926	39.0	128,885	51.88	248,439	100
Other Fishery Sector Employment	0	0	32,171	15.5	65,769	31.8	87,408	42.24	206,925	100
Total Fishery Sector Employment	0	0	72,803	16.0	162,695	35.7	216,293	47.50	455,364	100
Average employment / zone			62,192		63,630		80,357		231,876	

*Notes:*

1. The total number employed in fisheries does not match exactly with the summary tables in Task 1 as some regional breakdowns eg. Denmark and Ireland are omitted due to lack of regionally disaggregated employment data. In addition, some of the regions did not fully allocate all fishers to Nuts 3 areas so the Nuts 3 employment total is less than the overall total.

2. Spain E1 employment data is based on "dependency zones"

3. UK1 and UK2 employment data were presented at NUTS 2 which for the basis of this table were considered to be Nuts 3 equivalents.

**Table 22: Number and employment characteristics of EU Fisheries dependent areas defined by Ratio 2 Fishing at NUTS 4/5 level in 1996/97**

<b>RATIO 2 FISHING</b>	<b>&gt;10%</b>		<b>5-10%</b>		<b>2-5%</b>		<b>1-2%</b>		<b>&lt;1%</b>	
<b>TOTALS WITHIN EACH RANGE</b>										
	No.	%	No.	%	No.	%	No.	%	No.	%
No. of Zones	33	6.0	46	8.3	85	15.4	74	13.4	315	57.0
Total Employed	173,457	1.3	398,398	3.0	1,233,131	9.4	1,465,017	11.2	9,800,680	75.0
Employment in Fishing	28,164	20.2	29,361	21.1	36,860	26.5	19,550	14.1	25,200	18.1
Other Fishery Sector Employment	29,221	6.9	27,442	6.5	319,469	75.3	23,204	5.5	24,833	5.9
Total Fishery Sector Employment	57,385	21.8	56,803	21.6	56,329	21.4	42,754	16.2	50,033	19.0
<b>CUMULATIVE TOTALS</b>										
	No.	%	No.	%	No.	%	No.	%	No.	%
No. of Zones	33	6.0	79	14.3	164	29.7	238	43.0	553	100
Total Employed	173,457	1.3	571855	4.4	1804986	13.8	3270003	25.0	13070683	100
Employment in Fishing	28,164	20.2	57525	41.4	94385	67.8	113935	81.9	139135	100
Other Fishery Sector Employment	29,221	6.9	56663	13.4	376132	88.7	399336	94.1	424169	100
Total Fishery Sector Employment	57,385	21.8	114188	43.4	170517	64.8	213271	81.0	263304	100
Average employment / zone	5256		7239		11006		13740		23636	

*Note: This breakdown does not include France F3 and F4, Italy, Greece (no areas defined at NUTS 4/5 level)*

**Table 23: Number and employment characteristics of EU Fisheries dependent areas defined by Ratio 2 (total fishery sector employment) at NUTS 3 level in 1996/97**

<b>RATIO 2 TOTAL SECTOR</b>	<b>&gt;10%</b>		<b>5-10%</b>		<b>2-5%</b>		<b>1-2%</b>		<b>&lt;1%</b>	
<b>TOTALS WITHIN EACH RANGE</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No. of Zones	1	0.3	16	4.7	32	9.3	60	17.5	234	68.2
Total Employed	191,079	0.2	1,203,956	1.5	2,740,066	3.4	8,289,187	10.4	67,145,317	84.4
Employment in Fishing	17,072	6.9	54,572	22.1	45,635	18.5	56,478	22.9	72,966	29.6
Other Fishery Sector Employment	26,565	12.9	34,951	16.9	39,333	19.1	61,035	29.6	44,457	21.5
Total Fishery Sector Employment	43,637	9.6	89,523	19.8	84,968	18.8	117,513	25.9	117,423	25.9
<b>CUMULATIVE TOTALS</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No. of Zones	1	0.3	17	5.0	49	14.3	109	31.78	343	100.00
Total Employed	191,079	0.2	1,395,035	1.8	4,135,101	5.2	12,424,288	15.61	79,569,605	100.00
Employment in Fishing	17,072	6.9	71,644	29.0	117,279	47.5	173,757	70.43	246,723	100.00
Other Fishery Sector Employment	26,565	12.9	61,516	29.8	100,849	48.9	161,884	78.45	206,341	100.00
Total Fishery Sector Employment	43,637	9.6	133,160	29.4	218,128	48.1	335,641	74.08	453,064	100.00
Average employment / zone	191,079		82,061		84,390		113,984		231,981	

*Notes:*

1. the total number employed in fisheries does not match exactly with the summary tables in Task 1 as some regional breakdowns eg. Denmark and Ireland are omitted due to lack of regionally disaggregated employment data for total fishery sector employment
2. E1 employment data are based on "zones of dependency", which are considered to be equivalent to NUTS 3 for this table.
3. UK1 and UK2 employment data were presented at NUTS 2 which for the basis of this table were considered to be Nuts 3 equivalents.

**Table 24: Number and employment characteristics of EU Fisheries dependent areas defined by Ratio 2 (total fishery sector employment) at NUTS 4/5 level in 1996/97**

<b>RATIO 2 TOTAL SECTOR</b>	<b>&gt;10%</b>		<b>5-10%</b>		<b>2-5%</b>		<b>1-2%</b>		<b>&lt;1%</b>	
<b>TOTALS WITHIN EACH RANGE</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No. of Zones	64	11.6	59	10.7	96	17.4	67	12.1	267	48.3
Total Employed	482,967	3.7	836,097	6.4	1,747,282	13.4	1,500,710	11.5	8,503,607	65.1
Employment in Fishing	50,131	36.0	25,539	18.4	31,474	22.6	11,899	8.6	20,038	14.4
Other Fishery Sector Employment	59,585	48.0	30,154	24.3	24,078	19.4	9,803	7.9	604	0.5
Total Fishery Sector Employment	109,716	41.7	55,693	21.2	55,552	21.1	21,702	8.2	20,642	7.8
<b>CUMULATIVE TOTALS</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No. of Zones	64	11.6	123	22.2	219	39.6	286	51.72	553	100.00
Total Employed	482,967	3.7	1319064	10.1	3066346	23.5	4567056	34.94	13070663	100.00
Employment in Fishing	50,131	36.0	75670	54.4	107144	77.0	119043	85.59	139081	100.00
Other Fishery Sector Employment	59,585	48.0	89739	72.2	113817	91.6	123620	99.51	124224	100.00
Total Fishery Sector Employment	109,716	41.7	165409	62.8	220961	83.9	242663	92.16	263305	100.00
Average employment / zone	7546		10724		14002		15969		23636	

*Note: This breakdown does not include France F3 and F4, Italy, Greece (no areas defined at NUTS 4/5 level)*

### 4.3 Ratio 1: Value added in Fisheries

#### 4.3.1 Regional Analysis for Ratio 1

Ratio 1 provides a measure of the share of fisheries activity in the value added of the area. It is presented at a minimum of NUTS 3 level separately for fishing, processing, marine aquaculture and for all fisheries activity (including other activities not included in the above three).

Values for this dependency ratio are given at NUTS 3 and NUTS 4/5 level. Data for several regions with significant levels of fisheries dependency were not available at this latter level of regional disaggregation, and the ranking of areas based on the level of dependency will therefore exclude many such areas. It also will be noted that many of the highly dependent areas are apparently found in Greece where it should be noted that the NUTS 3 regions are relatively small, and therefore naturally selective for higher levels of dependency. The absolute values for dependency should be interpreted with a high degree of caution, and should ideally be considered as indicative of the nature and extent of dependency, rather than an absolute definition of the most fisheries dependent areas.

A summary of the most fisheries dependent NUTS 3 areas (or NUTS 2 in the case of UK) in each study region (according to Ratio 1 Total Fishery Sector added value) is shown in Table 25. Table 26 shows the corresponding data at Nuts 4/5 levels. Generally the Ratio 1 values in the most dependent areas are lower than the values for Ratio 2 (discussed in Section 4.4). At NUTS 3 level, only in Spain and Portugal are there areas where the Ratio 1 dependency is higher than 5%, with corresponding values at NUTS 4/5 level of around 38%. In most other regions, fisheries only contributes between 1 and 5% of the local economy in the most dependent NUTS 3 areas. In France F1 and F3, Ireland and UK the highest Ratio 1 values are less than 1%, indicating that in these regions the fishery sector only plays a small role in the local economy of even the most dependent NUTS 3 regions.

**Table 25: Summary of most fisheries dependent areas (at NUTS 3 level) in each study region (as defined by Ratio 1 total fishery sector added value)**

Country/Region	Most dependent NUTS 3 area	Ratio 1 Total Fishery Sector
Belgium	Oostende	1.3
Germany	Cuxhaven	3.4
Spain E1	Pontevedra	9.2
France F1	Manche	0.9
France F2	Finistère	2.2
France F3	Haut Corse	0.7
France F4	Guadeloupe	1.9
Greece	Samos	9.0
Italy I1	Grosseto	1.0
Italy I2	Teramo	2.2
Italy I3	Trapani	2.8
Ireland	West	0.0
Netherlands	Flevoland	2.5
Portugal P1	Algarve	5.7
Portugal P2	Azores	3.7
UK 1	East Riding and N.Lincolnshire	0.9
UK 2	Highlands and Islands	4.0
Finland	Åland-Ahvenanmaa	1.2

Notes:

1. Greece Ratio 1 is for fishing only
2. Ireland is sum of fishing, processing and aquaculture

3. Sweden and Denmark Spain E2 and E3, no Ratio 1 data available
4. UK1 and UK2 data are at NUTS 2 level
5. Value for Ireland West is 0.02

**Table 26: Summary of most fisheries dependent areas (at NUTS 4/5 level) in each study region (as defined by Ratio 1 - total fishery sector added value)**

Country/Region	NUTS 4/5 area	Ratio 1 Total Fishery Sector
Belgium	Bredene	4.0
Germany	Bremerhaven KS	5.7
Spain E1	Bermeo	38.3
France F1	Boulogne	3.8
France F2	Quimper	5.2
Portugal P1	Olhão	38.2
Portugal P2	Sta.Cruz Graciosa	8.4
UK 1	Grimsby	2.3
UK 2	Sutherland NW	23.6
Sweden	Oeckeroe	6.7
Finland	Föglö	22.6

Notes:

1. Sweden Ratio 1 Fishing
2. Values for Ratio 1 not available at NUTS 4 or 5 level for Denmark, Spain E2 and E3, France F3, F4, Greece, Italy and Netherlands

### 4.3.2 Areas Most Dependent on Fishing

Tables 1 and 2 in Annex 3 respectively show the Ratio 1 values for the 20 areas most dependent on fishing at NUTS 3 (or similar) level, and at NUTS 4/5 level. At NUTS 3 level Greece occupies 15 out of the top 20 most dependent areas according to this criterion, with two regions in Portugal (Algarve and Azores) and one in Spain (Pontevedra) also qualifying as highly dependent. The highest value added ratio for fishing is for Samos in Greece (9.0%).

At NUTS 4/5 level, the dependency ratios are higher, with the top 21 dependent regions having values for Ratio 1 fishing ranging from 9.3 to 35.3%, the latter in the case of Olhão in Portugal. However, the analysis omits several of the study regions (notably France F3 and F4, Italy and Greece) where data at this level of disaggregation was not available. This list of the top 20 most dependent areas is therefore rather limited in its usefulness.

### 4.3.3 Areas Most Dependent on Fish Processing

Dependency on fish processing is generally at lower levels compared to fishing, as shown in Annex 3 (Tables 3 and 4). It is also more widely dispersed throughout the community. The 20 most dependent areas at NUTS 3 level have Ratio 1 values for fish processing ranging from 0.3 to 2.5 %, the latter found in Cuxhaven in Germany. Kavala in Greece ranks as the second most dependent area on fish processing, and Flevoland as the third. Some other areas with relatively high dependence on fish processing are Rügen in Germany, Thessaloniki and Preveza in Greece and ZW Friesland and Ov. Zeeland in Netherlands.

Dependency of fish processing at NUTS 4/5 level appears to be more widely dispersed throughout the EU. The twenty most dependent areas cover the range of Ratio 1 values from 26.4% (in Urk,

Netherlands) down to 2.4%. The next most dependent locations for fish processing are Soenaes in Sweden, Rymättylä and Föglö in Finland, Fraserburgh in UK and Peniche in Portugal. Again this analysis omits France F3 and F4, Greece and Italy and is rather limited in its usefulness.

#### **4.3.4 Areas Most Dependent on All Fisheries Activity**

In terms of the overall fishery sector at NUTS 3 level, Tables 5 and 6 of Annex 3 show that the area of Pontevedra in Spain ranks as the most dependent in the EU, with total fishery sector added value contributing 9.1% of the local economy. La Coruña and Lugo also in Spain, Algarve and Azores (Portugal), Cuxhaven (Germany), Trapani and Teramo (in Italy) and Flevoland in Netherlands complete the top 10 fisheries dependent areas in the EU, on the basis of their contribution to the local economy.

At Nuts 4/5 level there are some very high levels of economic dependency on the fishery sector when considered as a whole. For example Urk in Netherlands has a Ratio 1 value of 51.5%, Bermeo in Spain 38.3%, and Olhão in Portugal 38.2%. Of the 20 most dependent areas, six are in Spain, five are in Finland and five in Portugal. However once again the analysis excludes France F3 and F4, Italy and Greece, and these 20 fisheries dependent areas should be regarded as indicative rather than definitive.

### **4.4 Ratio 2: Employment in Fisheries**

Ratio 2 provides a measure of the share of fisheries employment in the total employment of the area. It is presented at a minimum of NUTS 3 level separately for fishing, processing, marine aquaculture and for all fisheries activity (including other activities not included in the above three). The summary tables for the ratios are shown in Annex 3.

#### **4.4.1 Regional Analysis for Ratio 2**

A summary of the most fisheries dependent area (according to Ratio 2 Total Fishery Sector) in each study region is shown in Table 25 (for NUTS 3 level) and Table 26 (for NUTS 4/5 level) respectively. The tables are instructive since they show the wide range of fisheries dependency within the EU, and how the most dependent areas compare between regions and countries.

There is only one region where dependency ratios at NUTS 3 level are more than 10% of employment in the fishery sector, and that is Pontevedra, Spain E1 (North). However, in Greece, Portugal Mainland and Italy I3 fishery sector employment in the most dependent areas is more than 5%, and in all of these countries structural adjustment in fisheries dependent areas can be expected to have disproportionate impact. Medium ranges of dependency (2 to 5%) are found in Germany, France, Italy I1 and I2, Ireland, Netherlands, UK 1 and 2, and Finland. Sweden has the lowest dependency rates, less than 1% at NUTS 3 level.

At a greater level of regional disaggregation, the pattern is different. Although levels of employment dependency on the fishery sector are high in Spain (all regions), some other countries also show notably high levels of dependency in their most dependent regions. Urk in Netherlands, Hanstholm in Denmark, and Olhão in Portugal Mainland all show high levels of employment dependency above 25%. In Sweden and Finland, where the levels of dependency on fisheries for employment are generally quite low, there are some areas of very high dependency, such as Sotenaes (25.1%) and Föglö (23.1%) respectively.

**Table 27: Summary of most fisheries dependent areas (at NUTS 3 level) in each study region (as defined by Ratio 2 - total fishery sector employment)**

Country/Region	Most dependent NUTS 3 area	Ratio 2 Total Fishery Sector
Belgium	Oostende	1.4
Germany	Cuxhaven	4.1
Denmark	Bornholm	1.7
Spain E1	Pontevedra	15.1
Spain E2	Huelva	9.8
Spain E3	Taragona	6.1
France F1	Manche	1.9
France F2	Finistère	3.9
France F3	Herault	1.2
France F4	Guyane	1.9
Greece	Lesvos	9.8
Italy I1	Crotone	1.5
Italy I2	Foggia	1.9
Italy I3	Trapani	5.2
Ireland	West	2.0
Netherlands	Flevoland	3.0
Portugal P1	Algarve	8.3
Portugal P2	Azores	5.6
UK 1	East Riding and N.Lincolnshire	1.4
UK 2	Highlands and Islands	4.2
Sweden	Gotland	0.9
Finland	Åland-Ahvenanmaa	1.6

Notes:

1. Denmark ratio is for fishing
2. Ireland and Belgium is sum of fishing, processing and aquaculture

**Table 28: Summary of most fisheries dependent areas (at NUTS 4/5 level) in each study region (as defined by Ratio 2 - total fishery sector employment)**

Country/Region	NUTS 4/5 area	Ratio 2 Total Fishery Sector
Belgium	Bredene	5.0
Germany	Bremerhaven KS	5.8
Denmark	Hanstholm	31.4
Spain E1	Ria de Arousa	53.9
Spain E2	Barbate	31.3
Spain E3	Port de la Selva	61.9
France F1	Fecamp	9.4
France F2	Quimper	8.5
Netherlands	Urk	60.6
Portugal P1	Olhão	27.4
Portugal P2	Lajes Pico	12.6
UK 1	Grimsby	3.6
UK 2	Fraserburgh	20.5
Sweden	Sotenaes	25.1

Finland	Föglö	23.1
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*Note: Data at NUTS 4/5 level not available for France F3 and F4, Greece, Italy and Ireland*

#### 4.4.2 Areas Most Dependent on Fishing

The thirty NUTS 3 areas most dependent for employment on fishing, as defined by Ratio 2, are shown in Annex 3 (Table 7). The corresponding most dependent areas at lower levels of regional aggregation (NUTS 4 or 5 level) are shown in Table 5. The locations are ranked in order of dependency to facilitate assessing the effect of raising or lowering the dependency threshold. Cumulative totals are also shown. The Tables should be interpreted with caution, since there are material differences between regions in the way in the ratios are calculated. In many cases apparent differences in fisheries dependency are more likely to be due to differences in methodology and definition of key variables (or due to differences in the size of areas) than to true differences in dependency.

The thirty NUTS 3 regions most dependent on fishing have dependency Ratio 2 ranging from 9.63% to 2.31%. Overall these thirty regions account for a total fishery sector employment of 130,766 (some 25% of total fishery sector employment in the EU). About 1.82 million people are employed in these 30 regions, with the fishery sector employment contributing 7.19% of employment.

Of the thirty regions, 15 are in Greece, 11 in Spain, 2 in Portugal and 1 each in Italy and Germany. The four most dependent NUTS 3 regions are in Greece, with Lesvos being the most dependent of all. However it should be noted that the size of the regions varies quite considerably, with total employed in all sectors ranging from 7,795 to 191,079. The Greek NUTS 3 regions are on average much smaller than the remainder (average total employed 35,628 compared to overall 60,582 in all thirty regions), which must be taken into account when comparing dependency rates and ranking of most dependent regions.

Dependency ratios at NUTS 4 and 5 are much higher, reflecting the relatively greater impact of fisheries on the economy of smaller regions. These 27 areas most dependent on fishing have dependency Ratio 2 ranging from 61.9% to 12.6%. However it should be noted that data at this level of disaggregation was not available for several study regions (including Greece, Italy and France F3 and F4). Unlike the analysis at NUTS 3 level, this list cannot therefore be regarded as a definitive list of most dependent areas. The areas defined in the table account for a total fishery sector employment of 51,718 (some 9.9% of total fishery sector employment in the EU). Just over 151,000 people are employed in these 27 areas (the average being 5,596) with fishery sector employment contributing 34% of employment.

Of the 27 areas, 20 are in Spain, four in Portugal and three in Denmark. The five most dependent NUTS 4 areas are in Spain, with Port de la Selva being most dependent of all, with a Ratio 2 value for Fishing of 61.9%. However it should be noted that in areas with low total employment, relatively small changes in fisheries related employment can have a major impact on the dependency ratio. Porto de la Selva (with a total reported working population of just 357) and Ampolla (530) are examples and here the results are probably best regarded as anomalous. The remaining areas are more representative, with total numbers employed ranging up to 24,807.

Other dependent areas in Spain (with Ratio 2 Fishing values) are Barbate (28.8%) and Ametilla (27.8%). The NUTS 3 region of Huelva has two dependent NUTS 4 regions, Punta Umbria (26.2%) and Isla Cristina (24.2%). At NUTS 5 level Spain also has high levels of dependency in Bermeo 22.8%, Ondarroa (21.5%) and Ria de Arousa (18.0%). In Portugal the NUTS 4 areas of Olhão (23.9%), Vila do Bispo (19.0%), Vila Real S. Antonio (16.5%) (all in the Algarve) and Lajes on the island of Pico in the Azores (12.6%). The Danish most dependent areas are Holmsland (19.0%), Thyborøn-Harboøre (18.5%) and Læsø (16.3%).

#### 4.4.3 Areas Most Dependent on Fish Processing

The 25 NUTS 3 areas most dependent on fish processing are shown in Annex 3 (Table 9). The most dependent areas at lower levels of regional aggregation (NUTS 4 or 5 level) are also shown in Annex 3 (Table 10).

Dependency on fish processing contrasts markedly with that for fishing. Dependency Ratio 2 (fish processing) tends to be much lower even in the regions most dependent on this activity, with the highest value at NUTS 3 (of 3.4%) level being found in Cuxhaven, Germany. In fact only twelve NUTS 3 regions in the EU depend on fish processing for more than 1% of the regional employment total. However, note that the area in the table with the largest employment in this activity (La Coruña, with 2898) has only a relatively low dependency ratio due to the high total employment figure. Similarly, it should be noted that some other regions with high processing employment, for example Bremerhaven (3356 employed in the sector) and Boulogne-sur-Mer (5522 employed) do not feature at all on this table since the non-fish processing employment is also high, and Ratio 2 at NUTS 3 level is correspondingly lower than 0.5%.

The other major feature of the dependency on fish processing is how widely it is distributed throughout the EU, with four of the 25 most dependent NUTS 3 areas in Spain, four in Netherlands, and three each in UK, Germany, Ireland and Greece. Overall there are 36,254 employed in fish processing in these 25 regions, out of a total number employed of 2,862,909, with a relative dependency on this activity of 1.3%.

At NUTS 4/5 level, the average size of area is much smaller (at 9928 total employment) and the dependency ratio is correspondingly higher. The most dependent area (the NUTS 5 area of Urk in Netherlands) has 41.2% of employment in this activity. Other highly dependent areas are Fraserburgh in UK (Scotland) and Ria de Arousa (in Galicia, Spain E1). Overall, eight out of the 28 most dependent areas are in Spain, three in the UK 2 (all in Scotland), three in Finland (Föglö, Kustavi and Taivassalo) and three in Portugal (Peniche, Vila Real S. Antonio and Calheta in S. Jorge, Azores). Bremerhaven in Germany (5.5%) and Fecamp in France F1 (5.35%) complete the picture. Overall, there are 21,079 employed in fish processing in these most dependent regions, out of a total employed of 277,992, giving an overall dependency rate of 7.6%.

#### **4.4.4 Areas Most Dependent on Aquaculture**

In Annex 3 Tables 11 and 12 show the areas most dependent on marine aquaculture at NUTS 3 and NUTS 4/5 respectively. Employment dependency on aquaculture is much lower than for fishing or fish processing. At NUTS 3 level, Pontevedra and La Coruña in Spain E1 are the most dependent with 3.9 and 2.8% of jobs in this sector. Charentes Maritime (France F1) and Highlands and Islands (UK2) also have Ratio 2 values above 1%. At NUTS 4/5, Ria de Arousa in Spain E1 with 25% of the local employment attributable to this activity. Four regions in Finland are also relatively highly dependent on aquaculture, these being Houtskari (20.6%), Iniö (17.2%), Föglö (15.5%) and Brändö (13.7%). The rias of Galicia, with their extensive mollusc culture, also contribute another 6 of the top 20 aquaculture dependent regions, the balance being in UK2 (all in Scotland) where employment in salmon culture is important in Sutherland NW, Skye and Wester Ross and Shetland Isles.

#### **4.4.5 Areas Most Dependent on All Fisheries Activity**

In Annex 3 Tables 13 and 14 show the most dependent areas defined by the Ratio 2 for total employment in the fishery sector. It should be clearly noted that the inclusion of various activities in the number employed in the fishery sector does vary from region to region. All include as a minimum fishing, processing, coastal and inland aquaculture. However some will also include to a greater or lesser extent, employment in vessel construction and repair, marketing and distribution, gathering of bivalve mollusca and other up and downstream activities. These variations are highly likely to influence the absolute values of Ratio 2 (Total fisheries employment) and therefore the ranking of areas by dependency. Any interpretation of these data should take into account the possibility of these quite different definitions of total employment.

In terms of employment dependency on total fisheries related activity (Ratio 2 Total Fishery Sector employment) at NUTS 3 level (or equivalent) out of the top 40 dependent areas, 18 are in Greece and 11 in Spain, including the 5 most dependent regions. Ratio 2 Total Fishery Sector in the most dependent area is 15.1%, ranging down to 2.4% in the 40<sup>th</sup> ranked area.

Outside Greece and Spain, Portugal has two NUTS dependent regions in this list, these being the Algarve and the Azores. Dependent areas in Germany are Cuxhaven and Rügen, and in Italy Trapani and Agrigento. Finistère is the most dependent NUTS 3 region in France F2 (with 3.9% of jobs in the fishery sector).

At Nuts 4/5 level, there are some very high levels of employment dependency (above 50%) found in Spain E1 (three areas) and Urk in Netherlands. In fact 16 of the 30 most dependent areas (and 8 out of the top 10) are in Spain. Once again the analysis at this level of regional disaggregation excludes UK, France F3 and F4 Italy and Greece, and these 30 fisheries dependent areas should be regarded as indicative rather than definitive.

#### **4.5 Regional Analysis for Ratio 3**

Dependency Ratio 3 provides a measure of the share of the value of catches within a region which are subject to CFP quota management, as a proportion of the value of the total catches within that region. Although the measure does not take into account the extent to which quotas are already utilised, it can give a broad indication of how susceptible an area might be to changes in the management regime. Note that for Mediterranean fishing regions (where there are no quota limits applied to catches), the definition was extended to include species which were subject to other management regimes such as fishing gear restrictions. Note also that the definition of "subject to quota" was also interpreted to include tuna. Since the EU's accession to the International Convention for the Conservation of Atlantic Tunas (ICCAT), some species are subject to direct quota (eg. northern bluefin) and other species are subject to a commitment to maintain effort at 1991 levels. All tunas are therefore considered to be subject to management measures.

Table 29 and Table 30 show a regional breakdown of the values of Ratio 3, with the top 20 regions ranked by dependency Ratio 3 at NUTS 3 and NUTS 4/5 level.

Many areas appear to be highly dependent on species subject to management measures. At NUTS 3 level, 20 areas have a quota dependency above 90%. The areas most dependent are found in Sweden where the regions of Kalmar, Gotland, Blekinge, Skaane and Goetegorg and Bohus are all 100% dependent on species under quota. Eight of the top twenty dependent regions are in Italy, where management measures relate to gear controls and minimum sizes; these areas are Campobasso, Macerata, Ascoli Piceno, Forli, Ancona, Pescara, Rimini and Trapani in Sicily. In Denmark Frederiksorg, Nordjyllands and Rygkøbing Amts all have high levels of quota dependency. The only high value for Ratio 3 outside of Denmark, Italy and Sweden is in Bremerhaven. It should also be noted that in the UK2 Region, the whole of N.Ireland (a NUTS 1 area) has a Ratio 3 value of 86%.

The pattern is similar at NUTS 4/5 levels where 11 Swedish NUTS 5 regions all have 100% dependency. The island of Pico in the Azores (a region between NUTS 3 and 4) has landings almost exclusively of tuna, and is thus 97% dependent. Six NUTS 5 areas in Denmark also have high values for Ratio 3, in the region of 89-96%. Several areas in the UK have high dependency on stocks under quota, including Hull in UK1 with 91.6%, and Elgin and Forres, Blyth, Peterhead and Ards and Down. It should be noted that the County of Limerick in Ireland has a relatively high Ratio 3 value of 85%.

**Table 29: NUTS 2/3 Areas most dependent on species subject to management measures**

COUNTRY	REGION	NUTS 2	NUTS 3	RATIO 3 (%)
Sweden	SV1		Kalmar	100
Sweden	SV1		Gotland	100
Sweden	SV1		Blekinge	100
Sweden	SV1		Skaane	100
Sweden	SV1		Goeteborg and Bohus	100
Italy	I2	Molise	Campobasso	98.4
Germany	DA1		Bremerhaven, Kreisfreie Stadt	97.0
Italy	I2	Marche	Macerata	96.3
Denmark	DK1		Bornholms Amt	95.4
Italy	I2	Emilia Romagna	Forlì	95.2
Italy	I2	Marche	Ascoli Piceno	95.0
Denmark	DK1		Frederiksborg Amt	94.2
Denmark	DK1		Bornholms Amt	94.1
Italy	I2	Marche	Ancona	92.9
Italy	I2	Abruzzo	Pescara	92.4
Italy	I2	Emilia Romagna	Rimini	91.4
Denmark	DK1		Nordjyllands Amt	91.2
Denmark	DK1		Ringkøbing Amt	90.12
Finland	FIN1		Kymenlaakso	90.0
Italy	I3	Sicilia	Trapani	89.7

**Table 30: NUTS 4/5 areas most dependent on species subject to management measures**

COUNTRY	REGION	NUTS 4	NUTS 5	RATIO 3 (%)
Sweden	SV1		Borgholm	100.0
Sweden	SV1		Gotland	100.0
Sweden	SV1		Lysekil	100.0
Sweden	SV1		Oeckeroe	100.0
Sweden	SV1		Orust	100.0
Sweden	SV1		Simrishamn	100.0
Sweden	SV1		Soelvesborg	100.0
Sweden	SV1		Sotenaes	100.0
Sweden	SV1		Stroemstad	100.0
Sweden	SV1		Tanum	100.0
Sweden	SV1		Tjoern	100.0
Portugal	P2	Pico		97.5
Germany	DA1		Luebeck KS	96.0
Denmark	DK1	Neksø	Neksø	96.0
Denmark	DK1	Graested-Gilleleje	Gilleleje	94.2
Denmark	DK1	Lasø	Lasø	92.0
United Kingdom	UK1			91.6
Denmark	DK1	Skagen	Skagen	90.3
Denmark	DK1	Ulfborg-Vemb	Thorsminde	89.8
United Kingdom	UK2	Elgin and Forres		89.5
United Kingdom	UK1	Blyth		88.3
United Kingdom	UK	Peterhead		88.1

United Kingdom	UK2	Ards and Down		87.9
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## 4.6 Dependency in Relation to Structural Fund Objectives

Support for regional development within the EU is guided by a series of objectives, which define the needs of defined areas. A brief analysis was conducted to indicate the extent to which the present definition of Objective 1 and 2 regions relates to fisheries dependency in the EU. This indicates the extent of coverage of the dependent areas by the structural aid which is available to these regions during the period 2000 to 2006.

### 4.6.1 Objective 1

Support under Objective 1 promotes the development and structural adjustment of those regions whose development is lagging behind the rest of the community. These are regions whose per capita GDP has amounted to less than 75% of the Community average over the past 3 years (plus some regions with special needs). Objective 1 regions are designated at NUTS 2 level, and for the current period of funding (2000 to 2006) are defined as:

MEMBER STATE	OBJECTIVE 1 REGIONS
Greece	Whole country
Portugal Mainland	Whole country excluding Lisbon Nuts 2
Portugal Islands	Whole region
Ireland	Border & West only (NUTS 3)
Germany	The five new Lander (Brandenburg, Saxony, Saxony Anhalt, Mecklenburg-Vorpommern and Thuringen)
Spain	Andalucia, Extremadura, Canary Islands, Catalonia, Valencia, Murcia, Ceuta & Melilla, Galicia, Asturias
France	All the French Overseas Departments
Italy	Sardinia and Sicily Basilicata, Puglia Campania, Calabria
UK	Wales, Cornwall, Merseyside and S. Yorks
Sweden	Nuts 3 Dalarna, Gaeleborg, Vaesternorrland, Jaemtland, Vaesterbotten, Norrbotten
Finland	Nuts 3 Kainuu, Lappi, South Savo, North Savo, North Karelia

Objective 1 regions contain 22% of the EU population and will receive 69.7% of the structural funds allocated (136 billion Euro). The practical significance of the Objective 1 qualification for the fisheries sector is that higher levels of support funding will apply to areas which are classified as Objective 1. It is therefore instructive to assess the extent to which fisheries employment will fall within the areas defined as Objective 1 for the forthcoming funding period. For each of the study regions where Objective 1 funding is allocated, Table 31 shows the numbers employed in fisheries in Objective 1 regions.

Overall 155,705 fishers are employed in regions classified as Objective 1, corresponding to 63% of the EU total. Just four countries contribute the majority (92%) of these. Spain 51,908 fishers out of 68,275 are included, in Greece all 41,251 fishers are included, in Italy 27,891 out of 43,547 are included and in Portugal 22,853 out of 29,416 are included. The relatively high proportion of each of these member states' fishing sector which is included in Objective 1, indicates potential benefits to the sector from the Objective 1 funding available. However, Objective 1 funding will have less of an impact on fisheries dependent areas in Germany, France, UK, Sweden and Finland, where only relatively small numbers of fishers are found in Objective 1 regions. In these (and the remaining) Member States Objective 2 support for the fishery sector will be relatively more important.

The Objective 1 regions include 134 NUTS 3 areas in which fisheries dependency was estimated by this study. As shown in Table 32 below of these just 48 (36%) have a dependency on fishing of greater than 1%. Of these 48 areas, 25 are in Greece, eight in Spain, five in Portugal and just three in Italy. The remainder are in France, Germany and Ireland. These 48 most fisheries dependent Objective 1 regions

include 97,546 fishermen and a further 68,253 employed in other parts of the fishery sector, out a total employed of just over 3 million. A complete list is provided in Table 15 of Annex 3.

Fish processing is more widely dispersed than fishing in the EU, and only 25% of employees in the sub-sector are included in Objective 1 areas. The greatest number of these is in Spain, where 11,293 out of 16,850 process workers are in Objective 1 regions. Portugal also has a high proportion of process workers in these regions (4,605 out of a total 6,475 employed nationally). In aquaculture some 45% of EU-wide employment falls within Objective 1 regions.

#### **4.6.2 Objective 2**

Objective 2 funding, amounting to 11.5% of community structural funds, is available for converting the regions or parts of regions seriously affected by industrial decline. Objective 2 regions are defined at NUTS 3 level or below. There are three key eligibility criteria:

- an unemployment rate above the Community average
- a percentage share of industrial employment higher than the Community average
- a decline in this employment category

Objective 2 regions may also be flexibly defined according to specific needs, and include areas adjacent to Objective 1 regions, as well as other areas such as urban districts facing the threat of worsening unemployment, or indeed fisheries dependent areas which are suffering the impact of restructuring due to the pressures discussed elsewhere in this report.

The Objective 2 regions were defined at the end of 1999, and cover 18% of the EU population. Many of the Objective 2 regions are defined at NUTS 5 level and a detailed analysis is beyond the scope of this report. However, many are observed to be coastal areas, and fisheries dependency was clearly an indicative strand in the submissions made by Member States (in several cases based on interim results from the regional studies reported here).

Table 31: Numbers of employed in fisheries in EU Objective 1 regions

OBJECTIVE 1		NUMBERS EMPLOYED IN					POPULATION
COUNTRY	REGION	FISHING	PROCESSING	AQUA-CULTURE	TOTAL FISHERIES SECTOR	ALL SECTORS	
<i>Germany</i>	<i>DA1</i>	<i>1,822</i>	<i>812</i>	<i>0</i>	<i>0</i>	<i>308,000</i>	<i>676,000</i>
<i>Spain*</i>	E1	27,499	7,532	13,515	77,141	520,910	1,759,423
	E2	11,358	2,028	380	16,961	686,224	2,237,668
	E3	13,051	1,733	409	15,859	1,536,503	4,547,971
	<i>Total</i>	<i>51,908</i>	<i>11,293</i>	<i>14,304</i>	<i>109,961</i>	<i>2,743,637</i>	<i>8,545,062</i>
<i>France</i>	<i>F4</i>	<i>3,741</i>	<i>191</i>	<i>144</i>	<i>4334</i>	<i>464,400</i>	<i>1,573,800</i>
<i>Greece</i>		<i>41,251</i>	<i>2,409</i>	<i>2,910</i>	<i>49,525</i>	<i>3,885,623</i>	<i>10,259,900</i>
<i>Italy</i>	I1	5,260	449	302	11,068	2,015,000	7,859,509
	I2	6,281	224	1,158	13,427	1,301,000	4,695,556
	I3	16,350	1,173	1,282	30,100	1,789,000	6,764
	<i>Total</i>	<i>27,891</i>	<i>1,846</i>	<i>2,742</i>	<i>54,595</i>	<i>5,105,000</i>	<i>12,561,829</i>
<i>Ireland</i>	<i>IRL1</i>	<i>2,813</i>	<i>2,447</i>	<i>896</i>	<i>0</i>	<i>259,400</i>	<i>759,648</i>
<i>Portugal*</i>	P1	17,631	3,189	323	28,369	4,095,151	n.a.
	P2	5,222	1,416	5	6,703	194,199	n.a.
	<i>Total</i>	<i>22,853</i>	<i>4,605</i>	<i>328</i>	<i>35,072</i>	<i>4,289,350</i>	<i>n.a.</i>
<i>United Kingdom</i>	<i>UK1</i>	<i>3,026</i>	<i>250</i>	<i>9</i>	<i>3,865</i>	<i>1,992,000</i>	
<i>Sweden</i>	<i>SV1</i>	<i>245</i>	<i>62</i>	<i>0</i>	<i>0</i>	<i>988,100</i>	
<i>Finland</i>	<i>FIN1</i>	<i>189</i>	<i>86</i>	<i>329</i>	<i>759</i>	<i>433,071</i>	
<b>ALL OBJECTIVE 1 REGIONS</b>		<b>155,739</b>	<b>24,001</b>	<b>21,662</b>	<b>258,111</b>	<b>20,468,581</b>	
<b>TOTAL EU</b>		<b>251,602</b>	<b>95,849</b>	<b>45,341</b>	<b>526,034</b>		
<b>OBJECTIVE 1 as % EU</b>		<b>62</b>	<b>25</b>	<b>48</b>	<b>49</b>		

\* indicates data from 1996

**Table 32: Number and employment characteristics of EU Fisheries dependent NUTS areas falling within Objective 1 regions**

<b>RATIO 2 FISHING</b>	<b>&gt;10%</b>		<b>5-10%</b>		<b>2-5%</b>		<b>1-2%</b>		<b>&lt;1%</b>	
<b>TOTALS WITHIN EACH RANGE</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No. of Zones	0	0	7	5.2	25	18.7	16	11.9	86	64.2
Total Employed	0	0	353,474	2.0	1,462,382	8.1	1,194,576	6.6	15,010,273	83.3
Employment in Fishing	0	0	29,759	19.1	50,718	32.6	17,069	11.0	58,159	37.4
Other Fishery Sector Employment	0	0	28,515	28.3	32,290	32.0	7,448	7.4	32,659	32.4
Total Fishery Sector Employment	0	0	58,274	22.7	83,008	32.3	24,517	9.6	90,818	35.4
<b>CUMULATIVE TOTALS</b>										
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
No. of Zones	0	0	7	5.2	32	23.9	48	35.8	134	100.0
Total Employed	0	0	353,474	2.0	1,815,856	10.1	3,010,432	16.7	18,020,705	100.0
Employment in Fishing	0	0	29,759	19.1	80,477	51.7	97,546	62.6	155,705	100.0
Other Fishery Sector Employment	0	0	28,515	28.3	60,805	60.3	68,253	67.6	100,912	100.0
Total Fishery Sector Employment	0	0	58,274	22.7	141,282	55.1	165,799	64.6	256,617	100.0
Average employment / zone			50496		72,634		188,152		209,543	

*Notes:*

*1. Dependency band is defined by Ratio 2 Fishing at NUTS 3 level in 1996/97*

*2. Includes Spain E1 employment data based on "dependency zones"*

## **4.7 Multiplier Indicators of Dependency**

### **4.7.1 Regional Analysis of Multipliers**

Employment multipliers are used to provide a measure of the level of linkages between an activity and other related (both upstream and downstream) industries in the region. Thus, the fishing employment multipliers can measure the extent to which changes in fishing will have an impact on the local economy, and therefore provide a important indicator of the ultimate dependency of a region on fishing activity.

Multipliers do not indicate the size of the industrial sector in question and therefore should be looked in conjunction with the relevant employment figures in deciding how important an industrial sector is in a particular location. A very small industry may have a large employment multiplier, yet be of little significance in the location. Conversely small multipliers within a large industrial sector can make a significant impact on the local community.

The results of the multiplier estimations are presented in Table 33 and Table 34 below.

In the tables which follow, the employment multiplier provides an estimate of the factor between the number of jobs in the activity described, and the total number of jobs in related activities. Backward multipliers relate to jobs in the supply chain of inputs, and forward multipliers relate to jobs in downstream industries which utilise outputs. Thus a forward multiplier of 2.0 for fishing means that for every job in fishing there is one other job in downstream activities such as processing and distribution. A backward multiplier of 1.5 for processing means that for every job in processing there are 0.5 jobs in input suppliers to processing such as fishing, packaging materials, and energy.

Comparison of these multipliers between regions needs to be done with caution. Firstly they were calculated with data from different years (not only between the regions, but also within the models owing to availability of the necessary information). Secondly the amount of case study material to adjust the models more accurately to reflect the local economy varied significantly. Thus the results are indicative rather than prescriptive and one should observe the patterns rather than compare too closely the actual numbers.

**Table 33: Backwards and forwards employment multipliers for fishing and fish processing in the EU**

COUNTRY	REGION	NUTS 4/5	INDUSTRIAL SECTOR	BACKWARD EMPLOYMENT MULTIPLIER	FORWARD EMPLOYMENT MULTIPLIER	TOTAL EMPLOYMENT MULTIPLIER
Denmark	DK1	Ribe	Fishing	1.43	1.45	1.88
			Manufacture of Food, Beverages & Tobacco	3.16	1.61	3.77
		Bornhom*	Fishing	1.26	1.44	1.70
			Manufacture of Food, Beverages & Tobacco	2.90	1.57	3.47
Spain	E1	Galicia	Fishing	1.11		
			Fishing processing	1.23		
			Aquaculture	1.01		
	E2	Cadiz	Fishing			1.10
		Huelva	Fishing			1.07
		Atlantic Andalusia	Fishing			1.09
Greece	GR1	Kevala	Fishing	1.21	1.20	1.42
		Euboea	Fishing	1.23	1.17	1.40
Portugal	P1	V.Castelo	Fishing	1.17	2.45	2.62
			Processing	1.56	1.15	1.71
		Matosinhos	Fishing	1.24	2.95	3.19
			Processing	1.61	1.15	1.76
		V. Conde	Fishing	1.11	2.39	2.50
			Processing	1.55	1.07	1.62
		P. Varzim	Fishing	1.10	3.47	3.57
			Processing	1.49	1.19	1.68

COUNTRY	REGION	NUTS 4/5	INDUSTRIAL SECTOR	BACKWARD EMPLOYMENT MULTIPLIER	FORWARD EMPLOYMENT MULTIPLIER	TOTAL EMPLOYMENT MULTIPLIER
		Aveiro	Fishing	1.16	2.45	2.61
			Processing	1.56	1.15	1.71
		Fig. Foz	Fishing	1.18	2.20	2.38
			Processing	1.57	1.26	1.83
		Peniche	Fishing	1.10	3.38	3.48
			Processing	1.49	1.18	1.67
		Lourinha	Fishing	1.12	2.85	2.97
			Processing	1.52	1.19	1.71
		Sesimbra	Fishing	1.11	1.27	1.38
			Processing	1.51	1.24	1.75
		Setubal	Fishing	1.23	2.45	2.68
			Processing	1.61	1.15	1.76
		Olhao	Fishing	1.05	2.62	2.67
			Processing	1.49	1.09	1.58
		V.R.S Antonio	Fishing	1.16	7.59	7.75
			Processing	1.53	1.99	2.52
	P2	Madeira Cam de Lobos	Fishing	1.06	1.38	1.44
			Processing	n.a	n.a	n.a
		Madeira – Machico	Fishing	1.20	2.05	2.25
			Processing	1.90	1.20	2.10
United Kingdom	UK1					
		Grimsby	Fishing	1.33	1.75	2.08
			Processing	1.12	1.30	1.42
		Newlyn	Fishing	1.30	1.61	1.91
			Processing	1.10	1.09	1.19
	UK2	North East Scotland*	Fishing	1.59	1.81	2.38
			Processing	2.50	1.44	2.94
		Shetlands*	Fish catching	1.33		
			Fish farming	1.89		

COUNTRY	REGION	NUTS 4/5	INDUSTRIAL SECTOR	BACKWARD EMPLOYMENT MULTIPLIER	FORWARD EMPLOYMENT MULTIPLIER	TOTAL EMPLOYMENT MULTIPLIER
			Processing	1.78		
Sweden	SV1	West Goetaland*	Sea food products			2.5
			Fishing			1.3-1.6
		Four City Region*	Sea food products			2.6
			Fishing			1.35-1.65
Finland	FIN1	Rymattyla,Taivassao Velkua*	Fishing	1.27		
			Aquaculture	1.32		
			Processing	2.6		

Where \* indicate not a NUTS 4/5 area

**Table 34: Estimations of fisheries employment multipliers in EU regions**

COUNTRY	REGION	NUTS 4/5	INDUSTRIAL SECTOR	BACKWARD EMPLOYMENT MULTIPLIER	FORWARD EMPLOYMENT MULTIPLIER	TOTAL EMPLOYMENT MULTIPLIER
Belgium & Luxembourg	BL1	Brugge	Fishing			2.0
		Ostende	Fishing			1.4
Germany	DA1	Bremenhaven	Fishing			1.4
		Sassnitz on Rugen	Fishing			1.65
Spain	E1	Basque Country	Fishing	1.29		2.03
		Galicia	Fishing	1.14		1.55
		Asturias	Fishing	1.08		1.84
France	F1	Boulogne sur Mer	Fishing	1.5	2.0	2.9
		Port en Bessin	Fishing	1.4	2.2	3.2
	F2	Guilvinec	Fishing	1.3	2.0	2.5
		Douarnenez	Fishing	1.3	6	6.6
Ireland	IRL1	Killybegs	Fishing		6.01	

		Rossaveal	Fishing		2.05	
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Notes:

1. France total is greater than sum of forward and backward multipliers due to inclusion of linked employment which cannot be partitioned between up- and down-stream activities.

2. Spain E2 data is for Type II multiplier ie includes induced effects

### 4.7.2 Interpretation of Multipliers

The overall picture is of relatively small values for multipliers for fishing, demonstrating limited linkages between fishing and the local economies. In general, the data suggest that there is approximately half to one and half jobs on land, linked to the existence of every job at sea. There are however, a few areas where the multipliers are much larger, for example Killybegs in Ireland, and in a few of the Portuguese mainland regions (eg. Vila Real S. Antonio) thus revealing in some locations a fishing industry very much more integrated with other local business.

In general, the backwards multipliers for fishing are much smaller than those forward. This relates to the primary nature of the fishing industry with labour, rather than materials produced by other industries, making up a large proportion of the input cost, and the labour intensive nature of many of the processing, packing and distributing and retail industries. The only region for which this is not the case is in Greece, where both multipliers are small, and those forward even smaller than those backward. This is because the fish processing industry has hardly developed at all in Greece.

For the processing industry, the backwards linkages are on the whole very much higher than those forward. This is because of the primary nature of the fishing industry, and the fact that the processing industry is buying not only from the local fishing industry, but may also be using imported fish and inputs from other industries.

In the Portugal P1 region, the fishing forward multipliers are larger than the processing backward multipliers. This probably relates to two issues. Firstly, there is a low level of linkages between the fishing and processing industries; in most situations the processing industry relies extensively on imported raw material, thus giving a low backward multiplier. The reason that the fishing forward multiplier looks relatively large in comparison may be due to the more labour intensive nature of the processing industry when dealing with locally sourced raw materials (ie for every tonne of output, more people would be involved compared to imported raw material). Also the forward multiplier does not only include those in the processing industry, but also those further downstream, in packing, wholesaling, retail and services – all of which tend to be rather labour intensive.

As far as this study is concerned, the fishing multipliers are more significant in terms of assessing the impact of CFP measures on local communities. This is because, as we have seen, processing has only a 50% reliance on fish landed from Community waters. Even if processing multipliers were much higher, their interpretation in terms of impact assessment of CFP measures would be factored by this characteristic.

### 4.7.3 Relation Between Employment at Sea and on Land

Table 35 shows a crude estimate of the relationship between direct employment in fisheries at sea and on land. It shows the total direct fisheries related employment (FT+PT) in each region, and provides a ratio of the total fishing sector employment to employment in marine capture fishing. The ratio was calculated as a multiplier, ie. the number that one would multiply the numbers involved in fishing by arrive at the total direct employment. The ratio can be compared with the multipliers estimated by the GRIT methodology.

Overall in the EU it would appear that for every job at sea, there are a further 1.1 jobs on land in direct fisheries employment. As discussed under Task 1, the numbers employed in fisheries are underestimated by perhaps 60-75,000. This would suggest that, under present circumstances, as a crude means of estimating employment in all fisheries and related activities, the numbers of fishing jobs at sea can be multiplied by a factor of 2.4.

**Table 35: Relationship between employment in marine fishing and total fisheries related employment**

COUNTRY	REGION	FISHING	PROCESSING	OTHER	TOTAL EMPLOYMENT IN SECTOR	RATIO
<i>Belgium</i>	<i>BL1</i>	<i>745</i>	<i>1,261</i>	<i>436</i>	<i>2,579</i>	<i>3.46</i>
<i>Germany</i>	<i>DA1</i>	<i>4,422</i>	<i>11,280</i>	<i>633</i>	<i>19,529</i>	<i>4.42</i>
<i>Denmark</i>	<i>DK1</i>	<i>5,866</i>	<i>8,588</i>	<i>3,714</i>	<i>19,266</i>	<i>3.28</i>
<i>Spain</i>	E1	38,797	13,123	28,360	94,148	2.43
	E2	11,951	2,028	3,195	17,640	1.48
	E3	17,527	1,699	1,106	20,843	1.19
	<b>Total</b>	<b>68,275</b>	<b>16,850</b>	<b>32,661</b>	<b>132,631</b>	<b>1.94</b>
<i>France</i>	F1	4,770	4,846	3,247	15,136	3.17
	F2	12,939	6,156	6,378	36,528	2.82
	F3	3,634	939	1,351	8,305	2.29
	F4	3,741	191	258	6,835	1.83
	<b>Total</b>	<b>25,084</b>	<b>12,132</b>	<b>11,234</b>	<b>66,804</b>	<b>2.66</b>
<i>Greece</i>	<i>GRI</i>	<i>41,251</i>	<i>2,409</i>	<i>5,865</i>	<i>49,525</i>	<i>1.20</i>
<i>Italy</i>	I1	10,258	2,874	16,134	31,061	3.03
	I2	16,939	2,400	20,906	45,823	2.71
	I3	16,350	1,173	11,285	30,100	1.84
	<b>Total</b>	<b>43,547</b>	<b>6,447</b>	<b>48,325</b>	<b>106,984</b>	<b>2.46</b>
<i>Ireland</i>	<i>IRL1</i>	<i>6,274</i>	<i>4,920</i>	<i>2,000</i>	<i>15,542</i>	<i>2.48</i>
<i>Netherlands</i>	<i>NL1</i>	<i>2,379</i>	<i>3,300</i>	<i>5,187</i>	<i>11,800</i>	<i>4.96</i>
<i>Portugal*</i>	P1	24,194	5,059	5,963	37,688	1.56
	P2	5,222	1,416	54	6,703	1.28
	<b>Total</b>	<b>29,416</b>	<b>6,475</b>	<b>6,017</b>	<b>44,391</b>	<b>1.51</b>
<i>United Kingdom *</i>	UK1	9,895	9,598	n.a.	21,198	2.14
	UK2	8,811	10,322	n.a.	21,590	2.45
	<b>Total</b>	<b>18,706</b>	<b>19,920</b>	<b>n.a.</b>	<b>42,788</b>	<b>2.29</b>
<i>Sweden</i>	<i>SV1</i>	<i>2,634</i>	<i>2,008</i>	<i>1,500</i>	<i>7,186</i>	<i>2.73</i>
<i>Finland</i>	<i>FIN1</i>	<i>3,003</i>	<i>560</i>	<i>410</i>	<i>6,074</i>	<i>2.02</i>
<b>TOTAL</b>		<b>251,602</b>	<b>96,250</b>	<b>112,147</b>	<b>526,034</b>	<b>2.09</b>

The ratio is notably higher by a factor of 3 up to 4 in Netherlands, Belgium, Germany and Denmark compared to countries such as Greece, Spain and Portugal. The former regions are characterised by relatively low fleet employment in efficient capital intensive fishing operations, and a high level of processing employment mainly in enterprises utilising imported raw materials. These regions therefore show relatively higher apparent employment multipliers, although the real linkages between the jobs on land to fishing in these countries are much weaker than in the regions with lower apparent values.

There are some significant differences between these crude multipliers and those calculated by the GRIT methodology. This is for several reasons. First and most importantly, these crude measures take no account of the linkages between the various activities, only their presence. Thus, for example, there are few linkages between marine capture fishing and aquaculture. In some regions there are few linkages between fishing and processing, for example in the four countries with the largest apparent multiplier effect of fishing (Belgium, Germany, Denmark and the Netherlands) where the employment in fish processing relies to a substantial extent on imported raw material. This feature is identified by the GRIT methodology which takes into account the amount of local input used by the industry in question, and also how much of the output is used within the region.

Secondly, the input-output multipliers take account of a whole series of transactions throughout the economy, ie not only first round impacts but also the less direct upstream and downstream effects. These effects are not indicated by the crude indicators of onshore employment. Thirdly, the crude analysis is limited by data availability, so that in some of the regional totals employment only includes fishing, processing and aquaculture and there is no extra information on 'other employment' (such as employment in distribution or vessel construction and repairs). Finally, it should be noted that these ratios were calculated on a national rather than regional basis.

However, despite these reservations the crude estimate based on numbers (c.1.1) at sea to onshore employment does correspond quite well with the estimates of fishing multipliers derived from the GRIT analysis of 0.5 to 1.5 downstream jobs for every fisher. This is because the crude estimate takes no account of the second round and indirect impacts, but this is compensated by the inclusion of employment completely unrelated to marine capture fishing (all aquaculture and inland fishing).

## **4.8 The Nature of Fisheries dependency**

### **4.8.1 Dependency on Stocks Under Quota**

Quota reductions can have a significant short-term effect on employment in fishing where the quota dependency (Ratio 3) is high and the quotas are fully utilised, but in the longer term, for modest changes in quota, the impact is likely to cause a redirection of fishing effort. There are also implications for processing employment where the stocks subject to quota form a significant part of the raw material input for processing, or a lower-cost alternative input to imports. Here there may be a longer term impact of quota changes, as processing establishments close or shift operations to third countries with lower costs.

Quota dependency within a region is defined as the proportion of value of landings attributable to species which are subject to quota. High quota dependencies (above 70%) are characteristic of the fleets of the countries bordering the North Sea and Baltic Sea, and with Ireland. These regions account for some 43,692 (18%) of the EU fishers who can be considered to be those likely to suffer loss of employment opportunity if quotas are reduced.

Lower dependency regions are France (except the Channel ports), Spain and Portugal. Although quota dependency in the Mediterranean region is technically zero, since there are no quotas, management is affected in other ways (such as gear and effort limitations). No data are available on the dependency on landings which are subject to such measures, although the Italian studies have shown the extent to which catches are subject to other management measures. Future studies may wish to consider specifically including such a measure of dependency.

Of non-quota stocks the Iberian sardine is being considered for management measures. This would have an impact on Spain and Portugal. The impact for Portugal is shown in the following Table 36.

Comparable data for Spain are not available. The SWOT analysis has not indicated any other species which are being considered for management measures in the foreseeable future.

**Table 36: Job losses in fishing and fish processing due to impact of sardine quotas in Portugal**

<b>IMPLICATIONS FOR FISHING SECTOR</b>		<b>IMPLICATIONS FOR PROCESSING SECTOR</b>	
<b>Jobs lost</b>	<b>Principal impact locations</b>	<b>Jobs lost</b>	<b>Principal impact locations</b>
46.6 jobs per 1000 tonnes reduction in annual catch	Matosinhos P.Varzim, Peniche Sines	23.9 per 1000 tonnes reduction in annual catch	Matosinhos Peniche VRS Antonio

	Portimao		
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Source: Consultants' estimates

#### 4.8.2 Dependency on Fleet Segments Undergoing Structural Adjustment

Planned capacity reduction in line with a multi-annual guidance programme is a major instrument of the Common Fisheries Policy for bringing the size of the fishing sector in line with resource availability. Incentives are provided via the Financial Instrument for Fisheries Guidance for the permanent and temporary withdrawal of vessels from the community fleet. This policy clearly impacts on employment opportunities in the fisheries sector.

However, this impact is also dependent on other factors such as the level of obsolescence in the fleet and the age profile of fishers. For example, France F3 (Mediterranean) experienced a decline in number of fishers of 22% (1020) between 1991 and 1997. During the period there was a natural dynamic of older fishers leaving the sector, and new ones entering. It was estimated that during the period some 770 left their jobs prematurely due to the incentivised withdrawal of vessels. This would suggest that in this region, some 75% of the decline in numbers since the 1991 studies has been due to the structural adjustment of the fleet. Comparable data are not available for other regions, but this ratio may apply at least to other Mediterranean fisheries which exhibit similar characteristics - a high proportion of employment on small vessels, and an aging population of fishers.

There are also extensive regional variations in the impact of MAGP reductions, as shown in Table 37. Although there is no linear relationship between fishing capacity and employment in fishing, there is a wide variation in potential impact of capacity reductions, ranging by a factor of about 15 between highly capitalised fleets such as those found in Netherlands (with an average of 1.8 jobs per 100GT), and those with a disproportionate number of small vessels (eg. Greece, with 37.2 jobs/100GT). These regional differences should clearly be taken into account in terms of relative allocations of social support measures within fisheries structural funds.

The different levels of labour utilisation in the fishing fleets impact on average labour productivity, where there are significant variations between regions, as indicated by Table 38. Average EU labour productivity in marine fishing is ECU 24,770 per employee, with a wide range between 150,453 for Netherlands and just ECU 6,097 per employee in the Portugal Islands Region (8,608 for Portugal as a whole). By comparison, average productivity in fish processing is 104,531 per employee. The highest productivity is reported for Spain E3 (ECU 513,015 per employee. Although this appears to be an anomalous result). This result apart, labour productivity in this sector does not show the extreme variations of the marine fishing sector, with most regions in the range 70 to 120,000 ECU. Average labour productivity in aquaculture is of the same order as fishing, with an average of 26,770 ECU per employee, ranging from 3648ECU in Portugal to 275,572ECU in Denmark.

Table 37: Average labour utilisation in EU fishing fleets

COUNTRY	REGION	No. EMPLOYED IN FISHING	GROSS TONNAGE	kW	No. VESSELS	No. EMPLOYED/ 100 GROSS TONNES	No. EMPLOYED/1 00kW	No. EMPLOYED/ VESSEL
<i>Belgium</i>	<i>BL1</i>	745	22,875	65,228	152	3.3	1.1	4.9
<i>Germany</i>	<i>DA1</i>	4,422	59,035	161,503	2,337	7.5	2.7	1.9
<i>Denmark</i>	<i>DK1</i>	5,866	97,985	355,215	4,582	6.0	1.7	1.3
<i>Spain*</i>	E1	38,797	353,807	799,610	10,025	11.0	4.9	3.9
	E2	11,951	116,275	485,075	3,257	10.3	2.5	3.7
	E3	17,527	89,853	563,207	4,959	19.5	3.1	3.5
	<b>Total</b>	<b>68,275</b>	<b>559,935</b>	<b>1,847,892</b>	<b>18,241</b>	<b>12.2</b>	<b>3.7</b>	<b>3.7</b>
<i>France</i>	F1	4,770	36,797	199,200	1,024	13.0	2.4	4.7
	F2	12,939	115,610	591,567	3,331	11.2	2.2	3.9
	F3	3,634	17,773	170,055	1,900	20.4	2.1	1.9
	F4	3,741	17,566	182,237	2,820	21.3	2.1	1.3
	<b>Total</b>	<b>25,084</b>	<b>171,936</b>	<b>1,143,059</b>	<b>9,075</b>	<b>14.6</b>	<b>2.2</b>	<b>2.8</b>
<i>Greece</i>	<i>GRI</i>	41,251	110,904	655,891	20,491	37.2	6.3	2.0
<i>Italy</i>	IT1	10,258	48,930	345,290	4,685	21.0	3.0	2.2
	IT2	16,939	106,437	688,941	6,704	15.9	2.5	2.5
	IT3	16,350	88,734	442,828	4,954	18.4	3.7	3.3
	<b>Total</b>	<b>43,547</b>	<b>244,101</b>	<b>1,477,059</b>	<b>16,343</b>	<b>17.8</b>	<b>2.9</b>	<b>2.7</b>
<i>Ireland</i>	<i>IRL1</i>	6,274	61,000	190,349	1,244	10.3	3.3	5.0
<i>The Netherlands</i>	<i>NL</i>	2,379	134,628	384,325	464	1.8	0.6	5.1
<i>Portugal*</i>	P1	24,194	102,248	330,816	9,319	23.7	7.3	2.6
	P2	5,222	18,170	64,504	2,273	28.7	8.1	2.3
	<b>Total</b>	<b>29,416</b>	<b>120,418</b>	<b>395,320</b>	<b>11,592</b>	<b>24.4</b>	<b>7.4</b>	<b>2.5</b>
<i>United Kingdom*</i>	UK1	9,895	93,344	473,370	4,856	10.6	2.1	2.0
	UK2	8,811	111,554	486,182	3,158	7.9	1.8	2.8
	<b>Total</b>	<b>18,706</b>	<b>204,898</b>	<b>959,552</b>	<b>8,014</b>	<b>9.1</b>	<b>1.9</b>	<b>2.3</b>
<i>Sweden</i>	<i>SV1</i>	2,634	44,224	230,721	2,077	6.0	1.1	1.3
<i>Finland</i>	<i>FIN1*</i>	3,003	24,070	219,441	3,987	10.4	1.4	0.8
<b>TOTAL</b>		<b>251,602</b>	<b>1,856,009</b>	<b>8,085,555</b>	<b>98,599</b>	<b>13.6</b>	<b>3.1</b>	<b>2.6</b>

Note:

1. UK employment data are for 1996; fleet data are 1997
2. \* indicates data from 1996

Table 38: Estimates of average output per job in the EU Fishery Sector

COUNTRY	REGION	Fishing			Fish Processing			Marine Aquaculture		
		NO. EMPLOYED (PT+FT)	VALUE OF LANDINGS (ECU)	AVERAGE OUTPUT PER EMPLOYEE (ECU)	NO.EMPLOYED (PT +FT)	VALUE OF OUTPUT (ECU)	AVERAGE OUTPUT PER EMPLOYEE (ECU)	NO:EMPLOYED (FT+PT)	VALUE OF OUTPUT (ECU)	AVERAGE OUTPUT PER EMPLOYEE (ECU)
<i>Belgium</i>	<i>BE</i>	745	71,631,050	96,149	1,261	236,627,442	187,651	0	0	
<i>Germany</i>	<i>DE</i>	4,422	160,205,256	36,229	11,280	1,269,880,064	112,578	40	11,010,090	275,252
<i>Denmark</i>	<i>DK</i>	5,866	437,355,768	74,558	8,588	1,446,880,049	168,477	300	20,043,802	66,813
<i>Spain*</i>	E1	38,797	454,896,647	11,725	13,123	1,057,267,892	80,566	13,586	n.a.	n.a.
	E2	11,951	415,936,083	34,803	2,028	341,780,831	168,531	466	28,888,986	61,994
	E3	17,527	185,234,527	10,569	1,699	871,611,970	513,015	511	19,273,626	37,717
	<b>Total</b>	<b>68,275</b>	<b>1,056,067,300</b>	<b>15,468</b>	<b>16,850</b>	<b>2,270,660,700</b>	<b>134,757</b>	<b>14,833</b>	<b>48,162,612</b>	
<i>France</i>	F1	4,770	181,843,753	38,122	4,846	820,252,245	169,264	1,716	68,354,354	39,834
	F2	12,939	508,120,860	39,270	6,156	919,456,794	149,359	10,270	242,415,990	23,604
	F3	3,634	102,682,757	28,256	939	130,054,744	138,503	2,381	49,148,595	20,642
	F4	3,741	185,857,303	49,681	191	n.a.	n.a.	110	2,295,236	20,866
	<b>Total</b>	<b>25,084</b>	<b>978,504,670</b>	<b>39,009</b>	<b>12,132</b>	<b>1,869,763,783</b>	<b>154,118</b>	<b>14,477</b>	<b>362,214,180</b>	<b>25,020</b>
<i>Greece</i>	<i>GR</i>	41,251	451,086,671	10,935	2,409	89,793,279	37,274	2,910	164,423,687	56,503
<i>Italy</i>	IT	10,258	251,305,655	24,499	2,874	251,973,773	87,674	751	59,347,432	79,025
	IT	16,939	700,610,061	41,361	2,400	224,919,401	93,716	4,490	84,173,016	18,747
	IT	16,350	571,951,485	34,982	1,173	105,295,703	89,766	1,282	30,727,726	23,969
	<b>Total</b>	<b>43,547</b>	<b>1,524,311,927</b>	<b>35,004</b>	<b>6,447</b>	<b>582,188,358</b>	<b>90,304</b>	<b>6,523</b>	<b>174,247,654</b>	<b>26,713</b>
<i>Ireland</i>	<i>IRE</i>	6,274	176,750,732	28,172	4,920	270,907,923	55,063	1,958	66,230,021	33,825
<i>The Netherlands</i>	<i>NL</i>	2,379	358,142,491	150,543	3,300	436,039,280	132,133	312	56,223,737	180,204
<i>Portugal*</i>	P1	24,194	221,371,770	9,150	5,059	434,971,061	85,980	5,252	19,161,691	3,648
	P2	5,222	31,836,129	6,097	1,416	n.a.	n.a.	0	0	
	<b>Total</b>	<b>29,416</b>	<b>253,207,900</b>	<b>8,608</b>	<b>6,475</b>	<b>434,971,061</b>	<b>67,177</b>	<b>5,252</b>	<b>19,161,691</b>	<b>3,648</b>

COUNTRY	REGION	Fishing			Fish Processing			Marine Aquaculture		
		NO. EMPLOYED (PT+FT)	VALUE OF LANDINGS (ECU)	AVERAGE OUTPUT PER EMPLOYEE (ECU)	NO.EMPLOYED (PT +FT)	VALUE OF OUTPUT (ECU)	AVERAGE OUTPUT PER EMPLOYEE (ECU)	NO:EMPLOYED (FT+PT)	VALUE OF OUTPUT (ECU)	AVERAGE OUTPUT PER EMPLOYEE (ECU)
<i>United Kingdom</i>	UK1	9,895	241,659,733	24,422	9,598	578,434,318	60,266	850	7,961,676	9,367
	UK2	8,811	434,437,047	49,306	10,322	294,544,838	28,536	1,617	352,012,560	217,695
	<i>Total</i>	<i>18,706</i>	<i>676,096,770</i>	<i>36,143</i>	<i>19,920</i>	<i>868,979,156</i>	<i>43,623</i>	<i>1,775</i>	<i>359,974,240</i>	<i>202,802</i>
<i>Sweden*</i>	<i>SW</i>	<i>2,648</i>	<i>115,591,302</i>	<i>43,652</i>	<i>1,993</i>	<i>297,291,397</i>	<i>149,168</i>	<i>394</i>	<i>7,345,045</i>	<i>18,642</i>
<i>Finland*</i>	<i>FIN</i>	<i>3,003</i>	<i>26,709,678</i>	<i>8,894</i>	<i>560</i>	<i>79,923,274</i>	<i>142,720</i>	<i>640</i>	<i>40,811,884</i>	<i>63,769</i>
<b>TOTAL</b>		<b>250,871</b>	<b>6,214,030,465</b>	<b>24,770</b>	<b>94,874</b>	<b>9,917,278,324</b>	<b>104,531</b>	<b>49,414</b>	<b>1,329,848,643</b>	<b>26,912</b>

## Notes:

1. UK data uses 1997, therefore total employed does not correspond with totals elsewhere in the report.
2. \* indicates data from 1996

### 4.8.3 Dependency on Third Country Access

The European Union has established bilateral fisheries agreements with a number of other nations. Many of these provide for access rights for EU flagged vessels to fish within the EEZ of the third country concerned, and many fishermen from EU Member States find employment in this type of activity. The current third country access agreements are shown in Table 39 below, which indicates that the agreements with Mauritania and Morocco are perhaps the most significant in terms of cost to the EU budget. These agreements are also of importance since a significant proportion of the fish caught under the agreement is landed directly in EU ports, in Southern Spain, Canary Islands and Portugal.

**Table 39: Principal fisheries access agreements concluded by the EU**

Country	Fishing opportunities	Annual cost to EU budget
Angola	Tuna, shrimp, demersal species	13 million ECU
Argentina	Hake, Patagonian grenadier, squid, Patagonian rockcod / roughhead grenadier	810,000 ECU, joint ventures and enterprises
Cape Verde	Tuna	500,000 ECU
Equatorial Guinea	Tuna	220,000 ECU
Estonia	Cod, herring, salmon, sprat	
Faroe Islands	Cod, haddock, saithe, redfish, Blue ling, Blue whiting, flatfish, other species	Reciprocal
Gambia	Tuna, shrimp, other species	466,667 ECU
Greenland	Cod, Redfish, Greenland halibut, deep water prawns, Atlantic halibut, catfish, Blue whiting, capelin, grenadier	Financial compensation and tariff incentives
Guinea Bissau	Tuna, shrimp, finfish, cephalopods	6.35 million ECU
Guinea Conakry	Tuna	1.35 million ECU
Iceland	Redfish	Reciprocal
Ivory Coast	Tuna, demersal species	833,333 ECU
Latvia	Cod, herring, salmon, sprat	Reciprocal
Lithuania	Cod, herring, salmon, sprat	Reciprocal
Madagascar	Tuna	725,000 ECU
Mauritania	Tuna, pelagics, crustaceans, black hake, demersals, crawfish, cephalopods	54.4 million ECU
Mauritius	Tuna	485,000 ECU
Morocco	Tuna, sponge, cephalopods, shrimp, pelagics, black hake	125 million ECU
Mozambique	Tuna	Financial
Norway	Cod, haddock, saithe, redfish, Greenland halibut, Norway pout, sandeel, other species	Reciprocal
Republic of Comoros	Tuna	360,000 ECU
Senegal	Tuna, shrimp, cephalopods, black hake	900,000 ECU
Seychelles	Tuna	3.3 million ECU
Sao Tome e Principe	Tuna	725,000 ECU

*Note:*

*Moroccan access agreement expired in November 1999*

#### 4.8.3.1 *Dependency on the Moroccan Agreement*

The Moroccan agreement is by far the largest and most significant. The access rights are allocated by the EU mainly between Spain and Portugal. In 1996 the Moroccan agreement sustained 1,117 fishing jobs in Portugal, mainly in Olhão and Sesimbra. The landings in Portugal of fish caught under the agreement principally comprise scabbard fish, other demersal species and cephalopods. None of these provide substantial inputs to the fish processing sector, and the impact of this agreement on processing employment on the Portuguese mainland is considered to be negligible.

Corresponding figures for the dependency of the Spanish region E2 (Atlantic Coast and Canary islands) are not available. However the main dependent areas will be in the NUTS 3 areas of Cadiz, Huelva and la Luz in Las Palmas. Total numbers of employed are summarised in the following table.

**Table 40: Employment in areas dependent on Moroccan fisheries access**

NUTS 3 Area	No.employed 1996	
	Fishing	Processing
Huelva	3807	808
Cadiz	4479	309
Las Palmas	2851	330
Tenerife	814	180
<b>TOTAL</b>	<b>11951</b>	<b>1627</b>

The Moroccan fishery supports a significant number of the jobs in fishing and processing (the latter mainly in re-processing demersal fish and cephalopods which were frozen at sea). The fleet segments which are under threat are indicated in Table 41 overleaf.

#### 4.8.3.2 *Dependency on the Mauritanian Agreement*

The Mauritanian agreement will continue until the end of July 2001. It provides for fisheries access by Spanish, Portuguese, Italian, German, Irish, Dutch and French vessels. The agreement provides for licences for 17 tuna vessels (pole and line and surface longliners), 40 freezer tuna seiners and 22 pelagic freezer trawlers. In addition the trawl fleet is allocated quotas of:

Sector	Capacity GRT
Crustacea	5,500
Black hake	8,500
Other demersal fish	9,700
Crawfish	300
Cephalopods	15,000

Proportionally, the Mauritanian fishery is of much lower importance, with only about 95 jobs dependent in Portugal, and these are based in Lisbon, with many alternative employment opportunities available. The numbers of Spanish, French and Italian employed in fishing in Mauritanian waters are not available, but the employment impact of this fishery is clearly more diffuse than for Morocco. One of the key resources in terms of employment appear to be tuna, with the associated onshore employment impact on processing in Galicia, Azores, and Concarneau.

**Table 41: EU fishing opportunities under EU-Morocco fisheries agreement, 1995-1999**

USE OF VESSEL	1995-96		1996-97		1997-98		1998-99	
	TONNAGE GRT	NO. OF VESSELS						
Cephalopod boats <sup>1</sup>	30,212	128	28,692	116	23,572	105	19,920	66
Shrimp trawlers <sup>2</sup>	11,200	150	10,000	134	9,000	122	8,200	113
Longliners <sup>2</sup>	11,350	174	10,830	164	10,102	152	9,270	140
Seiners – northern zone <sup>2</sup>	1,300	26	1,300	26	1,300	26	1,300	26
Seiners – southern zone <sup>2</sup>	4,800	11	4,600	11	4,800	11	4,800	11
Artisanal boats <sup>2</sup>	1,550	46	1,550	46	1,550	46	1,550	46
Black hake trawlers	3,000	11	3,000	11	3,000	11	3,000	11
Pelagic trawlers	1,300	12	1,300	12	1,300	12	1,300	12
Tuna boats		27		27		27		27
Sponge fishing		5		5		5		5
<b>TOTAL</b>	<b>64,712</b>	<b>590</b>	<b>59,672</b>	<b>552</b>	<b>54,624</b>	<b>517</b>	<b>49,340</b>	<b>477</b>

Notes: <sup>1</sup> Variation in number of vessels: 5%; <sup>2</sup> Variation in number of vessels: 10%

Source: European Commission

#### 4.8.4 Dependency in the Processing Sector

It is known that the EU processing sector imports substantial quantities of fish as raw material for processing. Therefore of importance for the present studies is the nature, and extent of the linkages between processing and the EU fishing industry. Although there is not a complete data set on the extent to which employment in processing is dependent on local landings, the results from the regions permit some estimates to be made, based on known sources of raw material for certain types of processing activity. These estimates have been made by summing the employment in locations and sectors which are known to be substantially dependent on local or other EU fish landings. In some cases, output values of different segments within the fish processing have been used to disaggregate the overall employment figure, making the assumption that employment value is proportional to employment. Table 42 therefore indicates the numbers of jobs linked to processing of local fish landings and the nature and location of those jobs.

Overall some 53% of processing jobs appear to be dependent on EU landings. This result is strongly supported by the analysis undertaken at Task 3, which shows that whilst numbers employed in fishing in the pre-enlargement EU12 has declined by 18% in the nominal period 1990 to 1996/97, the numbers of employed in processing has only declined by 12%.

Note that this figure includes all jobs in the tuna canning sectors of Spain, France and Portugal. Although in these countries canneries are substantially dependent on imported raw material supplies, they would be likely to succumb in the longer term to the pressure to move to third countries if it were not for landings by EU vessels in Galicia, Brittany and Azores respectively. For this reason, tuna canning in these three countries is considered to be 100% dependent on EU landings. The Italian tuna canning industry is considered to be exceptional, since it is now almost 100% dependent on imported raw material. Any change in the level of EU tuna landings would not be expected to alter substantially the employment situation in this country's tuna sector, whereas it would have an impact in other tuna processing areas, most notably the Azores, where the only competitive benefit of the location is resource availability.

Sardine canning is also important in providing employment linked exclusively to local landings. Spain (including Huelva in the South), Portugal P1 (Mainland) and France F2 (Brittany and Bay of Biscay) provide the main centres. In Italy I1 (Mediterranean) about 35% of employment is linked to local landings, mainly in the sardine canning and anchovy conserving sectors. Other areas of Italy are more weakly linked.

In most of the more northern EU countries such as Belgium, Germany, Denmark, Sweden, and parts of the UK, the EU-landing related employment in processing is limited to primary processing of whitefish and some shellfish processing (eg. shrimp processing in Netherlands and Denmark). In Germany, nearly 100% of the processing inputs (fillet blocks and herring) are imported, and there are few if any links to landings. In Belgium also, the larger industrial processors rely on imports. In Denmark although the fish meal industry does rely exclusively on local landings, it provides little employment relative to the volume of material processed.

**Table 42: Links between fish landings and the EU processing sector**

COUNTRY	REGION	No. of Jobs		NATURE AND LOCATION OF DEPENDENCY
		TOTAL	EU LANDING DEPENDENT*	
Belgium	BL1	1,261	133	Shrimp and flatfish processing
Germany	DA1	11,380	0	Total includes 100 processing jobs in Austria. Not dependent
Denmark	DK1	8,588	859	Primary processing of whitefish Bornholm Shellfish processing Esbjerg; fishmeal
Spain*	E1	13,123	13,123	Re-processing of frozen at sea Galicia Tuna canning Galicia
	E2	2,028	2,028	Re-processing of frozen at sea Huelva and Las Palmas
	E3	1,699	500	Sardine and anchovy conserves
France	F1	3,850	n.a.	Primary processing of whitefish Boulogne
	F2	6,156	2,359	Sardine canning Concarneau Tuna canning Concarneau, Duarnenez
	F3	596	596	Sardine and anchovy conserves
	F4	191	191	No imports to processing
Greece	GR1	2,409	2,409	No imports to processing
Italy	I1	2,874	1,066	Non-tuna inputs = 35%
	I2	2,400	408	Non-tuna inputs = 17%
	I3	1,173	176	Non-tuna inputs = 15%
Ireland	IRL1	4,920	4,920	Few imports to processing.
Netherlands	NL1	3,300	1,650	Primary processing of whitefish and shellfish. Overall c.50% imports to processing
Portugal*	P1	5,059	1,850	Sardine and tuna canning
	P2	1,416	1,416	Tuna canning
United Kingdom Scotland*	UK1	9,598	5,343	c.EU landings c.50% Humberside and 100% SW
	UK2	9,300	9,300	Primary processing of whitefish; salmon processing
Northern Ireland*		1,022	1,022	Few imports to processing
Sweden	SV1	1,993	996	Estimated 50% processing inputs from imports
Finland	FIN1	560	560	
	<b>TOTAL</b>	<b>95,381</b>	<b>50,505</b>	

*Notes:*

1. EU landing dependent jobs are consultants' estimates of jobs in sardine, anchovy and tuna canning plus primary processing of white fish
2. Spain and France includes processors at inland locations
3. \* indicates data from 1996

## 5 Task 3: Examination of the Development of Employment and Dependency Since 1990

### 5.1 Change in Fishing Employment

The developments in fishing employment between the present and the previous studies are shown in Table 43, both in term of the absolute change, and the percentage change in employment in marine capture fishing.

**Table 43: Employment changes in fishing (nominally between 1990 and 1996/97)**

COUNTRY	REGION	No. EMPLOYED IN FISHING (1996/97)		No. EMPLOYED IN FISHING (1990)		CHANGE	
		No. employed	% of	No. employed	% of	No. employed	% of
<i>Belgium</i>	<i>BL1</i>	745	0.30	913	0.30	-168	-18.40
<i>Germany</i>	<i>DA1</i>	4,422	1.76	5,535	1.80	-1,113	-20.10
<i>Denmark</i>	<i>DK1</i>	5,866	2.33	7,291	2.38	-1,425	-19.50
<i>Spain</i>	E1	38,797	15.42	47,983	15.63	-9,186	-19.10
	E2	11,951	4.75	22,807	7.43	-10,856	-47.60
	E3*	17,527	6.97	21,634	7.05	-4,107	-19.00
	<b>Total</b>	<b>68,275</b>	<b>27.13</b>	<b>92,424</b>	<b>30.11</b>	<b>-24,149</b>	<b>-26.10</b>
<i>France</i>	F1	4,470	1.78	n.a.			
	F2	12,939	5.14	n.a.			
	F3	3,634	1.44	n.a.			
	F4	3,741	1.49	n.a.			
	<b>Total</b>	<b>25,084</b>	<b>9.97</b>	<b>27,036</b>	<b>8.81</b>	<b>-1,952</b>	<b>-7.20</b>
<i>Greece</i>	<i>GR1</i>	41,251	16.39	39,750	12.95	1,501	3.80
<i>Italy</i>	I 1	10,258	4.08	16,624	5.42	-6,366	-38.30
	I 2	16,939	6.73	19,423	6.33	-2,484	-12.80
	I 3	16,350	6.50	16,694	5.44	-344	-2.10
	<b>Total</b>	<b>43,547</b>	<b>17.31</b>	<b>52,741</b>	<b>17.18</b>	<b>-9,194</b>	<b>-17.40</b>
<i>Ireland</i>	<i>IRL1</i>	6,274	2.49	7,910	2.58	-1,636	-20.70
<i>Netherlands</i>	<i>NL1</i>	2,379	0.95	3,500	1.14	-1,121	-32.00
<i>Portugal</i>	P1	24,194	9.62	34,561	11.26	-10,367	-30.00
	P2	5,222	2.08	4,640	1.51	582	12.50
	<b>Total</b>	<b>29,416</b>	<b>11.69</b>	<b>39,201</b>	<b>12.77</b>	<b>-9,785</b>	<b>-25.00</b>
<i>United Kingdom</i>	UK1	9,895	3.93	14,941	4.87	-5,046	-33.80
	UK2	8,811	3.50	9,464	3.08	-653	-6.90
	<b>Total</b>	<b>18,706</b>	<b>7.43</b>	<b>24,405</b>	<b>7.95</b>	<b>-5,699</b>	<b>-23.40</b>
<i>Sweden</i>	<i>SV1</i>	2,634	1.05	3,250	1.06	-602	-18.50
<i>Finland</i>	<i>FIN1</i>	3,003	1.19	3,005	0.98	-2	-0.10
<b>TOTAL</b>		<b>251,602</b>	<b>100.00</b>	<b>306,961</b>	<b>100.00</b>	<b>-55,345</b>	<b>-18.00</b>

Table 43 illustrates that apparent numbers of fishers in the EU have fallen by 55,345, from a nominal 306,961 in 1990 to 251,602 in 1996/7, corresponding to an overall decrease of 18%.

Three countries showed quite substantial declines in the number employed. These were Spain (mainly in regions E1 and E2), Portugal (Mainland) and Italy. The greatest fall in employment was in Spain, where

the number employed declined by over 24,000, about one quarter of the total of 92,424, with the main decline experienced in regions E1 (North) and E2 (Atlantic coast), where the work force was halved, from almost 23,000 to just under 11,000 (a fall of 47.6%). Part of this fall can be attributed to the reduced access to the Moroccan fishery under successive fisheries agreements between the EU and Morocco.

Portugal (Mainland) was the region to show the next largest decline in fishing employment with a fall of over 10,000, again about one third of the work force reported in the 1991 studies (although the number of fishers reported was based on the 1981 census). In Portugal as a whole, this decline was slightly offset by an increase in the number of fishers in the Azores, from 4640 to 5222.

Fishing employment in Italy (all regions) fell by an apparent 9,194 workers. This fall of 17.4% of the total fishing workforce masked more extreme regional variation, especially in Italy I1 (Mediterranean) which experienced a fall of 38.3%. UK 1 (England & Wales) also experienced a drop in employment from 14,941 to 9,895, a decrease of 33.8%. Most of the other regions experienced falls in employment of 20% or over, including Germany, where employment fell from 5,535 to 4,422, despite re-unification and the integration of the E.German fleet. Exceptions which only experienced very small falls in numbers were Italy I3 (Sicily and Sardinia), Finland and UK 2 (Scotland & Northern Island). Regions which experienced an increase in fishing employment were Greece and Portugal P2 Islands, although in both of these regions there are doubts expressed about the validity of the definition of employment in fishing during the 1991 studies.

Overall the pattern of employment in fishing in the EU has changed only slightly. Spain remains the main source of employment in fishing, with 27.1% (down from 30.1% in the 1991 study). Italy has more or less retained its share of 17.3% of jobs, and Greece has increased share from 12.9 to 16.4%. France has experienced a slight increase in the share of EU fishing jobs, from 8.8 to 10.0%, whilst the UK and Portugal have seen their shares decline by a similar order. There was virtually no change in the relative situation of the smaller fishing nations, with Belgium, Denmark, Germany, Ireland, Netherlands, Sweden and Finland more or less maintaining their previous shares (all less than 2.5% of fishing employment).

## **5.2 Changes in Fishing Employment in Relation to Fleet Capacity**

Table 44 shows the development in the fleet in the nominal period between the two studies, adjusted for EU expansion to include the two new maritime nations, Sweden and Finland. In broad terms, the trend shows a nominal reduction in fleet capacity of 8.4% in power and 12.1% in tonnage, compared to an average reduction in fishing employment between the two studies of about 18%. However, a direct comparison is difficult due to the wide range of reference years used in the 1991 study (going back to 1981 in the case of Portugal islands) and the re-unification of Germany which resulted in a significant addition to that country's fleet register. The effect of the former would be to over-estimate employment changes between the nominal dates, and the effect of the latter would be to under-estimate the fleet capacity changes. Both of these factors would therefore reduce the apparent difference between the rate of fleet and employment changes.

However, despite this narrowing of the difference between the rate of fleet capacity and employment changes, the relationship is clearly not linear. Spain for example, shows an employment change of 26%, yet a capacity change of only 3.3% in power and 13% in tonnage. This pattern of employment changes in excess of fleet capacity reductions is reflected in most regions. This may be partly due to the tendency for the least productive fleet segments to be withdrawn first, with greater employment impact, but will undoubtedly also be due to the impact of other socio-economic pressures on the sector.

Table 44: Changes in EU Fleet Structure 1990 - 1996/97

COUNTRY	REGION	1996/97		1990		% change	
		POWER kW	TONNAGE GRT	POWER kW	TONNAGE GRT	Power kW	TONNAGE GRT
<i>Belgium</i>	<i>BL1</i>	65,228	22,875	79,816	27,089	-18.3	-15.6
<i>Germany</i>	<i>DA1</i>	161,503	59,035	190,273	78,341	-15.1	-24.6
<i>Denmark</i>	<i>DK1</i>	355,215	97,985	488,278	114,926	-27.3	-14.7
<i>Spain*</i>	E1	799,610	353,807				
	E2	485,075	116,275				
	E3	563,207	89,853				
	<b>Total</b>	<b>1,847,892</b>	<b>559,935</b>	<b>1,910,145</b>	<b>644,989</b>	<b>-3.3</b>	<b>-13.2</b>
<i>France</i>	F1	199,200	36,797				
	F2	591,567	115,610				
	F3	170,055	17,773				
	F4	182,237	17,566				
	<b>Total</b>	<b>1,143,059</b>	<b>187,746</b>	<b>1,072,428</b>	<b>195,969</b>	<b>6.6</b>	<b>-4.2</b>
<i>Greece*</i>	<i>GR1</i>	655,891	110,904	710,062	129,313	-7.6	-14.2
<i>Italy</i>	I1	345,290	48,930				
	I2	688,941	106,437				
	I3	442,828	88,734				
	<b>Total</b>	<b>1,477,059</b>	<b>244,101</b>	<b>1,536,518</b>	<b>267,471</b>	<b>-3.9</b>	<b>-8.7</b>
<i>Ireland</i>	<i>IRL1</i>	190,349	61,000	176,075	50,693	8.1	20.3
<i>Netherlands</i>	<i>NL1</i>	384,325	134,628	441,953	140,460	-13.0	-4.2
<i>Portugal*</i>	P1	330,816	102,248				
	P2	64,504	18,170				
	<b>Total</b>	<b>395,320</b>	<b>120,418</b>	<b>504,067</b>	<b>187,993</b>	<b>-21.6</b>	<b>-35.9</b>
<i>United Kingdom*</i>	UK1	473,370	93,344				
	UK2	486,182	111,554				
	<b>Total</b>	<b>959,552</b>	<b>204,898</b>	<b>1,228,922</b>	<b>214,733</b>	<b>-21.9</b>	<b>-4.6</b>
<i>Sweden</i>	<i>SV1</i>	230,721	44,224				
<i>Finland</i>	<i>FIN1</i>	219,441	24,070				
<b>EU 15 TOTAL</b>		<b>7,991,591</b>	<b>2,053,240</b>				
<b>EU 12 TOTAL</b>		<b>7,635,393</b>	<b>1,803,525</b>	<b>8,338,537</b>	<b>2,051,977</b>	<b>-8.4</b>	<b>-12.1</b>

Source: Annual Report to the Council and Parliament on the progress of the multi-annual guidance programmes for the fishing fleet at the end of 1993. COM (94) 208 Final, Brussels 1994

Note:

1. Germany 1990 does not include Eastern Länder
2. \* indicates 1996 data
3. Sweden 1998 data

### **5.3 Change in Fish Processing Employment**

The development of employment in fish processing is shown in Table 45. The development in this sub-sector are much less apparent due to the lack of disaggregated data from the earlier study in many regions. It is only possible to make a comparison on the basis of national totals, and since the EU has expanded since the previous study, this can only be done on the basis of the previous EU 12 Member States. These cover some 95% of processing employment in the present EU 15, and are therefore assumed to be representative of the overall total.

It would appear that employment in fish processing has fallen in the EU12 from 104,316 in 1990 to 90,634 in 1996/97 (a decline of just over 12%). It is apparent that this change is much less than that experienced by fishing (c.18%) illustrating once again the lack of linkages between the two sub-sectors in some regions.

The largest apparent declines in employment in processing have been experienced by Portugal (52.2%) and Denmark (37.3%). However, the 1991 study employment figure for Portugal is an estimate, and includes unspecified "other" activities, so the decline in numbers is likely to be significantly overstated. The 1990 data for Denmark also included "other" employment in wholesale, retail and ancillary industries. Employment in ancillary industries was calculated by assuming that for each three people employed in other segments of the industry, one is employed in ancillary industries. The apparent decline in processing employment is therefore overstated.

Italy, France and UK suffered declines of 19.4, 23.8 and 18.4% respectively. Spain experienced a decline of 12.2%. Numbers employed in fish processing appears to have increased slightly in Belgium, and substantially in Germany, although the increase in the latter is based on an unrealistic estimate of only 100 processors in W.Germany in 1990.

Table 45: Changes in employment in fish processing between 1990 and 1996/97

COUNTRY	REGION	NUMBERS EMPLOYED IN PROCESSING			% Change	DATA COMMENTS	
		1996/97	1990	Change		1996/97	1990
Belgium & Luxembourg	BL1	1,261	1,200	61	5.10	1997 includes wholesalers and processors	Excludes wholesalers
Germany & Austria	DA1	11,280	100	11,180		1997 includes wholesalers in processing companies but not wholesaling companies	1990 W.Germany only
Austria	DA1	100				1997 subdivided into Prodcom codes, additional 3,500 in wholesale retail	
Denmark*	DK1	8,588	13,700	-5,112	-37.30	Excludes 1,401 inland processors	
Spain *	E1	1,172					
	E2	2,028					
	E3	1,699					
	Total	15,449	17,600	-2,151	-12.20	Excludes <i>mareyage</i> , and inland processors	
France*	F1	3,850				Excludes <i>mareyage</i> , and inland processors	
	F2	6,139				Excludes <i>mareyage</i> , and inland processors	
	F3	596					
	F4	191					Excludes France F4 exterior.
France 1-3	Total	10,585	13,900	-3,315	-23.80		
France 1-4	Total	10,776					
Greece	GR1	2,409	800	1,609			
Italy	I1	2,874					
	I2	2,400					
	I3	1,173					
	Total	6,447	8,000	-1,553	-19.40		
Ireland	IRL1	4,920	4075	845	20.70		
Netherlands	NL1	3,300	7,000	-949	-13.60	6,051 including distribution	Previous data included distribution
Portugal*	P1	5,059					
	P2	1,416					
	Total	6,475	13,541	-7,066	-52.20		Unspecified estimation, includes processing and public auctions
UK Scotland* N.Ireland*	UK1	9,598					
	UK2	9,300					
	UK2	1,022					
	Total	19,920	24,400	-4,480	-18.40		
Sweden	SV1	2,008					
Finland	FIN1	560				FTEs	
<b>TOTAL EU12</b>		<b>90,634</b>	<b>104,316</b>	<b>-13682</b>	<b>-13.1</b>		

Notes - See text for a discussion of the apparent high rate of decline in employment in fish processing Portugal and Denmark.

\* indicates data from 1996

## 5.4 Changes in Fisheries dependency Ratios

The 100 most dependent regions as determined by Ratio 2 (Fishing) in the 1991 study are shown in Annex 3 Table 16, along with a comparison between Ratios 1 and 2 in the nominal years 1990 and 1997. To obtain an indication of the relative changes in dependency, an analysis was conducted on the basis of Ratio 2 Fishing where available, or by Ratio 2 Total Fishery Sector Employment where not available. It should be noted in this interpretation that dependency Ratios 1 and 2 can vary both by changes in the numerator (value added or employment in fishing) or by changes in the denominator (total value added or total employment in the region). Changes in fisheries dependency ratios can reflect changes elsewhere in the regional economy, especially at the relatively low levels of dependency used for the threshold in this study. The following analysis of changes in ratios is based on Ratio 2 Fishing, since as in the 1991 study, this is considered to be comprised of the most reliable data which are comparable across regions.

Of the 100 dependent areas in 1990, 51 show a decline in dependency Ratio 2 greater than 0.1%. Fourteen show little or no change, and 36 have increased in dependency. All but four of the 30 most dependent areas in 1990 showed a fall in fisheries dependency. In some cases the decline in dependency is quite marked. The largest changes were in the most dependent areas, for example in Spain E1, where Ratio 2 (Fishing) declined from 42.5 to 21.5% for Ondarroa, and from 38.5 to 22.8% in the case of Bermeo. These are the areas where there has been a very significant structural adjustment in the regional economy.

One exception to the decline in the most dependent areas is the Ria de Arousa (Pontevedra) in Spain E1, where there was a slight increase in Ratio 2 from 51.5% dependency in 1990, to 52.2% in 1996/97. Thirty-five other areas have also shown an increase in their dependency; amongst these eight are in the UK2 Region (all in Scotland), these being Sutherland, Ullapool, Skye and Wester Ross, Berwickshire, Orkney, Lochaber, Kirkcubright, and Oban and Islay. Ria de Pontevedra in Spain E1 also shows an increase in dependency, as do Trapani and Agrigento in Italy. Elsewhere increases in dependency have been experienced by Galway and Mayo, and Cork and Kerry in Ireland, and the Island of Madeira in Portugal P2. In France F1, Boulogne and Fecamp have also increased in dependency, as have Quimper and Vendée Maritime in France F2.

The remaining 13 of the top 100 fisheries dependent areas have shown little or no change (defined as a shift in Ratio 2 Fishing of less than 0.1%). This applies to areas such as Cuxhaven and Ruegen in Germany, Tarragona in Spain E3 and Cantabria in Spain E1.

The greatest changes in fisheries dependent areas are shown in Table 46 (largest increases) and Table 47 (largest decreases) in dependency. Most of the increases in dependency have occurred in France F1 and F2 regions, and UK2 (in particular Scotland). Only one of the most significant dependency increases was outside these regions, in Galway (Ireland).

Most of the largest falls in dependency have occurred in the Spain E1 region, in particular the *rias* of Galicia. Note that the largest changes have occurred in regions ranking highly on the list of most dependent regions in 1991. Here the largest changes in Ratio 2 (in Ondarroa) have been over 20 percentage points. Only Keith and Buckie (UK2) and Bredene (Belgium) outside Spain E1 have experienced declines in dependency on fishing of a similar order as the areas in Spain E1.

**Table 46: EU fisheries dependent areas with most significant dependency increases (nominally between 1990 and 1997)**

1990 RANK	1997 RANK	COUNTRY	REGION	NAME OF AREA	TERRITORIAL UNIT	CHANGE IN RATIO 2 FISHING (absolute %)
70	19	United Kingdom	UK2	Campbeltown	Travel to work area	5.10
69	27	France	F2	Quimper	Zone d'emploi	3.81
72	30	France	F2	Vendée Maritime	Zone d'emploi	3.12
71	33	France	F1	Fecamp	Zone d'emploi	2.89
28	17	United Kingdom	UK2	Skye & Wester Ross	Travel to work area	1.90
68	50	France	F1	Boulogne	Zone d'emploi	1.73
63	45	Ireland	IRL1	Galway And Mayo (Excl Galway City)	NUTS 3 and 4	1.60
52	40	United Kingdom	UK2	Kirkcudbright	Travel to work area	1.40
75	52	France	F2	Saint Malo	Zone d'emploi	1.38
76	53	France	F1	Dieppe	Zone d'emploi	1.30

**Table 47: EU fisheries dependent areas with most significant dependency decreases (nominally between 1990 and 1997)**

1990 RANK	1997 RANK	COUNTRY	REGION	NAME OF AREA	TERRITORIAL UNIT	CHANGE IN RATIO 2 FISHING (absolute %)
1	2	Spain	E1	Ondarroa	Zones of Dependence	-21.00
2	1	Spain	E1	Bermeo	Zones of Dependence	-15.70
12	25	United Kingdom	UK2	Keith & Buckie	Travel to work area	-7.90
3	4	Spain	E1	Lugo Coast	Zones of Dependence	-5.84
7	9	Spain	E1	Getaria	Zones of Dependence	-4.70
11	12	Spain	E1	Ria De Camariñas	Zones of Dependence	-4.08
8	7	Spain	E1	Estaca De Bares	Zones of Dependence	-3.51
18	46	Belgium	BL1	Bredene	NUTS 5	-3.40
9	8	Spain	E1	Ria De Vigo	Zones of Dependence	-3.20
10	10	Spain	E1	Ria De Corcubi3n	Zones of Dependence	-3.20

## 5.5 Changes in Fisheries dependent Areas

It is instructive to compare the fisheries dependent areas identified by the 1991 studies with those indicated by the present work, using the same dependency threshold of 1%. Because of the data limitations of the 1991 studies, this is best achieved on the basis of Ratio 2 for fishing which provides the most valid basis for comparison.

Table 21 and Table 22 in Section 4 show the numbers and aggregated employment characteristics of EU fisheries dependent areas in 1996/97 and can be compared with Table 48 below, which is derived from the equivalent data from the 1991 studies. These tables define fisheries dependent areas by dependency bands, of ratio 2 fishing values >10%, 5 to 10%, 2 to 5%, 1 to 2% and <1%. The data are presented for each band and in cumulative totals for descending levels of dependency, to illustrate the effect on employment of modifying the dependency criteria. These data are provided for the 1991 studies, and for the present studies at both NUTS 3 and NUTS 4/5 level, and provide the basis of the following analysis of developments in fisheries dependency in the interim.

Using the threshold of 1%, the 1991 study identified 141 areas dependent on fisheries (out of 311 studied), compares with 55 (out of 340) NUTS 3 regions and 235 (out of 560) NUTS 4/5 regions in 1996/97. This immediately illustrates the difficulty of making a direct comparison between the two studies, since the apparent changes in dependency are substantially affected by the size of area selected. The Tables also show the average size of area, in terms of total employment. For the areas above 1% dependency in the 1991 study, this was 39,007. In 1996/97 the average employment was 81,818 for NUTS 3 areas and 13,915 for NUTS 4/5 areas. Unfortunately therefore, the changes in dependency are masked by the effect of changes in regional definitions, and no meaningful analysis can be made at this general level.

**Table 48: Number and employment characteristics of EU Fisheries dependent areas (zones of dependency) in 1990**

<b>Ratio 2 Fishing</b>	<b>&gt;10%</b>	<b>5-10%</b>	<b>2-5%</b>	<b>1-2%</b>	<b>&lt;1%</b>	<b>Other</b>
<b>TOTALS WITHIN EACH RANGE:</b>						
No. of Zones	20	25	57	39	158	12
Total Employed	300,000	500,000	2,100,000	2,600,000	32,700,000	37,100,000
Fleet Employment	52,100	34,600	64,700	34,900	96,700	14,100
Other fishery employment	39,800	19,700	59,500	13,400	101,900	73,100
Total Fishing Sector Employment	91,900	54,300	124,200	48,300	198,600	87,200
<b>CUMULATIVE TOTALS:</b>						
No. of Zones	20	45	102	141	299	311
Total Employed	300,000	800,000	2,900,000	5,500,000	38,200,000	75,300,000
Other fishery employment	52,100	86,700	151,400	186,300	283,000	297,100
Fleet Employment	39,800	59,500	119,000	132,400	234,300	307,400
Total Fishing Sector Employment	91,900	146,200	270,400	318,700	517,300	604,500
Av.employment/zone	15,000	17,778	28,431	39,007	127,759	242,122

However it is possible to compare the fisheries dependent areas identified by the 1991 studies with those indicated by the present work, using the data in Annex 3 Table 16, which does make direct comparisons between identical regions over the time period between the two studies. Again using Ratio 2 Fishing as the basis for comparison on this reduced list of fisheries dependent areas, the analysis of the 1991 regional studies identifies 58 areas dependent on fisheries with Ratio 2 above 1%. In the interim period seven of these regions fell below 1% dependency, but a further 13 increased their dependency above this threshold. As a result the 1996/97 data indicate a total of 64 fisheries dependent

areas. Therefore, despite the generally negative changes in dependency ratios noted above, the majority of those areas which met the dependency criteria of 1% for Ratio 2 Fishing in the nominal year of 1990, still met it in 1997. Overall there appears to be little change in the fisheries dependent areas defined in this manner, although there are some changes at the margins. If anything, the slight increase in numbers of regions above the dependency threshold would suggest a trend to increasing levels of dependency amongst the most dependent areas, as fisheries activity becomes more concentrated in industrial clusters.

## 6 Task 4: Forward study of trends in employment

### 6.1 Introduction

Support measures to ameliorate the impact of structural adjustment in the fishery sector should take into account both planned changes under the Common Fisheries Policy, and discontinuities in fishery activity brought about by external factors over which policy does not have complete control. In particular, in terms of the impact of policy interventions, the impact of CFP measures may be more or less severe depending on externalities.

Such discontinuities may be negative (eg. loss of access to third country waters on expiry of fisheries agreements) or positive (eg. extension of fishery activity to deep water resources previously not exploited). Each regional study undertook a SWOT analysis which provided a basis for identifying externalities affecting fishery employment. This was summarised at the end of Task 1. In general there are few short-term opportunities in the sector for substantial increases in employment. However there are some significant threats to employment, related both to consequences of over-fishing as well as other externalities. The main threats to employment, both in the long- and the short-term, may be summarised as:

- Structural adjustment and effort reduction under MAGP IV and beyond (short-term effect)
- Quota reductions where present quotas are fully utilised (long-term effect)
- Loss of access to third country fisheries (long-term effect)
- Competition from imports as a result of reduced tariff barriers under WTO (long-term effect)

These are now considered in more detail and their potential impact explored.

### 6.2 Employment Impact Assessment

#### 6.2.1 Impact of MAPG IV

Multi-annual Guidance Programme IV is a programme of fishing capacity and effort reduction measures. Each Member State (MS) has agreed capacity targets (in terms of tonnage and power) for the period 1997 to 2002. In some cases capacity targets may be higher where alternative measures for effort reduction are in place. The MAGP IV progress during the first year was reviewed in 1998, and a report published by the Commission in April 1999<sup>3</sup>.

The report details the progress towards capacity reduction targets and the amount of fleet structural adjustment remaining to be achieved. During 1997 the fleet was reduced by about 2% in tonnage and 3% in power. On a Community level and in most cases, the MAPG IV targets have been met, with tonnage 16% below target and power 7% below target. However France and Netherlands have not met their objectives, and in these countries further additional reductions in capacity may be anticipated during the period 1999-2002. Furthermore targets for some fleets segments in some countries have not been met, and these will suffer higher rates of adjustment. In addition no data were available for Italy because a major revision of the fishing vessel register was not completed before the end of the study.

It should be noted that MAGP IV may be revised, since the targets were set at levels which were already achieved by many MS fleet segments at the start of the period, and the measure therefore has had little impact on employment over and above other changes. This is especially so since tonnage and power are only crude indicators of fishing capacity; reductions in both may be compensated by increases in fishing effort and/or in efficiency, due to improvements in fishing technology. Some fleet segments in

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<sup>3</sup> Annual report to the Council and the European Parliament on the results of the MAGP for the fishing fleets at the end of 1997.

some regions, for example beam trawling in Belgium, are considered to be operating at the minimum viable capacity necessary to sustain the skills base and on-shore infrastructure.

The potential impact of a given change in capacity/or quota reduction for some defined fleet segments is considered in Table 49. This provides numbers of vessels, employment and values of landings by fleet segment, and suggests in general terms the nature of the relationship between capacity and jobs. However it is clear from the brief analysis in Task 3 above, that the decrease in fleet jobs is only partially related to structural changes in the fleet induced by MAGPs. More work is required to assess the impact of given reductions in tonnage and power, and to apply this on a regional basis, and to include up- and downstream impacts based on the estimates of employment multipliers.

**Table 49: Potential employment impact of reductions in fleet capacity**

COUNTRY	REGION	Fleet Segment	Employment	No. of Vessels	Employment per vessel	No. of jobs invlved per 20% fleet reduction	Total impact (based on multiplier)
Belgium	BL1	Beam Trawlers	450	93	4.84	90	180
Germany	DA1	Trawler Wcoast	487	149	3.27	97	136
		Trawler E.Coast	176	122	1.44	35	58
Denmark	DK1	Trawler W.Coast	889	271	3.28	178	335
		Trawler N.Coast	841	321	2.62	168	316
Netherlands	NL1	Beam Trawl	1,189	172	6.91	237	n.a.
United Kingdom*	UK2	Scottish Demersal Trawlers	2,073	371	5.59	415	988

\* indicates data from 1996

Based on data derived from "Economic Performance of Selected European Fishing Fleets – Annual Report 1998" which is from a Concerted Action study (FAIR PL97-3541).

## 6.2.2 Impact of Quota Reductions

A similar approach may be adopted for assessing the employment impact of quota reductions, although here the impact in fleet employment is less direct, since at least in the short-term, quota reductions need not necessarily mean that a vessel stops fishing. Rather reduced profitability forces less efficient vessels towards permanent withdrawal or export.

Furthermore, one should also consider the efficiency with which quota measures are policed. With a sizeable supply of so-called "black fish" (for example in the case of primary processing of white fish) reductions in quota could well leave supplies into processing and employment intact. Conversely, there could be a significant employment impact derived from strengthened enforcement.

## 6.2.3 Impact on Processing

Impacts of conservation policy on processing employment depend on whether there is a reduction in fishing capacity, or a reduction in quotas. In the latter case it also depends on whether quotas are fully utilised. In the case of capacity reductions the effect is to reduce supplies to processing in the short term, but in the longer-term the remaining capacity will tend to increase effort and/or efficiency to meet

demand and replace the catch from the vessels which were withdrawn. In the latter case, reductions in quota for a species which enters processing, and where quotas are fully utilised, will cause a permanent reduction in supplies from the local source, which in the short-term may alter the cost structure as local sources of raw material increase in cost or are replaced by imports. Ultimately, this impact may result in the closure of processing establishments with a long-term effect on employment.

In terms of impact on processing, except in specific locations and sectors, the link between landings and processing is limited by the increasing use of imported raw materials. On average in the 1996/97, only some 53% of EU processing jobs were dependent on EU landings. However some sectors of the processing industry, and some regions have a much higher level of dependence. These sectors are the primary processing of white fish, and sardine and tuna canning,

Generally any reductions in supplies due to MAGP are spread across fleet segments. However, there may be more or less emphasis on some fleet segments which are important for some sectors of the processing sector. For example, reduction of the N.Sea beam trawl fleet would impact heavily on Belgian fish process workers who fillet and freeze flatfish. This is because the minimum unit of reduction is one vessel which, in the case of the Belgian and Netherlands fleets, accounts for a significant proportion of fleet capacity. Capacity reductions for this sector under MAGP III and IV took this feature into account. For other sectors, for example sardine purse seining or tuna pole and line fishing, capacity reductions may not even result in reduction of landings, since other vessels would tend to compensate (assuming that quota is available).

Even if landings were reduced by a capacity reduction or quota measure there may not be an overall loss of supplies into processing, since the processing industry may have an opportunity to source raw materials from elsewhere. This is clearly the case for tuna, where imported raw material forms a significant proportion of processing inputs. Sardine finds markets in fresh consumption, so any shortfall in supplies would be likely to divert some supplies to processing or could even pull in imports.

Primary processing of whitefish therefore seems to be the processing sector most strongly threatened by capacity reduction and quota measures. This is also the sector where quotas are generally fully, if not over-utilised, so there will be a direct impact of quota reduction on processing employment.

#### 6.2.4 Effect of Loss of Access to Third Country Fisheries

Access agreements may be classed as:

1. **Financial agreements:** Morocco, Greenland and ACP countries (Angola, Cape Verde, Comoros, Ivory Coast, Gambia, Guinea Bissau, Guinea Conakry, Equatorial Guinea, Madagascar, Mauritius, Mauritania, Mozambique, São Tome, Senegal and the Seychelles).
2. **Reciprocal agreements:** Estonia, Lithuania, Poland, Latvia, Iceland, Norway, Russia and the Faroe Islands.
3. **Joint venture and enterprise agreements:** Argentina

Reciprocal and joint venture agreements can be regarded as relatively stable and there are no significant changes in access envisaged. In fact four of the countries are likely to accede to the EU within the foreseeable future so fisheries access will become more secure. Perhaps the greatest instability is introduced by the so-called financial agreements, in which fisheries access to an EEZ is granted by a state in return for a direct financial consideration. The two largest agreements are Morocco (€25 million per year) and Mauritania (€4.4 million per year).

With respect to the Moroccan access agreement, note that the permitted fishing capacity declined by 24% between 1995 and the expiry of the agreement in November 1999. Furthermore, the perennial uncertainty over future access has also had an impact in lack of investment and fleet renewal. Some of the social impacts of loss of Moroccan fishery access will have already been sustained by the Spanish

and Portuguese fishery sector, and there is evidence of this in the development of the sector since the 1991 studies, where in Spain E2 (Atlantic Coast and Canary Islands) the work force was halved, from almost 23,000 to just under 12,000.

### 6.2.5 Effect of Competition from Imports as a Result of Reduced Tariff Barriers under WTO

For most species which enter the EU processing sector tariff barriers on imports have already disappeared. Imports of part-processed tuna for canning (in the form of loins) are supported by the application of quota tariffs, permitting import of quantities required by EU canners at a preferential duty rate. This measure benefits suppliers such as Ecuador, Colombia and Côte d'Ivoire, as well as the canneries which they support in Spain, France and Italy. However tariffs remain on imports of several processed products. The EU tuna canning sector is presently protected by the tariff structures of the CFP which place a tariff barrier on non-ACP sources of canned tuna.

APEC Countries, led by the USA, have initiated a proposal for an Accelerated Tariff Reduction across a number of industrial sectors including fishery products. This would have the effect of removing all tariffs, including those on canned tuna, by 2005, with flexibility to retain up to 15% of tariff lines (or 20% of trade in each category) until 2010. The proposal is to be discussed through the WTO in the near future.

Dependency on the tuna canning sector is illustrated in Table 50. Overall an estimated minimum of 7,500 jobs are held in tuna canning in the EU. It is estimated that about 60-70% of these are held by women, and their jobs are directly threatened by the removal of tariff barriers on non-ACP production.

**Table 50: Estimated numbers employed in tuna canning**

COUNTRY	REGION	RAW MATERIAL TO PROCESSING (tonnes)	No:of JOBS (ESTIMATED)	MOST DEPENDENT REGIONS
Spain E1	E1	n.a.	3,320 <sup>1</sup>	Galicia
France F2	F2	35,500	1,893 <sup>2</sup>	Concarneau, Douarnenez
Portugal P1	P1	30,647 <sup>3</sup>	850	Matosinhos, Peniche
Portugal P2 Azores	P2	10,474	1,067	Ponta Delgada
Portugal P2 Madeira	P2	9,426	395	Funchal, Santa Cruz
Italy <sup>4</sup>		n.a.	n.a.	
TOTAL			7,525	

Notes:

<sup>1</sup> Calculated on basis of 40% value of regional processing employment of 8300

<sup>2</sup> No. employed in processing in Quimper

<sup>3</sup> Estimated from final product yield of 40% on raw material

<sup>4</sup> No data available

## **7 Task 4: Suggestions for improved socio-economic support measures**

### **7.1 Objectives of Support Measures**

The community structural fund, the Financial Instrument for Fisheries Guidance, and the Community PESCA Initiative have both provided a variety of socio-economic measures to alleviate directly the impact of structural adjustment in fishing-dependent areas. Although the PESCA Initiative ceased in 1999, the measures it delivered have been incorporated in the new FIG regulations. As a result the fishery sector will continue to benefit from the availability of:

- early retirement schemes
- lump-sum redundancy payments
- job-creation in related or alternative activities
- training and re-training

The specific measures available differ from one member state to another.

The principal need of displaced fishery workers is for employment in alternative industries and sectors. However, it appears that in practice activities closely related to fishing seem to be the focus of many 'diversification' schemes. To facilitate labour mobility from fishing to other occupations, support measures should provide:

- opportunities for job-seeking and re-training where they are not adequately provided from other sources
- family security to cover period whilst job seeking or re-training
- in extreme cases, support for migration to other areas

Those involved in fishing itself are not the only workers to be displaced by industry decline. Workers in the processing industry may also be affected by redundancy and hence be legitimate targets for socio-economic measures. In addition, there also a need for support for investment in enterprises which will create viable alternative employment. Creation of new jobs outside the fishery sector rather than simply increasing flexibility in local labour markets may therefore be what is required. In some cases, though not all, areas with high dependency on fishing are also areas of high unemployment generally, meaning that alternative job opportunities are scarce. The policy objectives of employment and income generation is not confined to the fortunes of the fishing industry, but is more general, and needs to be addressed on a correspondingly general basis.

In addition, many workers in the fishery sector do not qualify for unemployment benefits when they lose their jobs, since many fishers and many process workers do not pay contributions to social security. Socio-economic measures of the kind listed above are therefore an important safety net.

### **7.2 Targeting of Support Measures**

#### **7.2.1 Benefits of Targeting of Support Measures**

The present studies have not only quantified the level of dependency on fishing, but through the case study work have also investigated and illustrated the qualitative nature of that dependency. The diversity of the EU fishery sector means that no two fisheries dependent areas have identical needs. It is therefore not desirable to generalise from the results derived from the regional studies, which would

result in unfocused support measures addressing only the few impacts which such areas have in common. Rather policy should enable a flexible application with targeting of measures to address the needs of specific areas, defined at an appropriate NUTS level. A good example is the possibility of designing measures to ameliorate the impact of changes in quota arrangements (eg. a reduction of demersal white fish quota or implementation of quota arrangements for the Iberian sardine). It also applies to loss of access to third country fishery agreements, where the Moroccan case is the most acute.

The economic case for targeting of support rests on the greater marginal return to spending in those areas most affected by loss of fishing opportunities, and on the opportunity to design region specific programmes which address their particular needs and circumstances. The approach also maximises scope for local consultation and hence the likelihood that any measures proposed should be accepted by regional fishing communities.

This level of targeting permits specific ports and vessel segments to be identified which will suffer from changes in, for example, access to fish stocks. There is a strong argument for treating the development of social support measures in such target regions on a case by case basis. Certainly the UK1 (England and Wales) and UK2 (Scotland and N. Ireland) experience of a "bottom up" approach seems to have merit and has been successful in overcoming initial suspicion amongst fishers. More accurate targeting of dependent areas should permit the implementation of a consultative approach which would result in the needs of fishers being better met in the design of support measures.

Furthermore, the measures to be adopted will depend substantially on unemployment rates and alternative employment opportunities in each location. They can be linked to other regional development initiatives, in terms of the targeted design of re-training opportunities, financial support for re-training, provision of re-location support and similar activities. In all cases we would therefore propose a local consultative process to identify local area needs, which can then be reflected in the measures applied.

Where there are existing regional economic development programmes, support measures for fishing should be harmonised and coordinated with them. It is important that support should generate viable and sustainable alternative employment and this will be location specific. It is also important that support measures should not lead to conflict with other regional objectives, relating for example to environment.

While it might be argued that targeted support should take account of the nature of local labour markets and alternative employment opportunities, variation in support levels or the nature of support according to the extent of such opportunities may lead to a perceived iniquity in treatment of different regions.

### **7.2.2 Identification of Target Areas**

Targeting of support measures requires detailed regional information concerning the circumstances of fishing regions. The information needs for effective targeting are provided to a significant extent by the current study in its identification of fisheries dependent areas at the NUTS 3 level. A remaining task is to determine a threshold level of dependency in relation to the various ratios calculated. The major difficulty is in the fact that not all regional studies have operated on a common basis to allow the same criteria to be applied throughout the EU. Different fishing regions obviously have different circumstances in relation to local labour markets and face threats from different sources – some from loss of access to distant water fishing under the various agreements, others from reductions in quota, and others from shifts in global supply and demand. The appropriate responses need to be tailored accordingly.

A two-stage process might be envisaged in which regions qualifying for support are identified according to some threshold criterion and then regional fisheries development programmes designed to meet local needs. This obviously involves some devolution of control over detailed support measures to regions. Some scrutiny mechanism would be required to ensure that any regional initiatives are

consistent with overall EU policy. On the other hand the approach can ensure that measures for the fishing industry are consistent with regional development priorities.

### **7.2.3 Regional Fisheries Development Plans**

This consultation exercise could result in the development of a regional operational plan which would reflect the local objectives of the restructuring process in the fishery sector, and propose tailor-made support measures. These would be likely to consist of the existing range of measures, but with a better regional focus. Such a regional plan is being promoted by the Municipality of Olhão in Portugal, one of the regions which will suffer from the loss of access to Moroccan waters. Such plans should be brought within the framework of the FIFG, ESF and ERDF since they can deliver clearer focus, involve a greater level of social partner participation at local level and therefore offer a greater level of subsidiarity.

On approval of the plan by the Member State and the Commission, the implementation would follow the usual procedures laid down by the MS for FIFG, ESF and ERDF implementation, in the framework of either Objective 1 or Objective 2 programmes. Higher rates of Community or MS assistance could apply for the targeted areas with approved plans, and perhaps there could be a "fast-track" or a "pre-qualification" for the approval procedures for actions the meet the plan guidelines. This would ensure the timely delivery of support measures, and allow it to be linked more closely to structural adjustment of the sector, whether occurring as a result of external events, or as a result of conservation policy.

## **7.3 Support Measures for Fishers**

Loss of employment opportunities due to further decommissioning of the EU fleet would tend to be dispersed widely across the fisheries dependent areas identified by the present studies, although clearly the impact would differ from one region to another depending upon the extent of fisheries dependency. Where the incidence is widespread, more general measures are appropriate. There is a strong case for continuation of the decommissioning grants to fishers since this would appear to provide the most direct means of support. However, the general lack of uptake by Member States is of concern, although these studies have not identified why the member States have been so reluctant to implement it. Some regional reports have commented upon the reluctance of fishers to leave the sea, and the difficulties of adjusting to a life on shore. However, it seems likely that this is at least partly due to a constellation of factors including the limited alternative employment opportunities in many traditional fishing areas.

## **7.4 Support Measures for Fish Processing**

### **7.4.1 Processing Investment Support**

Process workers are to a substantial extent insulated from the effects of the CFP conservation measures, at least in some regions, due the low dependence on EU landings, and the ability in most cases to switch at short notice into alternative imported sources of raw material. From a policy point of view, there is little need to support fish processing in such regions for the purpose of ameliorating the impact of CFP structural or conservation policies. However, the failure of local landings to keep pace with increasing demand for fish and fish products has meant an inevitable increasing reliance on imported supplies. Development of fish processing on the basis of raw materials from whatever source, can provide additional jobs which capitalise on the local skills base.

In other cases, the fishing sector may well depend on processing as a major market for some species. This is very much the case in those key linked sectors, primary processing of white fish, sardine and tuna canning. Furthermore it is a fact that, for historic reasons, much fish processing, is located in areas which are themselves dependent on fishing. Fish processing therefore is an industrial sector which such areas have in common. It provides strategic markets for the fishing industry and substantial employment

opportunities, in many cases for the women of the fishing community. For both of these reasons fish processing is deserving of continued support.

Present policy on investment support measures under FIFG supports fish processing in general, whatever the source of raw material, and whatever the location. As a result there is a lack of targeting of investment support measures to regions where such support would do most good. Although PESCA support has been focused by Member States on fisheries dependent areas, increasingly there appears to be a trend for this support to be used for processing activities which use imported raw material and which are closer to main markets.

It might be argued that this appears to be a misuse of FIFG structural funds and takes away the potential employment benefit from fisheries dependent areas. For this reason policy might strengthen the relative incentives by making the investment support for fish processing conditional on location in fisheries dependent areas or use of EU landed raw material. On the other hand the economic forces in modern food distribution may favour the location of processing at strategic points in road communication networks. To encourage location elsewhere may be to encourage a regional misallocation of resources against the requirements of the market.

Processing and marketing have accounted for approximately 26% of funding under FIFG, but the precise targeting of support is not known. Whatever the regional targeting of processing support, attention needs to be given to the development of more than primary processing. The demand for fish and fish products is increasingly one for processed fish products rather than fresh whole fish, especially among younger consumers. This trend has been associated with the emergence of supermarkets as the major source of purchase of fish, at least in Northern Europe. It is also linked to the demographic and social influences on food markets. Of particular importance is the growing number of single-person households. In many traditional fisheries dependent areas the extent of processing is limited to simple filleting. In others there is effectively no processing at all, not even primary processing. Support for further processing allows local processing to create more value-added in line with market requirements, and to capture a greater share of the margins available in the distribution chain. Such support might be expected to have most impact where the processed products were targeted at local or regional markets, for example in the catering and tourism, but this implies that processing developments will be limited in size and employment impact.

#### **7.4.2 Support for Training in Processing Skills**

A key locational factor is the availability of skilled labour, which is why fisheries dependent areas have retained processing sectors long after they ceased to depend on local supplies (in fact in some cases long after the fishing industry has disappeared, Humberside in the UK being the notable example). Again, it could be argued that the relative strengths of fisheries dependent areas should be enhanced.

Notable in the Task 4 studies undertaken in the regions is the relatively low priority given to improving fish processing skills, which can be considered as one of the key strategic strengths of such regions. There is a need for these skills to keep pace with technological development in processing technology and changes in health and hygiene rules, if the comparative advantage is to be maintained. This would suggest a need for training in these topics.

However, it should be also noted that the trends in modern food distribution favour location of processing at points convenient for economic distribution rather than close to landing ports. As more and more supplies to fish processing are derived from imports, there are obvious limits to the extent to which training of fish processing workers can benefit employment in fisheries dependent areas. In such cases training in alternative skills outside fish and food processing may be more appropriate.

#### **7.4.3 Gender Issues**

Women comprise a significant part of the fish processing workforce. Women are less mobile because of family commitments and therefore their opportunities for alternative employment are correspondingly less than male fishers for example who have in some cases observed demonstrated a strong willingness to migrate. Where alternative jobs are not available then more self-sufficient solutions are required, which involve small business development support such as advisory centres, business training and credit unions and sources of credit, and child care facilities for working mothers.

In terms of communication with women employed in processing, existing fisheries channels eg. via Producer Organisations are not appropriate. Communication with sources of assistance should be developed via NGOs (possible with women fisheries liaison staff in the regional or central fisheries administration) to ensure that there is adequate coordination and focus of these broader base measures. Support for NGOs which represent and work on behalf of women working in fisheries, should also be considered.

## **7.5 Support Measures for Alternative Employment Opportunities**

Socio-economic measures implemented by Member States appear to have focused on the creation of jobs and training for employment *within* the fisheries sector. The viability of this depends on there being a difference in the fortunes of sub-sectors of the regional fisheries economy. The requirement is to create sustainable alternative employment and simply encouraging labour to shift from one declining subsector to another is an inadequate response. However, it is clear that certain fisheries related activities in traditional fishing areas could be developed further. This might include vertical integration into processing and distribution, perhaps exploiting local tourist markets. Such activities might be conducted on a cooperative basis by local fishing organisations.

However, the particular focus of activity in many fishing regions may mean that there are relatively fewer alternatives within the local fishing industry than in other non-fisheries related sectors. The possibility of fishers finding alternative employment in aquaculture has been one element of the PESCA programme, which has offered support for aquacultural development. There is little evidence from the case study work conducted by the regional studies, of the transferability of fishing skills to aquaculture, although it is true that some fishers have found employment in coastal aquaculture enterprises, for example where boat-handling skills may be in demand. In any case, aquaculture is a significant employer and merits support in its own right rather than simply as a destination for labour released from fishing. Furthermore the prospects for all branches of aquaculture are not equally bright due to environmental constraints, coastal zone use conflicts and lack of markets for certain species. It is also not necessarily the case that aquaculture employment opportunities arise close to traditional fishing ports where structural unemployment is likely to emerge .

Where alternative employment opportunities are scarce, as will often be the case since traditional fishing areas are often also areas of above average unemployment generally, support for small business creation may be the most effective approach. The development of employment opportunities outside the fisheries sector will, as noted above, frequently imply a need for business creation. This in turn will require a network of supportive business advice since redundant fishers or fish processors cannot always be expected to be equipped with the necessary business skills. Business as well as technical training is necessary. There is a need to think widely in terms of economic diversification in fisheries dependent areas. Tourist development has offered employment in some of the Mediterranean regions.

Many fisheries dependent areas also have a tourist industry for example and indeed the fishing industry itself has often been a tourist attraction. This applies throughout the EU. Whilst not aiming to turn a local fishing industry into a theme park attraction, there is great public interest in the fishery sector and its culture, which provides a market opportunity which can be exploited. This might be through generation of more added value from those fishing activities which do continue, by supplying tourist markets for local fish products, perhaps in combination with heritage exhibits. Many fishers, perhaps mainly the smaller scale operators, have turned their skills and experience and local knowledge to businesses in pleasure angling, or used their boat handling skills, and boats where suitable, for pleasure trips. Most such tourist related activity is inevitably seasonal. Furthermore, skills and experience gained

in fishing are not the only requirement for success in such businesses and appropriate training and advice would again be essential. Financial support for conversion of boats and other investments, to meet safety standards, for example, might also be required.

## **7.6 Administrative Design of Support Measures**

### **7.6.1 Application Procedures**

There is a widespread concern within the industry that the complexity of application procedures for support are a deterrent to uptake. Greater simplicity and transparency in the rules and application procedures and a speeding up of decision-making could encourage uptake, especially amongst communities where literacy rates may be low.

### **7.6.2 Qualifying Conditions**

In many regions, payment of a minimum of social security benefits is a qualifying condition for support. This has been the case in those countries (Portugal and France) which have made use of direct payments to fishers whose vessels have been decommissioned. Whilst it is recognised that, to a large extent, the social security qualification provides a clear and unambiguous indicator of dependency, many workers in the fishery sector do not pay contributions to social security. As a result they suffer a double jeopardy, failing to qualify for both unemployment benefit and direct support.

It is proposed that it would be beneficial to adopt a more flexible approach in the Community and national legislation, defining the conditions of access to support measures. The conditions should, it is proposed, be more representative of the reality of the nature of employment in the fishery sector. In particular the rules should recognise that fishers' dependence on weather and season means that many are not employed under formal arrangements. Clearly the individual must present adequate evidence to ensure qualification (eg. that a minimum period has been spent in the fishery sector and/or working on the decommissioned vessel) but with imagination and effort new criteria could be applied. For example, criteria could be related to the matriculation of fishers, or days at sea within a given period, and harbour or coastguard authorities (which maintain records, or could easily do so) could be employed in checking the criteria as applied to fishers.

### **7.6.3 Grant Versus Credit Support**

With respect to the grant aid in support of investment, in some cases the financial conditions (for example to requirement for joint financing) may act as a deterrent. This is especially the case for small-scale operators who may lack capital resources. In these cases availability of credit facilities on favourable terms might provide a more realistic incentive for investment than grant aid with rigid conditions of access.