

Review of impact of Packaging and Packaging Waste legislation

**Prepared for Sea Fish Industry Authority
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Pira Ref: J56401b rev 2

Contents

	Page No
1 Introduction	1
2 Objective	1
3 Programme of Work	1
4 Summary of Legislation	1
4.1 Producer Responsibility Obligations	2
4.2 Essential Requirements	7
5 Findings of industry review and recommendations	8
5.1 Relating to the Producer Responsibility Obligations	8
5.2 Relating to the Essential Requirements	17
6 Conclusions	21
Appendix A: Detailed supply chain diagrams	22

1 Introduction

This report covers the review of the impact of packaging legislation on the sea fish industry by Pira International, as contracted by Sea Fish Industry Authority.

2 Objective

To review the impact of the Packaging and Packaging Waste Directive on the sea fish industry.

3 Programme of work

A map of sea fish product distribution in the UK was compiled, from vessel landings to point of sale at markets/retailers.

The Producer Responsibility Obligations and the Essential Requirements elements of the legislation were considered in the context of the map. The findings of this are described below in Sections 4 and 5.

In support of this a database literature search was included in the work to source any additional information relating to fish distribution in the UK and distribution packaging developments in the industry.

4 Summary of legislation

The UK implementation of the Packaging and packaging waste directive (62/94/EC) may be considered in two parts. The first part is labelled the Producer Responsibility Obligations and relates to packaging waste. The second part is labelled the Essential Requirements and relates to the packaging itself.

4.1 Producer Responsibility Obligations

The Producer Responsibility legislation implements targets for recovery and recycling in the UK as required by the EU Packaging and packaging waste directive.

Comparable requirements exist in all other member states, though the method of achieving the targets varies from state to state.

The Producer Responsibility legislation in the UK affects any business which 'handles' packaging, subject to compliance with two 'thresholds', as follows:

1. the business must 'handle' 50 tons or more of packaging per annum
2. the business must have an annual turnover of £2 million or more.

Businesses are deemed to 'handle' packaging if they perform any one of four specific operations as follows:

1. manufacture of packaging raw materials
2. conversion of packaging materials into packaging
3. packing or filling of packaging
4. final selling of packaging to the end user of packaging.

Thus any business performing any of the four specified operations upon 50 tons or more of packaging (or performing any combination of the operations on a total of 50 tons or more of packaging), with a turnover of £2 million or more, will be obligated with respect to the Producer Responsibilities.

Examples of the four specified packaging 'handling' operations are as follows:

Manufacture of raw materials:

Production of plastic pellets from oil (for later use in the manufacture of plastic bags). Production of paper from wood pulp (for later use in the manufacture of corrugated fibreboard).

Conversion of packaging materials:

Manufacture of plastic bags, plastic bottles or expanded polystyrene boxes (from plastic pellets). Manufacture of corrugated boxes (from reels of paper).

Packaging or filling of packaging:

Packing of fresh or frozen fish into expanded polystyrene or fibreboard boxes.

Final selling:

The final sale of the pack may be defined as the sale beyond which pack and product are separated. For example, when carton of fish fingers are purchased by a member of the public in a supermarket, beyond that purchase the fish fingers do not undergo a further sale in their carton – the fish fingers and the carton become separated in the home. However, when fish packed in to an expanded polystyrene box are sold from a processor to a market trader, if the market trader then sells the fish (to a hotel, for example) and the fish remain inside their EPS box, the processor is not the final seller of the packaging (but the market trader is). If the market trader removes the fish from the box and sells the fish separately (discarding the box), then the processor becomes the final seller.

Once a business becomes obligated under the legislation, the business must adhere to the Producer Responsibility Obligations, which dictate that proportions of packaging handled must be recovered and recycled.

Recovery means: Material recovery (using the material to manufacture a similar or new item), energy recovery (producing energy through combustion of the material), composting or biodegradation (natural breakdown of the material).

Recycling means: Material recovery and composting only.

The annual recovery and recycling targets to be achieved by July 2001 are as follows (as stipulated in the EU Packaging and packaging waste directive):

- Recovery of 50 to 65% of all packaging waste
- Recycling of 25 to 45% of all packaging waste (with no less than 15% recycled per material type)

In the UK these targets are being achieved by implementation of the Producer Responsibility Obligations. The UK specific recovery and recycling targets (as they effect the fish industry) are as follows:

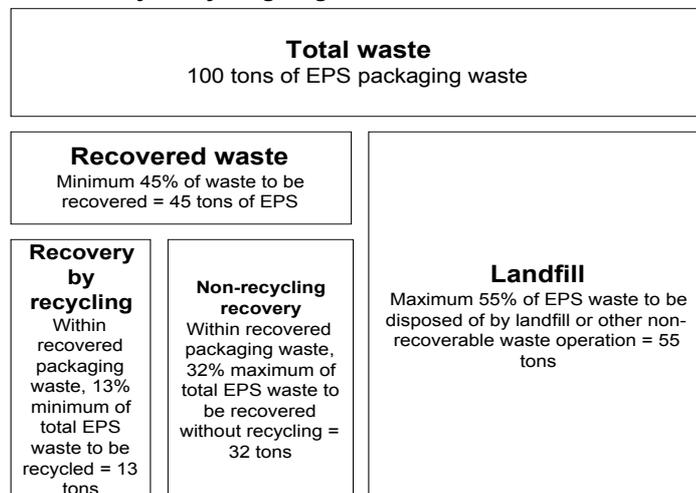
By end of 2000:

- Recovery of 45% of all packaging waste
- Recycling of 13% of each packaging material.

Currently in the UK there is no overall recycling target (as there is in the directive) as it is assumed that much of the recovery in the UK will be through materials recycling anyway.

An example of implementation of the current UK targets is shown below for EPS, however the breakdown is currently the same for all other packaging materials as well.

UK recovery / recycling targets for end of 2000 for 100 tons of EPS waste



Within the legislation the targets are periodically subject to change. For example, by the end of 2001 the recovery target and the recycling target per material will increase to the values shown below:

- Recovery of 52% of all packaging waste
- Recycling of 16% of each packaging material

In addition, by the end of 2001 a non-material specific (overall) recycling target will be introduced (despite the current assumption about materials recycling as mentioned above). This target will be that in total 50% of packaging waste be recycled.

In the UK, responsibility for recovery is shared by the various stages of the distribution chain for the packaging concerned. Allocation of the responsibility is as follows (as per the categories described earlier in this report section):

- Manufacture of raw materials: 6%
- Conversion into packaging: 9%
- Packing/filling: 37%
- Final selling: 48%

Thus if you are the packer/filler in a particular supply chain and for that supply chain you handle 200 tons of packaging annually (assume that only one packaging material is involved), by the end of 2000 your portion of responsibility for that packaging is as follows:

- 37% of 200 tons = 74 tons.

You are currently obligated to recover a minimum amount of the packaging for which you are responsible as follows:

- 45% of 74 tons = 33.3 tons.

Of this 33.3 tons to be recovered, a minimum of 13% of the total 74 tons must be recycled, thus 9.62 tons of packaging must be recovered by materials recycling.

In reality, a business will handle a mix of materials, may perform more than one activity and may operate in more than one supply chain. As stated above, obligation is dependent on the weight of packaging handled and the activity performed on that packaging.

Thus, for any business an obligation may exist for each activity and each supply chain, and the total obligation is the summation of obligation in each.

Importers of packaging accrue the responsibility of all the various stages up to the point of importing. If packaging material or packaging is exported prior to final use then responsibilities do not accrue for that material or packaging.

The way that packaging is recovered works on a system of 'equivalents'. This means that although you work out your obligation based on the specific packaging you handle and specific activity, you don't necessarily have to recover that specific packaging.

Instead, you can recover and recycle the correct amount of packaging from any packaging waste available.

In terms of the practicalities of managing recovery, many businesses subscribe to an agent organisation, which collects and handles waste on behalf of the business. Again the rule of equivalents applies: the agent may not actually collect the packaging waste generated by one of its customers, instead the agent may source an equivalent amount of waste packaging for recovery from a different supply.

However, even with assistance from collection agent organisations, businesses still need to be able to establish the amount of packaging they must recover, even if they do not perform the recovery and recycling action themselves. Of course some businesses handle, recover, recycle and document their compliance entirely on their own.

4.2 Essential Requirements

The Essential Requirements apply to all packaging without exception (there are no threshold conditions for inclusion).

The Essential Requirements define particular design features that all packaging must incorporate in order to minimise the impact of packaging on the environment. The requirements are:

1. Packaging must be minimised by weight and volume (in other words the pack must be as light and as small as is possible), whilst not compromising pack fitness for purpose
2. Packaging must be recoverable (by materials recycling, incineration with energy recovery, or by biodegradation/composting)
3. Presence of noxious and hazardous substances must be minimised (such that these are minimised with respect to leachate and ash arising from packaging disposal)
4. The sum of lead, mercury, cadmium and hexavalent chromium must not exceed 100 parts per million.

In the UK the onus for demonstrating compliance with the Essential Requirements is placed on the packer/filler, brand owner or importer of the product.

In general terms within the industry there are packer/fillers at many points in the distribution chain, but as an example, a business packing fish at sea qualifies as a packer/filler. A brand owner is the business whose name and logo appear on packaged fish at point of sale. An importer is the business first taking ownership of product brought into the UK (for example a business whose activity is purchasing and importing prawns from Asia).

In the UK, enforcement of the Essential Requirements is performed by Trading Standards Officers. Local authorities have responsibility for policing businesses in their catchment area. In addition, Trading Standards have a system in place for nation-wide communication and co-operation between different home authorities.

To date, policing effort has focused on consumer packaging that appears for sale primarily in larger retail stores, and on the minimisation aspects of the requirements. For information, the first prosecution by Trading Standards took place in March 2000 against a regional butcher in the Midlands for a retail meat pack that utilised an excess of EPS (in moulded tray form).

5 Findings of industry review and recommendations

The findings of the review of distribution of product in the industry and recommendations are discussed below corresponding to the two parts of the legislation.

5.1 Relating to the Producer Responsibility Obligations

Initial review of the fish industry product distribution map (and the Billingsgate work) has highlighted that the system of product distribution is complicated: product changes hands (ownership) many times throughout the chain, product is re-packed at various stages, packaging used includes returnables and non-returnables, businesses within the chain vary greatly in size and there are many supply chains running in parallel (with businesses involved in complex trading and packaging flows).

The supply chain represents a highly complicated system in terms of the Producer Responsibility Obligations; this is compounded by the fact that communication within the industry is poor and so tracking changes in ownership of product (in order to establish own obligation) is difficult.

There are no hard and fast rules allowing easy identification of obligated and non-obligated businesses from a Sea Fish point of view. In addition, the variety in trading patterns means that there are no easy to apply rules detailing what the obligations are for the businesses within the distribution system.

It would be possible to perform site audits at additional points within the industry (similar to the Billingsgate work) in order to identify obligated businesses, however, this is likely to be time consuming and may not identify all obligated parties. In addition, this would go no way to establishing the details of the obligations for those businesses found to cross the Producer Responsibility thresholds.

Instead a more sensible approach is that Sea Fish promote a programme of 'self assessment' in which businesses are encouraged to identify whether they are obligated, and if so, establish what their obligations are.

Sea Fish could raise the whole Packaging and Packaging Waste legislation issue in an existing newsletter or other existing industry communication system, and follow this with two self assessment guides, available on request (for example).

Considering the guides, the first guide would help businesses establish whether they are obligated or not. Through this guide, if a business identifies itself as exempt, the business can keep a record of their assessment and need not concern themselves with this part of the legislation until the business grows (or the thresholds are lowered). Periodic self assessment would allow businesses to track whether or not they become obligated as years pass.

If a business establishes that it is obligated then it would continue with the second guide: an introduction to the producer responsibilities and a system to assist businesses in establishing their responsibilities.

The system could take the form of a series of 'question/answer' flow diagrams relating to business function (vessel owner, processor, port merchant, etc...), which allow businesses to assess their activities and establish their obligation.

Eventually the 'question/answer' system could be linked to a spreadsheet style computer programme into which businesses enter data in order that businesses also have assistance in calculating their responsibility in terms of tonnage of material.

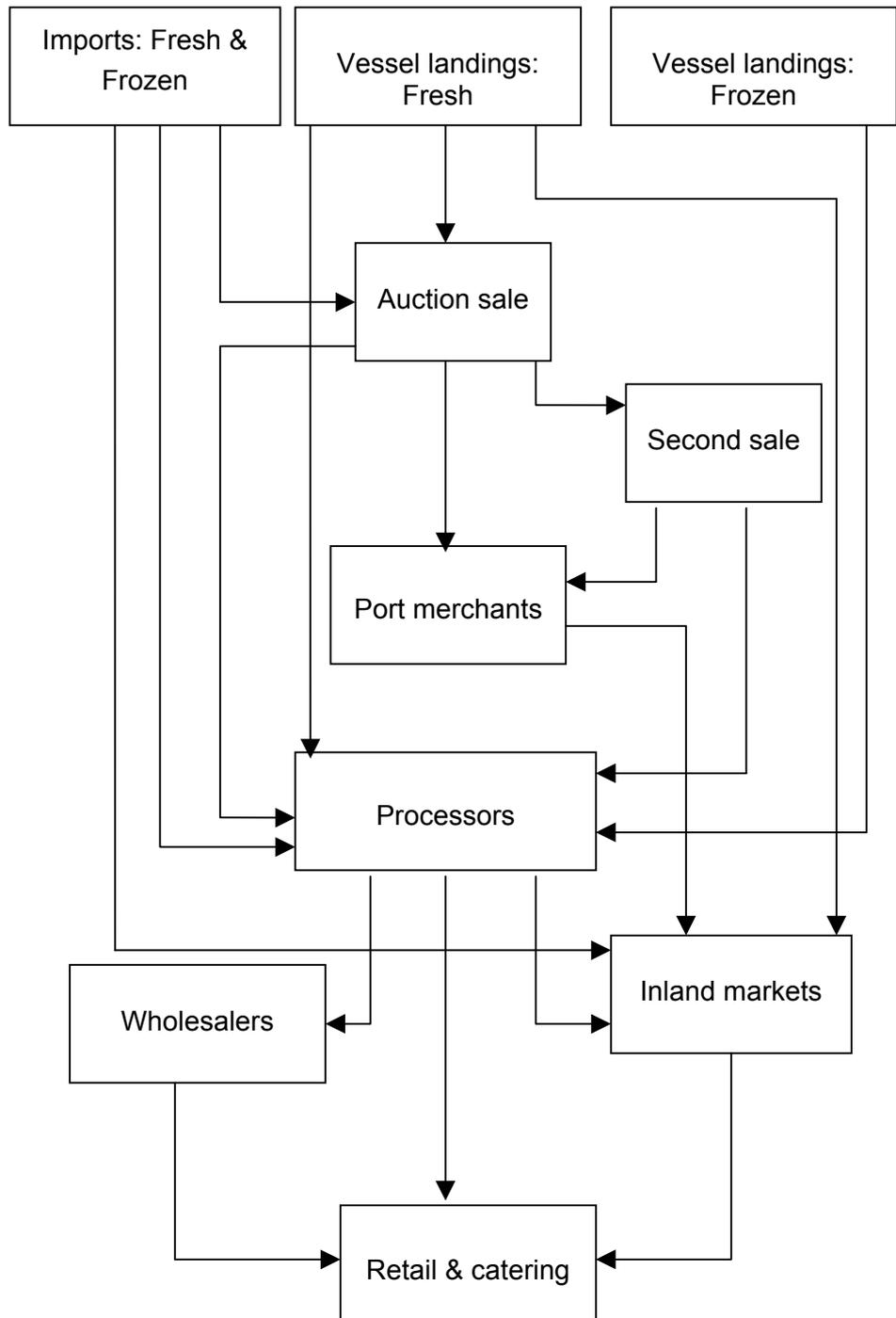
To construct the 'question/answer' flow diagrams it is first necessary to breakdown the overall fish product distribution map into individual supply chains. All supply chains require charting before it is possible to fully construct 'question/answer' flow diagrams.

A simplified overall fish product distribution map is shown overleaf. A number of more detailed maps, which show more realistically the complexity of supply within the industry, are attached as Appendix A at the end of this report (diagrams supplied by Sea Fish).

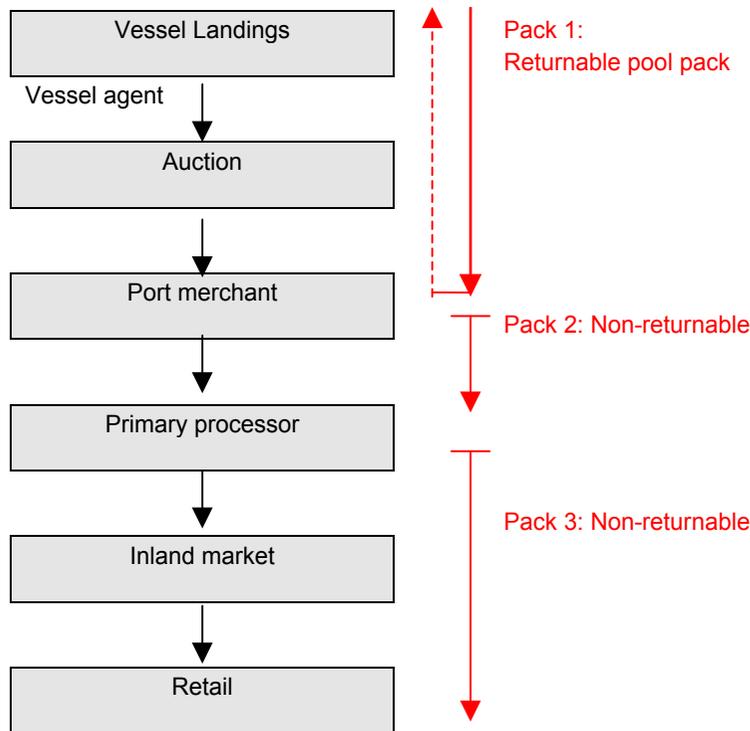
On the pages following the overall map are example supply chain charts showing breakdown of responsibility for three example chains within the overall map. It is worth noting that even for these three example supply chains there are many variations possible from the basic model; only minor changes could have significant impact on where responsibilities lie within the chains.

The chain diagrams are followed by an example 'question/answer' flow diagram (note that this diagram is not completed as all the relevant supply chain charts have not been compiled).

**Simplified inland distribution map for fish
(excluding canned fish and live shellfish)**



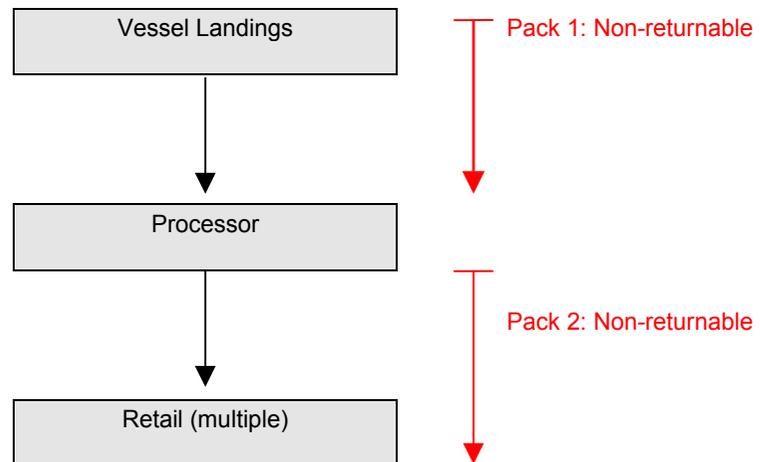
Example of a possible fresh fish supply chain



Obligations

- Vessel owners using returnable 'pool' packs have no obligation on Pack 1.
- Auctioneers and vessel agents don't take ownership of product and have no obligations.
- Port merchant re-packs fish into non-returnable EPS for transit – port merchant is packer/filler and seller of Pack 2.
- Primary processor re-packs fish into non-returnable EPS – processor is packer/filler of Pack 3.
- Inland market sells fish in Pack 3 (no re-packing takes place) – market trader is seller of Pack 3.
- Retail outlet (small fish and chip shop) is final customer (of pack) and has no obligations.

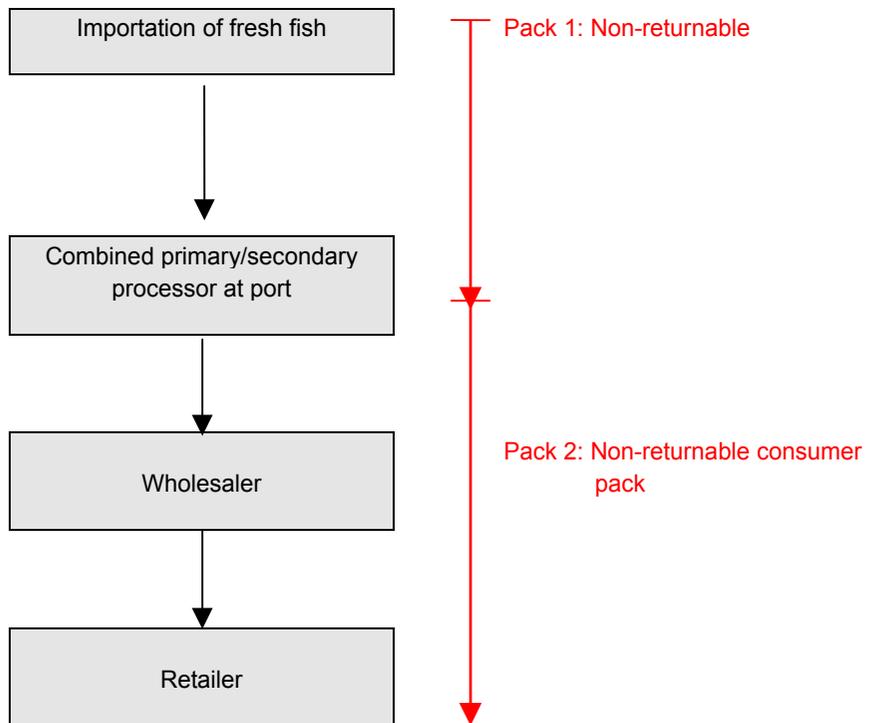
Example of a possible frozen fish supply chain



Obligations

- Vessel owners are packer/filler and sellers of Pack 1.
- Processors re-pack into Pack 2 – Processor is packer/filler of Pack 2
- Multiple retailer sells Pack 2 to the general public – Retailer is seller of Pack 2.

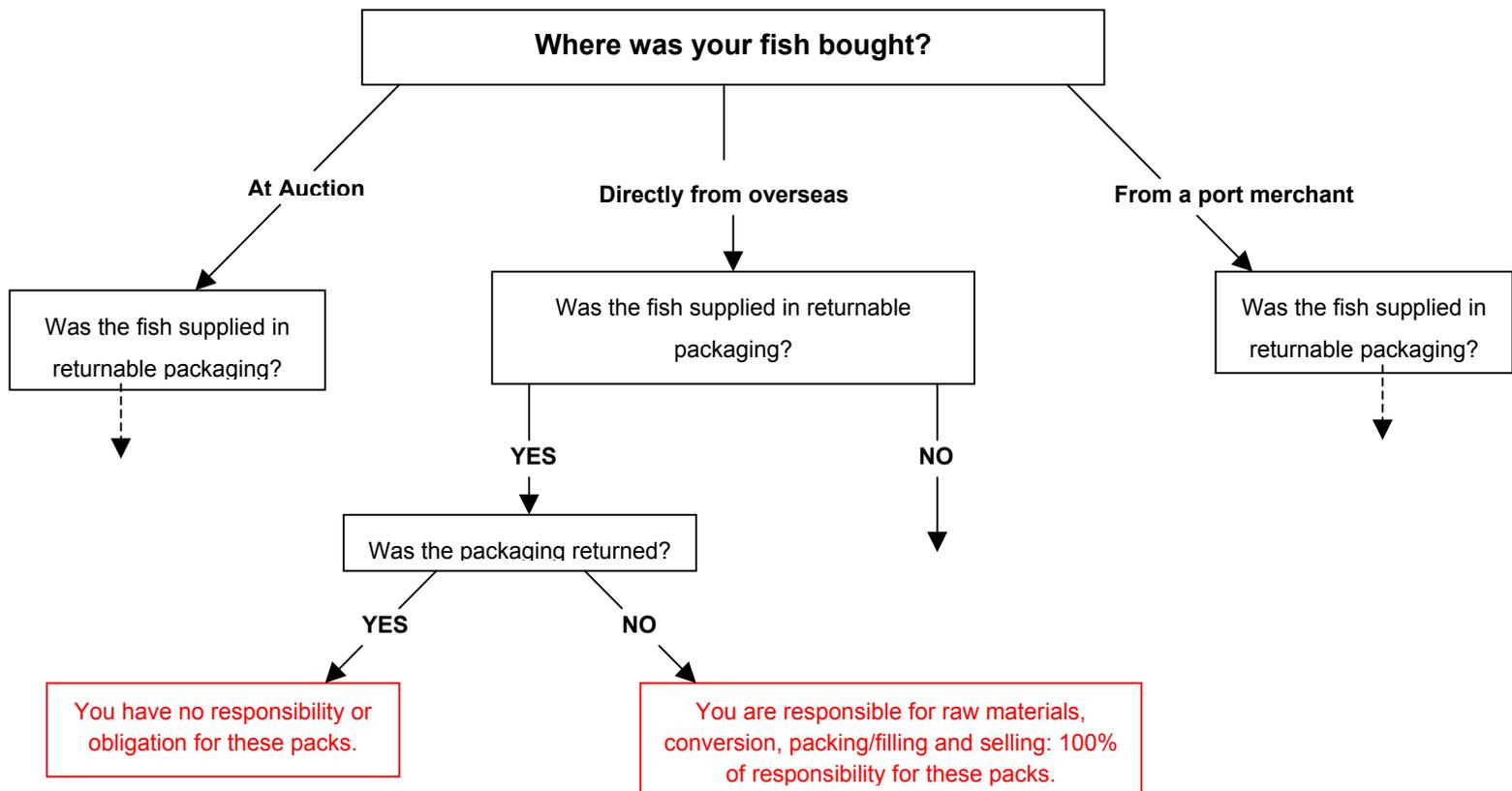
Example of a possible imported fish supply chain



Obligations

- Assuming that the imported fish is handled by agents only up to the point of sale (at auction), the processors take the 'rolled up' responsibility for Pack 1 – the processors take responsibility for raw materials, converting, packing/filling and selling of Pack 1.
- Processors also take packer/filler responsibility for Pack 2.
- Wholesaler performs no re-packing and has no responsibility.
- Retailer takes seller responsibility for pack 2.

**Example flow diagram for incoming fish product for Primary Processors
(diagram incomplete, for demonstration of possible style only)**



Compilation and completion of the two Producer Responsibility Obligations guides is beyond the scope of this work (as is charting of all supply chains within the distribution map and compilation of 'question/answer' flow diagrams). However, the following items provide the basis of the material that would be required for completion of the guide documents:

- Summary of legislation in Section 4 above
- The overall distribution map
- The above supply chain charts
- Appendix B (Estimating packaging use) of the Billingsgate market report.

In the longer term it may be worthwhile for the industry to investigate the possibility of setting up an industry wide system for collecting and submitting packaging waste data in relation to the Producer Responsibility Obligations. This would reduce the onus on individual businesses to collect data and make calculations.

The system could use available industry wide data (landings, fish sales, etc.) to calculate the quantity of packaging that has been used in total within the industry. From the total data, the total industry obligation could be calculated; recovery and recycling in line with this obligation would then be facilitated by the scheme administrator joining an appropriate compliance scheme (Valpak for example). In order to cover the costs of the system, businesses within the industry would pay a fee to the scheme administrators; the fee could be related to turnover, for example.

This option requires discussion within the fish industry and further investigation to establish feasibility (including discussion with the Environment Agency) in order to progress, and thus is outside the scope of this study.

5.2 Relating to the Essential Requirements

As the current focus of enforcement of the Essential Requirements is primary (retail) packaging, many business activities are considered low risk in the fish product distribution chain.

Responsibility for the Essential Requirements lies with packer/fillers, importers and brand owners.

Those businesses which pack fish products into retail packaging are of initial concern; this includes secondary processors, wholesalers (if they own branded fish products) and retailers.

The larger businesses in these business groups (the multiple retailers and well known brand processors) should already be aware of the legislation and are likely to have addressed the situation. However, medium and smaller size processors and retailers are less likely to be aware of the Essential Requirements.

How does enforcement work? Trading Standards may respond to a complaint from the public about packaging or they may have targeted packs during their own operation. Also, they may notice packaging issues during a site visit relating to weights and measures, for example. When a challenge takes place, Trading Standards will request documentation for review in relation to the pack design in question. A period of grace is given for making the documentation available, but this is really for pulling existing supporting documentation together into a presentable format for review – the period of grace is not meant to be a period for establishing the documentation for the first time.

If the documentation is not considered sufficient to validate the pack, then a prosecution may follow.

The Essential Requirements are less tangible to deal with than the Producer Responsibility Obligations. Minimisation, recoverability and noxious substance content are not specified in terms of a value or figure - instead the targets are general. For every single pack there are reasons and arguments for its design, shape, etc. For example a particular pack may be designed in a particular way because of the limitations of packing machinery that is used to fill the pack during processing.

It is worth noting that the DTI have published a guidance note on the Essential Requirements and this is a good source of information for businesses starting to address those requirements.

For minimisation, what is required is a documented argument that justifies pack design and which demonstrates that the pack cannot be 'reduced' any further. For fresh fish it is possible that existing reports relating to the temperature conditions of fresh fish product during transit could form the basis of an argument relating to current EPS box design.

It is worth noting that within the packaging industry, in general the cost of disposal of packaging is becoming a real driver in pack design and pack change. Businesses are now starting to consider the costs associated with packaging disposal when carrying out life cycle cost assessment of packaging. Thus disposal is now included in the calculation of total pack cost, where previously this calculation has been based on raw materials purchase, materials conversion, pack storage and distribution costs, for example.

As an indication of costs for recovery and recycling of packaging waste, figures are given below for PRNs for various packaging materials. PRNs are packaging recovery notes: the documents that are required in order to demonstrate that a business has met its recovery and recycling obligations (under the Producer Responsibility legislation). PRNs are a tradable commodity on the open market; these cost figures were obtained from The Environment Exchange, a broker in PRNs.

The figures show the average 1999 cost of PRNs in Sterling per ton, by material:

— aluminium	12.5
— glass	5.4
— paper	6.1
— plastic	31.5
— steel	6.8

It is worth noting that at some points during the year, the cost of plastic PRNs were more than double the average value shown above. These costs show the general trend that plastics are more expensive to recovery and recycle than board (paper) packaging. At this stage it is expected that disposal costs of plastics will continue to rise.

Considering the minimisation Essential Requirement, before time and effort is spent on minimisation of current packs, the above figures demonstrate that it may be worthwhile further investigating alternative pack materials for the fish industry (in order to reduce future pack recovery and recycling costs). It is important to note, however, that changing from one pack material to another does not demonstrate minimisation within the context of the Essential Requirements; it would still be necessary to show that the new pack is also minimised.

In terms of recovery, simple documentation is required which demonstrates that the pack is recoverable by one of the recognised routes (see section 4 for these). This documentation could take the form of published articles relating to materials recycling, for example. Such literature was found during the database literature search and this is appended at the back of this report.

In addition, it is also possible to demonstrate compliance with the recovery requirement if it can be established that the packaging materials produce a 'calorific gain' on combustion – in other words if the materials can be successfully recovered by incineration.

In the DTI guide, calorific gain values are presented for various materials including polystyrene. This data could be used in compiling a document that demonstrates compliance with the recovery requirement through energy recovery by incineration.

With respect to noxious and hazardous substances, and heavy metals limits (mercury, cadmium, etc), many businesses are writing to their packaging suppliers in order to receive written assurance from them that the packs meet the Essential Requirements in these areas.

In terms of action on the part of Sea Fish, it is recommended that awareness of the Essential Requirements is raised now for those businesses in the target sectors (processors, retailers,..) by general bulletin, and that businesses are referred to the guidance notes. Due to the range of pack types and style within the industry, Sea Fish are really limited to providing general information and advice on the Essential Requirements.

It would also be worthwhile for Sea Fish to establish the situation relating to the Essential Requirements periodically in order to establish whether the focus of Trading Standards has moved to other areas within the distribution chain. This would be possible through dialogue with Pira, for example.

A key element of Trading Standards' stance on the Essential Requirements is communication and development of a working relationship with businesses handling packaging. This has been emphasised to us at Pira on a number of occasions. It may therefore be worthwhile for Sea Fish to have discussions with Trading Standards in order to initiate a dialogue. Pira can supply Sea Fish with contact details of relevant Trading Standards officers if required.

6 Conclusions

In summary the following actions are recommended:

- Sea Fish raise the whole packaging and packaging waste legislation issue across the industry by publication within an existing industry bulletin – the publication to be relatively brief and candid.
- Relating to the Producer Responsibility Obligations, Sea Fish compile two guides enabling self-assessment of obligations and responsibilities, perhaps available from Sea Fish on request.
- Relating to the Essential Requirements, Sea Fish raise industry awareness of this part of the legislation in a more detailed bulletin and urge businesses to take their own action, particularly for medium size retailers, brand owners and processors.
- In the longer term, it may be worthwhile the fish industry investigating setting up a collective system across the industry relating to the Producer Responsibility Obligations.

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Appendix A

**Detail of the fish industry supply chain structure,
supplied by Sea Fish**

Description of the distribution chain and the structure of the retail trade

The UK distribution chain is extremely complex. Fish can change hands between two and seven times between capture and consumption.

It is impossible to represent all the UK industry in a single diagram. Different types of fish are distributed in different ways. Separate diagrams are given for the major types of fish and products. Shellfish distribution is particularly difficult to represent because of the wide differences between the species and the forms in which they are traded. Variations in the distribution chains are shown. It is impossible to quantify the various flows within the chains but the main routes are highlighted by the thick lines. The retailing and catering patterns are largely common and are detailed separately.

List of diagrams;

Figure 1	Whitefish / demersal distribution chain
Figure 2	Pelagic / oily fish distribution chain
Figure 3	Finfish aquaculture (salmon & trout) distribution chain
Figure 4	Live shellfish distribution chain
Figure 5	Processed shellfish distribution chain
Figure 6	Final distribution to the consumer

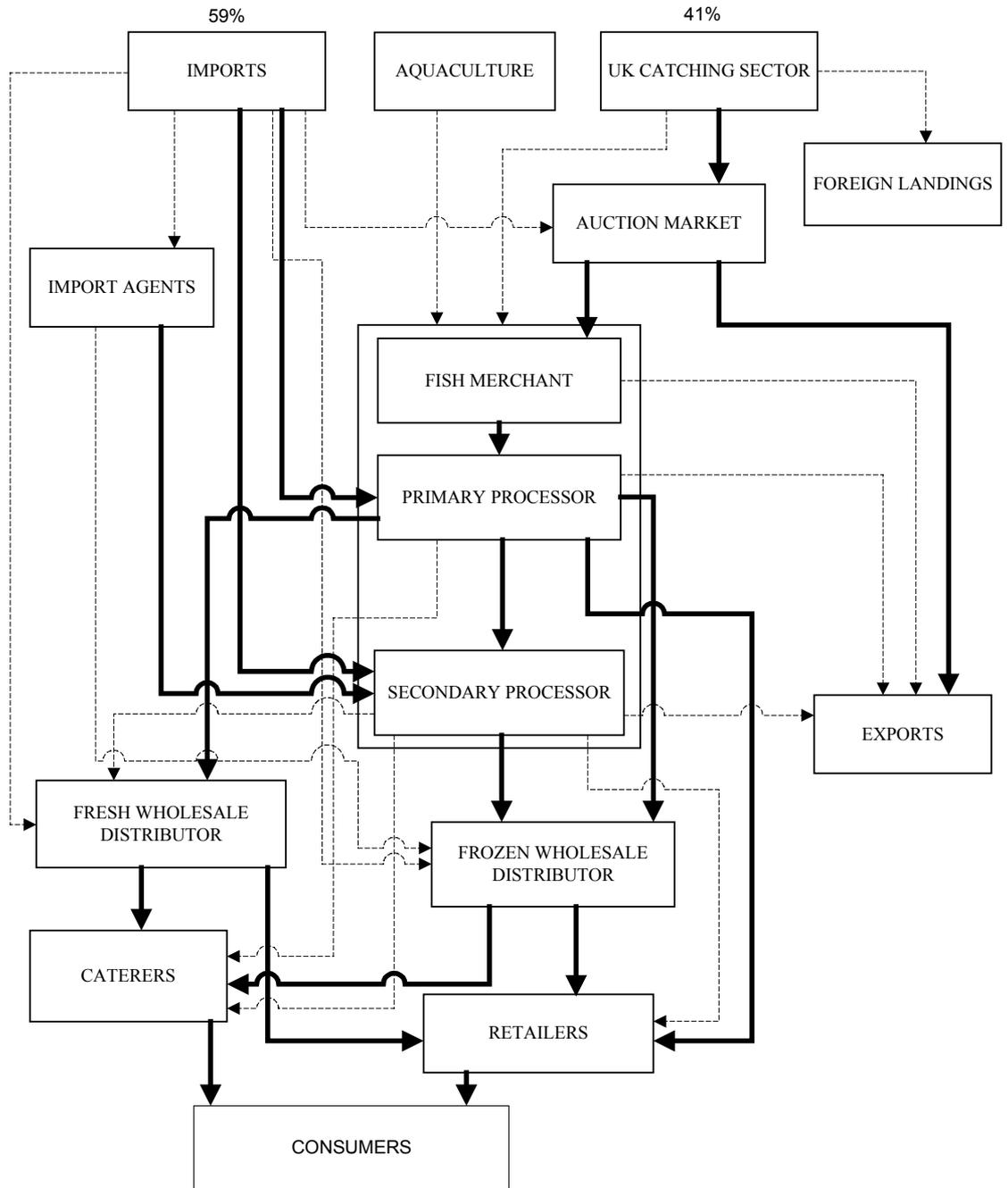


Figure 1 Whitefish / demersal distribution chain

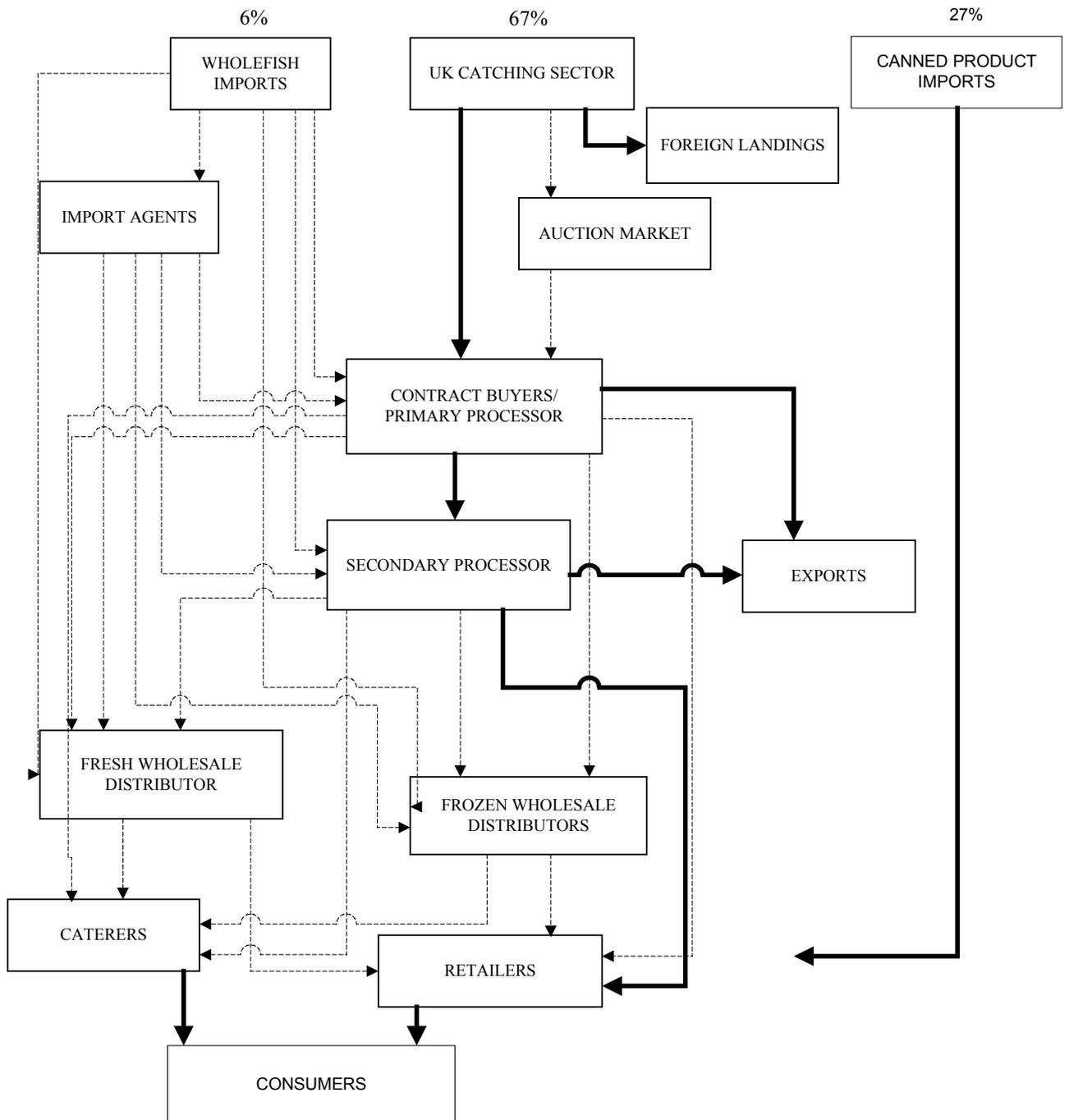


Figure 2 Pelagic / oily fish distribution chain

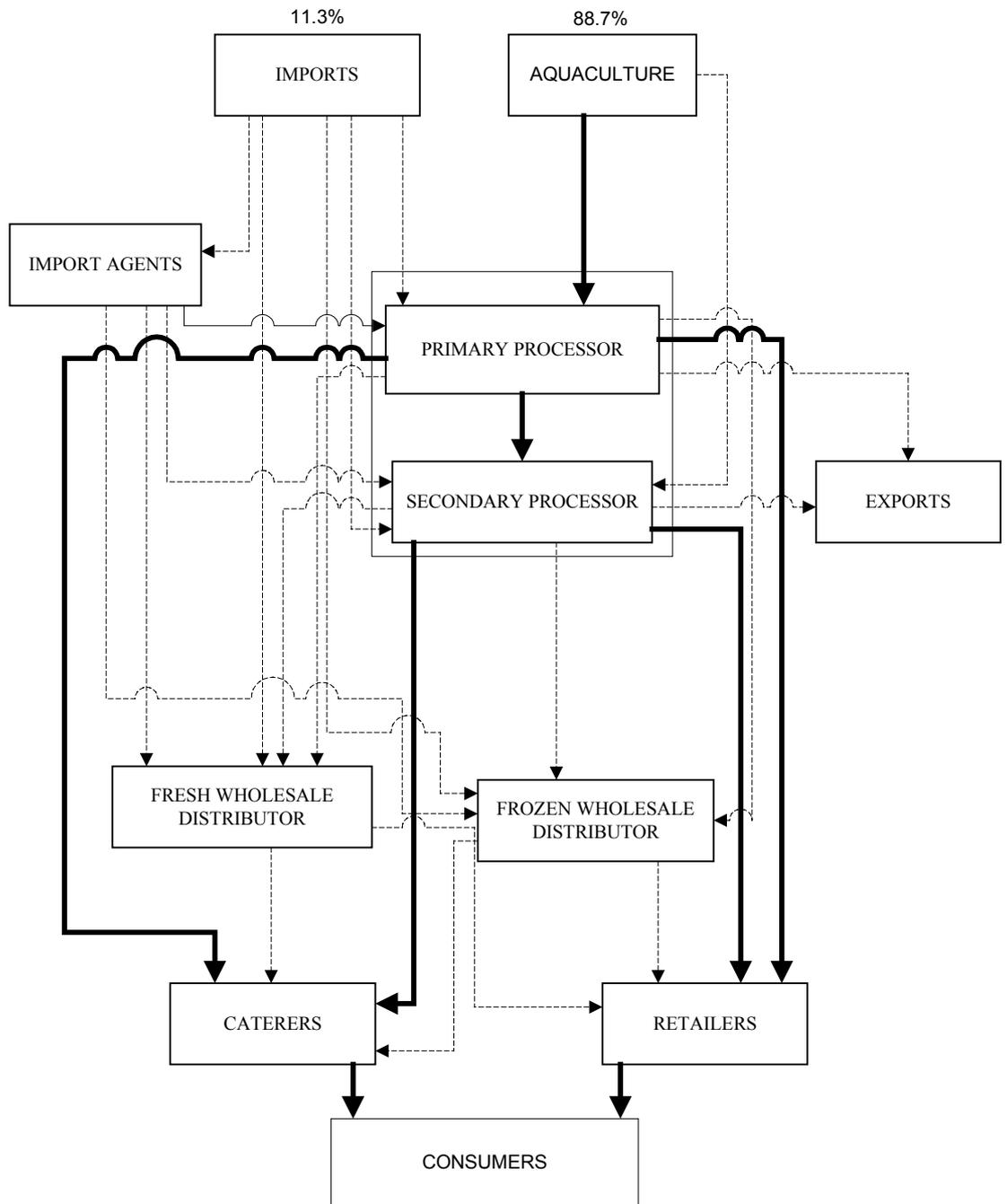
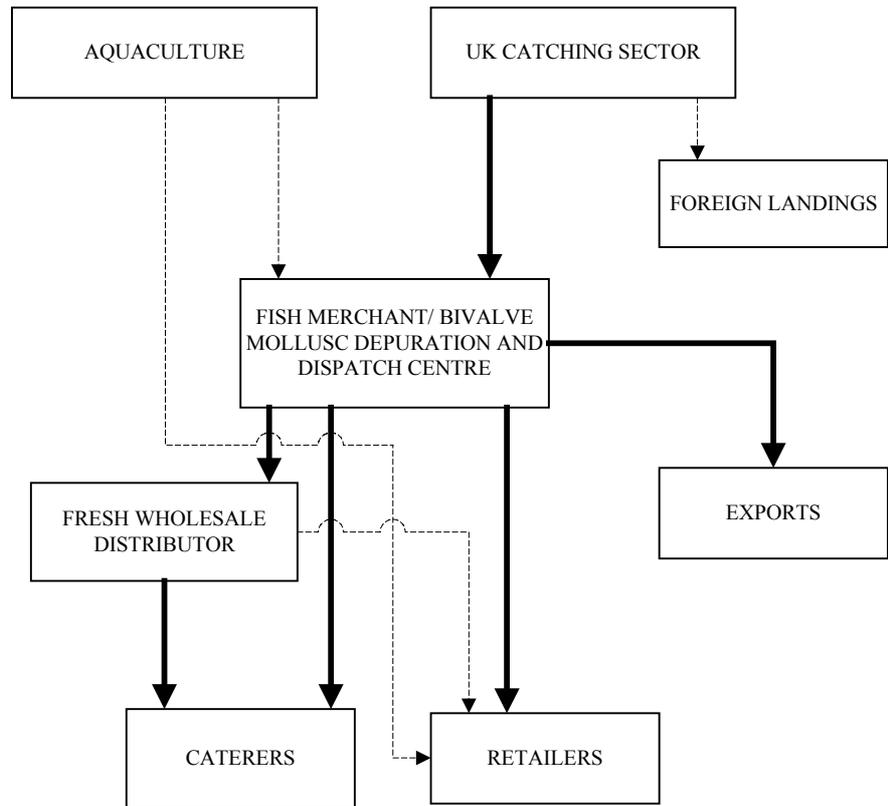
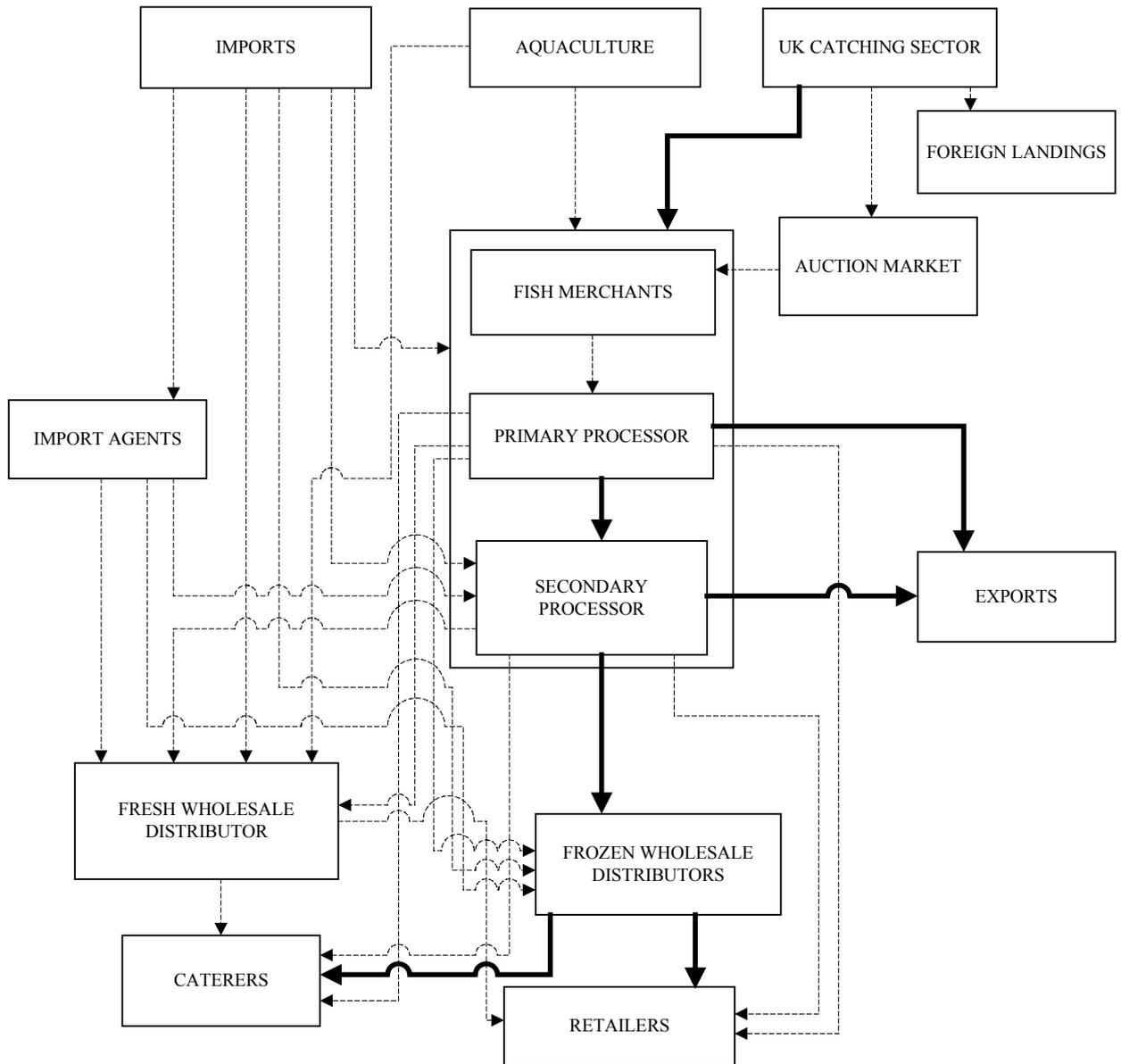


Figure 3 Finfish aquaculture (salmon & trout) distribution chain



* It is impossible to differentiate between the data on trade in processed and live shellfish hence there are no % figures for live shellfish.

Figure 4 Live shellfish distribution chain



* It is impossible to differentiate between the data on trade in processed and live shellfish hence there are no % figures for processed shellfish.

Figure 5 Processed shellfish distribution chain

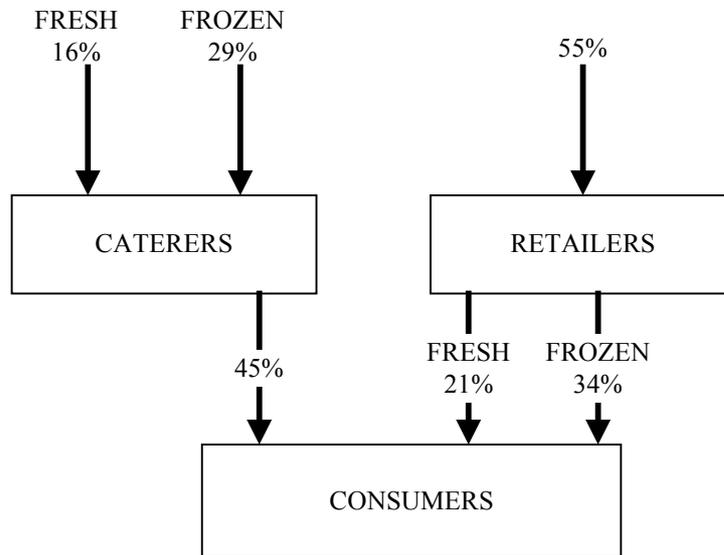


Figure 6 Distribution to the consumer – all fish and shellfish

The following table shows the market share, for fresh and frozen fish, by type of retailer.

Type of retailer	Proportion of the frozen retail market	Proportion of the fresh retail market
Multiple retailer	71.3%	64.7%
Other retailers	28.7%	35.3%